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Project Update Report for the Round 2 Sustainable Groundwater Management Grant for the Monterey Subbasin

Prepared by:

Salinas Valley Basin Groundwater Sustainability Agency

1441 Schilling Place, Salinas, CA

and

Marina Coast Water District Groundwater Sustainability Agency

920 2nd Avenue Suite A, Marina, CA

With support by:

Montgomery & Associates

EKI Environmental

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ACRONYMS & ABBREVIATIONS

180/400 Subbasin....180/400-Foot Aquifer Subbasin
AACE......................Advancement of Cost Engineering
AFY.........................acre-feet per year
ASR.........................Aquifer Storage and Recovery
AWSP ....Alternative Water Supply Project
BGRP ....Brackish Groundwater Restoration Project
CEQA......................California Environmental Quality Act
cfs............................cubic feet per second
CIP ....Capital Improvement Program
CSIP ....Castroville Seawater Intrusion Project
DWR ....Department of Water Resources
Eastside Subbasin....Eastside Aquifer Subbasin
EIR ....Environmental Impact Report
EIS...........................Environmental Impact Statement
FTE ....full time equivalent
GDP.........................gross domestic product
gpcd.........................gallons per capita per day
gpm ....gallons per minute
GSA.........................Groundwater Sustainability Agency
GSP ....Groundwater Sustainability Plan
GTAC......................Groundwater Technical Advisory Committee
HCM ....hydrogeological conceptual model
M1W ....Monterey One Water
MBGWFM.............Monterey Subbasin Groundwater Flow Model
MCWDGSA............Marina Coast Water District Groundwater Sustainability Agency
MCWRA.................Monterey County Water Resources Agency
mg/L........................milligrams per liter
MGD ....million gallons per day
MPDA.....................Monitoring Plan for the Deep Aquifers of the Salinas Valley Groundwater Basin
MPWMD.................Monterey Peninsula Water Management District
NAA........................No Action Alternative
NEPA......................National Environmental Policy Act
NSIP........................New Seawater Intrusion Project
O&M.......................operations and maintenance
PMAs ....projects and management actions
PV ....present value

QA/QC ....quality assurance / quality control
RO ....reverse osmosis
ROC ....reverse osmosis concentrate
SGBW ....Seaside Groundwater Basin Watermaster
SGM R1 Grant ....Sustainable Groundwater Management Round 1 Implementation Grant
SGM R2 Grants.......Sustainable Groundwater Management Round 2 Implementation Grants
SGMA ....Sustainable Groundwater Management Act
SIRP ....Seawater Intrusion Response Plan
SMC ....Sustainable Management Criteria
SRDF.......................Salinas River Diversion Facility
SVBGSA.................Salinas Valley Basin Groundwater Sustainability Agency
SVIHM....................Salinas Valley Integrated Hydrologic Model
SVOM ....Salinas Valley Operational Model
SVRP.......................Salinas Valley Reclamation Project
SWIM......................Seawater Intrusion Model
SWO........................Surface Water Operations
USBR ......................U.S. Bureau of Reclamation
USGS ......................U.S. Geological Survey
WEPP ....Water Efficiency Pilot Program

1 INTRODUCTION

On January 1, 2024, California Department of Water Resources (DWR) and Marina Coast Water District Groundwater Sustainability Agency (MCWDGSA) entered into Agreement Number 4600015624, a $6,447,910 Sustainable Groundwater Management (SGM) Round 2 Implementation Grant for the Monterey Subbasin (Round 2 Grant). MCWDGSA subsequently entered into a subgrant agreement with Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) allocating $3,060,610 to support SVBGSA's Monterey Subbasin related activities.

Over the past 2 years, the Round 2 Grant has supported numerous coordinated efforts by MCWDGSA and SVBGSA to improve groundwater conditions, fill data gaps, and improve regional groundwater modeling tools for the Monterey Subbasin and the adjacent subbasins in collaboration with the Seaside Watermaster. The improved groundwater models provide a stronger and more reliable technical foundation for ongoing project evaluations. Both Groundwater Sustainability Agencies (GSAs) have implemented projects and management actions (PMAs) within their respective management areas while collaborating on regional challenges, including Deep Aquifers management and SVBGSA's demand management strategy for the subbasins within its jurisdiction. The grant supported SVBGSA with developing water efficiency pilot projects targeting rural residents in areas like the Monterey Subbasin Corral de Tierra Management Area.

The grant also contributed in part to SVBGSA's continued work on project feasibility studies that were initiated under the Round 1 grant for the 180/400-Foot Aquifer (180/400) Subbasin, discussed in Section 6 of this report. These studies provide key information for understanding how effective the main groundwater management approaches to address seawater intrusion are: increasing recharge, reducing extraction, developing alternative water supplies, and creating extraction or injection barriers. This Project Update Report summarizes outcomes of PMA investigations funded through the Monterey Subbasin Round 2 Grant, other SVBGSA feasibility studies related to the Monterey Subbasin, and concurrent planning efforts undertaken by MCWDGSA. The report focuses on related groundwater sustainability challenges in the Monterey Subbasin and coordination on multi-subbasin challenges. The PMA findings included here should be viewed as an interim progress report within a broader, multi-phase planning process, not a final project selection or investment decision.

MCWDGSA and SVBGSA continue to implement an integrated approach to groundwater sustainability approach across all subbasins. PMAs are done with a Valley-wide approach, and actions focused on the 180/400 and Monterey Subbasins may have ancillary benefits to other subbasins. The report builds on the Project Update Report for the 180/400 Subbasin (SVBGSA, 2025a) and is accompanied by SVBGSA's Sustainability Strategy Report that summarizes the Salinas Valley SGM Round 2 Grant feasibility studies that SVBGSA completed concurrently.

This grant report is intended to inform ongoing work and future decision making for the next phase of Groundwater Sustainability Plan (GSP) implementation. Project concepts will continue to be refined, looked at in conjunction, and have cost estimates standardized as project alternatives are identified. The PMA findings discussed in this report are intended as an interim progress update within a broader, multi-phase planning process and should not be construed as a final project selection or investment decision.

2 CONTEXT

The Monterey Subbasin is located in a portion of the coastal Salinas Valley of Monterey County. The Salinas Valley covers an area of approximately 1,000 square miles with a footprint of over 250,000 acres of irrigated crops—including lettuce, strawberries, broccoli, artichokes, and wine grapes—generating over $3.9 billion in gross annual value at the farm. Groundwater is currently the sole source of drinking water for more than 300,000 people in urban and rural communities. The sources of groundwater recharge include precipitation, return flows from applied irrigation water, and streambed percolation from the Salinas River. Monterey County Water Resources Agency (MCWRA) operates 2 reservoirs, Nacimiento and San Antonio, that release water to the Salinas River for groundwater recharge and other purposes. Groundwater makes up more than 95 % of the water used within the Salinas Valley, supporting domestic, agricultural, and other beneficial uses. Agriculture heavily relies on groundwater, accounting for about 90% of the extractions in the Salinas Valley. Agriculture also provides 1 in 5 jobs in Monterey County, with growers producing a substantial share of seasonal leafy green production for domestic markets (Monterey County Farm Bureau, 2024).

The Salinas Valley experiences several groundwater challenges associated with overdraft, including seawater intrusion near the coast, declining groundwater levels, and loss of groundwater storage. Along the coast, the groundwater basin is a layered system of productive aquifers separated by clay-rich aquitards that restrict vertical groundwater movement. A near-surface aquitard covers much of the 180/400 Subbasin, limiting direct recharge from surface water. The upper 2 aquifers—the 180-Foot and 400-Foot Aquifers—are hydraulically connected to the Pacific Ocean, creating pathways for seawater intrusion. As groundwater pumping lowered water levels below sea level, seawater migrated inland through these connections.

Seawater intrusion is the primary management concern in the 180/400 and Monterey Subbasins, and the Langley and Eastside Subbasins are also vulnerable. Hydraulic connections across subbasin boundaries make seawater intrusion a regional issue. Groundwater exchanges with adjacent subbasins, along with surface water flows, influence groundwater conditions in the 180/400 Subbasin. Groundwater elevations inland and east of the intrusion front are well below sea level and continued to decline.

Other agencies, particularly MCWRA and Monterey One Water (M1W), operate projects to address seawater intrusion that predate the passage of SGMA. Monterey County Water Recycling Projects, which include the Salinas Valley Reclamation Project (SVRP) and the Castroville Seawater Intrusion Project (CSIP), constructed in the late 1990s, and Salinas Valley Water Project/Salinas River Diversion Facility (SRDF), constructed in 2010, provide alternative water supplies to approximate 12,000 acres in the coastal area areas of the 180/400 Subbasin adjacent to the Monterey Subbasin and Marina-Ord Area.

Managing seawater intrusion continues to be difficult for several reasons. Prolonged groundwater levels below sea level have allowed seawater to advance inland and mix with freshwater. Intruded areas exhibit elevated chloride concentrations, producing denser brackish groundwater. During recent periods of drought, new islands of seawater intrusion were detected in the 400-Foot Aquifer, where seawater-intruded groundwater flowed down from the overlying 180-Foot Aquifer. Seawater intrusion has moved inland beyond the CSIP service area and distribution system where no in-lieu irrigational supplies are available.

The Monterey GSP minimum threshold for seawater intrusion is set at the approximate location in 2015 of the 500 mg/L chloride concentration isocontour in the lower 180-Foot and 400-Foot Aquifers. It is set at approximately 3,500 feet from the coast in the Dune Sand Aquifer, upper 180-Foot Aquifer, and Deep Aquifers. This distance is generally consistent with the location of Highway 1 in the Monterey Subbasin and seaward of groundwater extraction in the Subbasin. Seawater intrusion that exceeds, or is inland of, the minimum threshold is considered an undesirable result.

In the areas between the CSIP service area and the City of Salinas, more agricultural groundwater users have shifted pumping to the Deep Aquifers, an aquifer system that underlies the 180-Foot and 400-Foot Aquifers. Over the past 2 decades, as more users have become reliant on these groundwater resources, groundwater levels in the Deep Aquifers have declined, dropping below the overlying aquifer and increasing the risk of seawater intrusion into the Deep Aquifers (Montgomery & Associates [M&A], 2024). SVBGSA and MCWDGSA share concerns over management of the Deep Aquifers, as a shared resource across multiple subbasins. This grant has supported joint efforts to develop a monitoring plan and a recommendations memorandum from the Deep Aquifers agencies working group, which includes SVBGSA, MCWDGSA, MCWRA, and County of Monterey Health Department, Environmental Health Bureau.

The Salinas Valley faces ongoing groundwater management challenges that require continued implementation of PMAs to ensure reliable supplies for both urban and agricultural users. Substantial progress has been made since the approval of the GSPs, but additional investments and coordinated efforts are needed to address groundwater management for long-term sustainability objectives. SVBGSA, MCWDGSA, with partner agencies and interested parties, will continue to improve analyses and planning and translate those efforts into improvements in groundwater conditions in the next phase of GSP implementation.

3 PURPOSE OF THE PROJECT UPDATE REPORT

GSPs identify potential PMAs to achieve groundwater sustainability. The purpose of this Project Update Report is to summarize recent PMA studies and next steps for project implementation to be included in the GSP 5-year evaluation. It attempts to summarize key findings and identify next steps to determine which PMAs should be advanced into the next phase of GSP implementation. The sections below provide an overview of MCWDGSA and SVBGSA groundwater management planning and implementation efforts completed under the grant and during this phase of GSP implementation.

This grant supported MCWDGSA, SVBGSA, and other agencies to work on issues related to the Deep Aquifers, building on the Deep Aquifers Study with additional recommendations, and to plan for near-term and long-term management to achieve groundwater sustainability as defined in the applicable subbasin GSPs. The Deep Aquifers span multiple subbasins, and implementing monitoring and management actions requires multi-agency alignment. Section 4 of this report summarizes this effort.

SVBGSA and partner agencies previously developed the Salinas Valley Seawater Intrusion Model (SWIM or SWI Model), a density-dependent groundwater flow and transport model that incorporates chloride concentrations and density effects. SWIM is an important tool used for several of the grant-funded studies. In 2025, SVBGSA updated the SWIM in collaboration with MCWDGSA in parallel with the updates to the Salinas Valley Integrated Hydrologic Model (SVIHM). In 2026, SVBGSA, MCWDGSA, and Seaside Watermaster further improved the SWIM groundwater level calibration in the Monterey and Seaside Subbasins, as well as the Deep Aquifers. SVBGSA additionally developed updated predictive Baseline Scenarios with the SWIM and the Salinas Valley Operational Model (SVOM) in support of regional and subbasin-specific PMA feasibility evaluations. The various rounds of modeling updates performed as part of the grant are summarized in Section 5.

Section 6 summarizes SVBGSA's regional project feasibility studies that have been completed in the last 2 years to address seawater intrusion. These studies have evaluated both modifying or improving existing projects and facilities or introducing new project concepts to mitigate seawater intrusion. While the studies have been focused on meeting the minimum threshold for seawater intrusion and achieving sustainability in the adjacent critically overdrafted 180/400 Subbasin, seawater intrusion is also a concern in the Marina-Ord Management Area of the Monterey Subbasin and projects are intended to have multi-subbasin benefits. SVBGSA has evaluated a number of PMA scenarios that are summarized in this report, considering whether they are effective at improving groundwater conditions, assessing project costs, and starting to evaluate economic benefits.

Section 7 and Section 8 of the report summarize ongoing PMA efforts specific to the Marina Ord and Corral de Tierra Management Areas of the Monterey Subbasin, respectively. Ongoing PMA efforts within the Marina Ord Management Area include expanding existing recycled water reuse programs, conducting feasibility studies for indirect potable reuse and aquifer storage and recovery projects, and initiating renovation of the existing Reservation Road Desalination Plant within the City of Marina. PMA efforts specific to the Corral de Tierra Management Area include developing a demand management strategy and framework and initiating a water efficiency pilot program. These efforts are collectively intended to address overdraft conditions and improve water supply resiliency through simultaneous development of additional supply sources and reduction of groundwater demands within the Monterey Subbasin. Additional modeling evaluations to be completed in support of ongoing and future PMA planning and implementation activities are summarized in Section 9.

The SGM Round 2 Grant helped both agencies advance the Monterey Subbasin from SGMA planning toward implementation. The grant expanded monitoring and data systems, strengthened stakeholder engagement, and established the technical foundation for long-term groundwater sustainability. This report highlights several milestones, and outlines next steps for completing ongoing technical studies, stakeholder coordination, and ultimately project development. It should be viewed as a progress update and is intended to satisfy grant reporting obligations and inform interested parties about groundwater management progress. Figure 1 shows the Monterey Subbasin and how it comprises the 2 management areas.

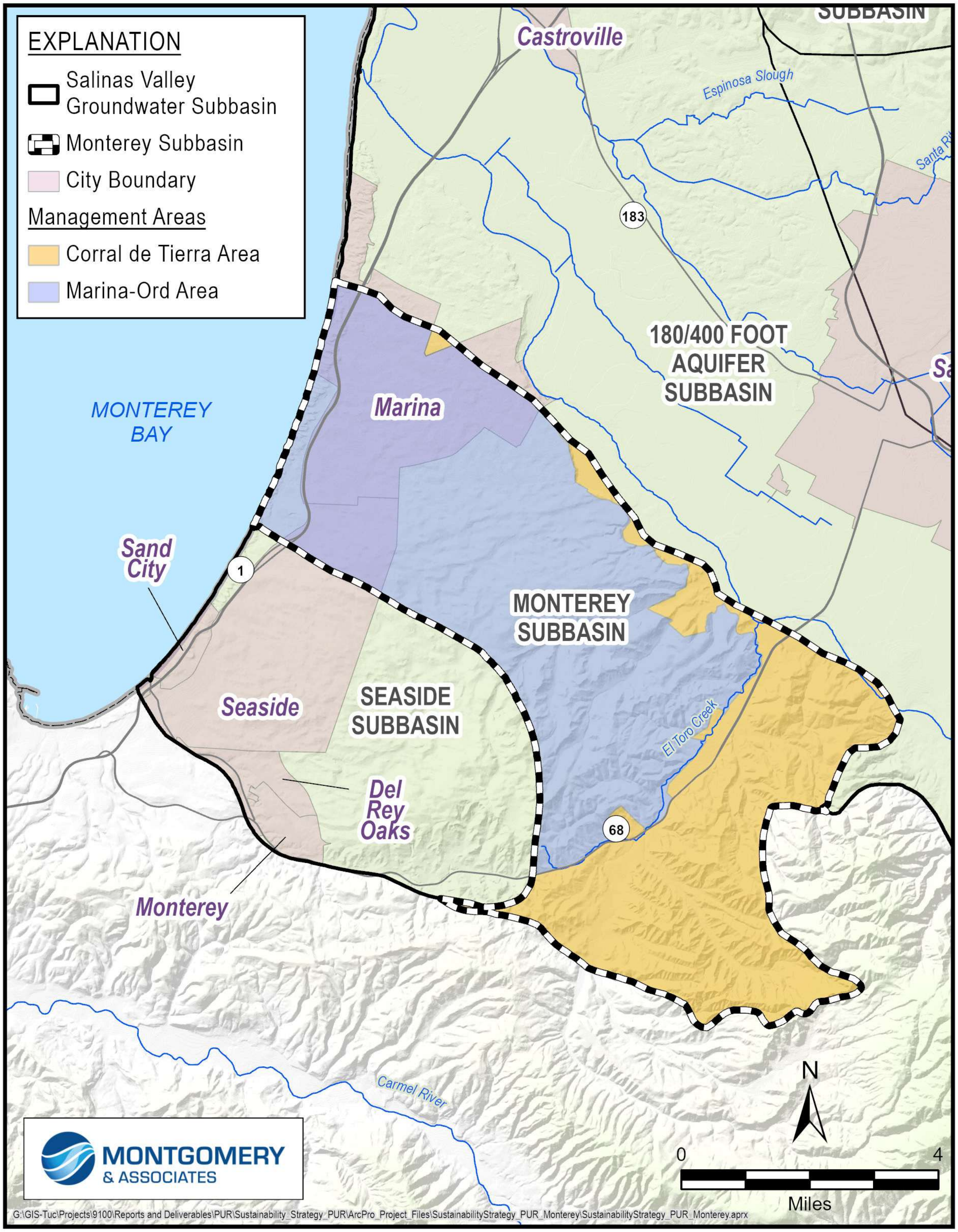


Figure 1. Monterey Subbasin Management Areas

4 DEEP AQUIFERS MANAGEMENT

The Deep Aquifers of the Salinas Valley represent a critical and increasingly relied upon groundwater resource for agricultural, municipal, and industrial uses in Monterey County. Recent scientific findings confirm that these deeper aquifer systems—once considered a protected reserve—are experiencing sustained declines in groundwater levels, driven largely by increased pumping in response to seawater intrusion in shallower aquifers. These trends have altered natural hydraulic gradients, increasing the risk of both downward and lateral seawater intrusion and raising concerns about long-term water supply reliability.

In 2021, SVBGSA worked with a cooperative group of agencies and partners to fund the Deep Aquifers Study (M&A, 2024). In January 2022, SVBGSA initiated the Study with funding from other sources. Component 8 planned for completion of the Study and subsequent tasks to develop recommendations based on the final Study. The Study, including developing the hydrogeologic conceptual model, water budget, and guidance for management, took 2 years to complete. The grant supported moving the Study through final peer review and publication, including revisions based on comments from the Groundwater Technical Advisory Committee (GTAC) administrative draft review of the Study in the spring of 2024.

The Study was released for public review on May 2, 2024, followed by presentations to the SVBGSA Board (May 8, 2024), MCWDGSA Board (May 20, 2024), and MCWRA Board (June 17, 2024). During this same period, partner agencies began organizing a working group to plan next steps. Since the fall of 2024, a collaborative working group of entities with water management authority in the Salinas Valley Groundwater Basin have been meeting to develop recommendations for the Deep Aquifers based upon the Study. The County of Monterey, the MCWDGSA, MCWRA, and the SVBGSA, collectively referred to as Deep Aquifers Working Group.

Since that time, the working group has been meeting regularly to develop a monitoring plan and recommendations. This grant supported the agencies working agency partners to build on the Study with additional recommendations and to plan for near-term and long-term management to achieve groundwater sustainability as defined in the applicable subbasin GSPs. The Deep Aquifers span multiple subbasins, and implementing monitoring and management actions requires multi-agency alignment.

4.1 Deep Aquifers Memorandum

The Deep Aquifers Study provided the most comprehensive understanding to date of the hydrogeologic structure, water budget, and risks facing these aquifers. The study confirms that the Deep Aquifers have limited natural recharge, slow groundwater movement, and increasing extraction pressures, resulting in annual storage declines of approximately 9,000–10,000 acre-feet. Monitoring data since the study's completion indicate that groundwater levels continue to fall below established sustainability thresholds across much of the groundwater basin, with undesirable results observed consistently under SGMA criteria.

GSP evaluations for the 180/400 Subbasin and Monterey Subbasin confirm that Sustainable Management Criteria (SMC) for groundwater levels and seawater intrusion are not being met in the Deep Aquifers. Monitoring data indicate that a substantial proportion of representative monitoring sites exceed minimum threshold exceedance criteria, with undesirable results observed consistently in recent water years. These findings indicate that current extraction patterns exceed sustainable conditions and that corrective management actions are required to achieve SGMA objectives.

In this context, the Deep Aquifers Memorandum establishes a technical and institutional framework for managing the Deep Aquifers within existing statutory authorities and SGMA planning processes. The memorandum does not prescribe new regulatory requirements but identifies a suite of management considerations, projects, and implementation pathways that may be evaluated and adopted by responsible agencies.

Near-term management considerations focus on risk mitigation and demand-side controls, including:

- Enhanced well permitting review incorporating hydrogeologic and sustainability criteria
- Targeted well destruction to eliminate preferential pathways for vertical migration
- Implementation of demand management measures (e.g., allocations, fees, and conservation programs) in areas exhibiting undesirable results
- Development of a Seawater Intrusion Response Plan (SIRP) with defined monitoring triggers and response actions

Long-term management strategies emphasize supply augmentation and aquifer replenishment, including:

- Aquifer Storage and Recovery (ASR) using diverted surface water
- Injection of advanced-treated recycled water (Indirect Potable Reuse)
- Brackish groundwater extraction and treatment
- Expansion and optimization of recycled water distribution systems
- Brackish water desalination or other alternative supply sources to offset groundwater demand

These project-based approaches are intended to increase groundwater elevations, reduce net extraction from the Deep Aquifers, and mitigate both vertical and lateral seawater intrusion risks.

The memorandum further supports an adaptive management framework consistent with SGMA requirements. This framework relies on continued expansion of monitoring networks, refinement of integrated groundwater models (e.g., SVIHM and SWIM), and periodic reassessment of groundwater conditions through annual reporting and 5-year GSP evaluations. Management actions may be adjusted over time based on updated data regarding groundwater elevations, storage trends, hydraulic gradients, and water quality.

Given the regional extent of the Deep Aquifers across multiple subbasins and jurisdictions, effective management requires interagency coordination in monitoring, data sharing, and technical evaluation. However, implementation authority remains with individual agencies, including GSAs, the County of Monterey, MCWRA, and MCWD, each acting within its respective statutory and regulatory framework.

4.2 Deep Aquifers Monitoring Plan

The Deep Aquifers Study included "...recommendations for refining existing monitoring networks to track trends, identify changes, and enhance the understanding of groundwater conditions in the Deep Aquifers" (M&A, 2024). The Monitoring Plan for the Deep Aquifers in the Salinas Valley Groundwater Basin (MPDA) was prepared by the MCWRA for the Deep Aquifers Working Group. It captures the monitoring recommendations from the Deep Aquifers Study and presents an approach for enhancing and expanding the historical network of monitoring wells and methods to improve regional understanding of the Deep Aquifers in the Salinas Valley Groundwater Basin and minimize or eliminate identified data gaps.

Monitoring of groundwater conditions in the Deep Aquifers for resource management is conducted by MCWDGSA, MCWRA, the Monterey Peninsula Water Management District (MPWMD), and the Seaside Groundwater Basin Watermaster (SGBW), collectively referred to herein as "Monitoring Entity" or "Monitoring Entities." The MPDA suggests that the Monitoring Entities continue their individual data collection efforts where appropriate and proposes alignment of methodologies and timing for collection and exchange of data from the Deep Aquifers.

The focus of the MPDA is collection of groundwater extraction and injection, elevation, and quality data. The MPDA assumes that data management for all wells in the MPDA will be conducted by MCWRA, and that collection and reporting of data will occur by the Monitoring Entities in accordance with existing plans or agreements that have been established to meet regulatory requirements such as GSPs. As defined in the Deep Aquifers Study, Deep Aquifers Memorandum, and MPDA, the lateral extent of the Deep Aquifers is shown on Figure 2.

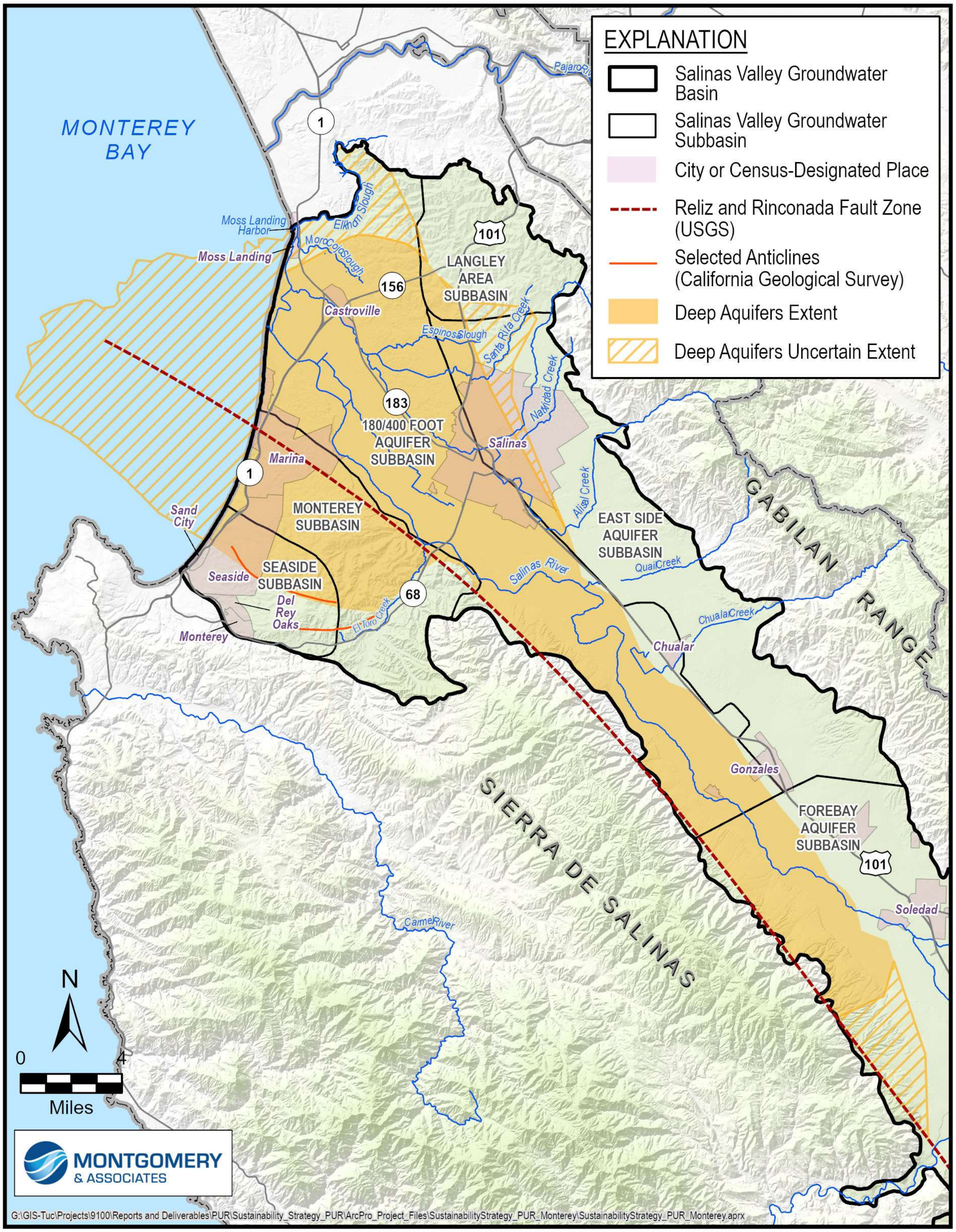


Figure 2. Deep Aquifers Extent

5 GROUNDWATER MODELING UPDATES

Multiple hydrologic models have been developed in support of ongoing SGMA planning and implementation efforts within the Salinas Valley. Groundwater models that cover the Monterey Subbasin include:

- The Salinas Valley Integrated Hydrologic Model (SVIHM)
- The Salinas Valley Operational Model (SVOM)
- The Seawater Intrusion Model (SWIM)
- The Monterey Subbasin Groundwater Flow Model (MBGWFM)

The various groundwater models serve complementary purposes and are often used together. The SVIHM is an integrated hydrologic flow model originally developed by the United States Geological Survey (USGS) to simulate historical groundwater levels and evaluate hydrologic budgets for across the Salinas Valley Basin. The SVOM is the predictive version of the SVIHM designed to evaluate the integration of reservoir operations and projects within the Salinas Valley. The SWIM is a variable-density groundwater flow and transport model developed by SVBGSA that simulates chloride movement within the coastal portion of the Salinas Valley Basin that is affected by seawater intrusion. The MBGWFM is a groundwater flow model developed by MCWDGSA to evaluate groundwater budgets and PMA implementation scenarios within the Monterey Subbasin as part of the 2022 Monterey GSP.

Each of these models were developed by different entities at different timeframes for specific purposes and therefore reflect unique design features and functionalities. However, the models at least partially overlap regionally (including within the Monterey Subbasin) and temporally, and thus should be aligned to the greatest extent possible in terms of their underlying hydrogeologic framework, aquifer properties, and hydrologic and aquifer stress assumptions (e.g., recharge and pumping rates). This alignment allows both models to reasonably and consistently reflect the best available data and information within the Basin and can continue to serve as useful tools for coordinated, regional SGMA planning and implementation actions within greater Salinas Valley Basin.

As part of this grant, multiple rounds of updates were completed to the SVIHM and SWIM to bring the models into greater alignment with each other and the MBGFWM resulting in improved calibration to historical water level and chloride conditions and comparable—though not identical—outputs within the Monterey Subbasin and greater Salinas Valley Basin. A more detailed description of updates completed to each of the models is provided below.

5.1 Salinas Valley Integrated Hydrologic Model (SVIHM) Updates

The SVIHM simulates coupled surface water and groundwater processes across the Salinas Valley using MODFLOW-OWHM Version 2, which represents dynamic interactions between water supply, water demand, and groundwater flow. Agricultural demands are estimated internally based on land use and climate inputs and are met through a combination of precipitation, recycled water, surface water diversions and deliveries, and groundwater pumping.

The original version of the SVIHM was developed by the USGS and publicly released in April 2025 (Henson *et al.*, 2025). The SVIHM simulates historical conditions and serves as the foundation for its predictive version, the SVOM, which is used for future projections. While the SVIHM and SVOM are the best available tools for regional groundwater management evaluations across the Salinas Valley, their development began prior to the development of GSPs and for objectives that were not entirely aligned with SGMA compliance needs. In particular, the SVIHM was poorly calibrated to historical groundwater levels in the Monterey and Seaside Subbasins, did not reflect the most updated hydrogeologic conceptual model of the Basin, and did not incorporate the latest data and information collected within the Basin including that obtained from the Deep Aquifers Study described in Section 4 above.

During 2025, SVBGSA modelers completed a comprehensive update and recalibration of the SVIHM in efforts to reflect the most current understanding of groundwater conditions within the groundwater basin and enhance the model's utility for long-term SGMA compliance and implementation efforts. Several aspects of the SVIHM were updated to better align with the current hydrogeologic conceptual model and other existing models within the Basin (such as the SWIM and the MBGWFM) and to improve accuracy of model results. These enhancements included:

- Incorporation of new data unavailable during the original USGS model development
- Structural updates to the model grid, layering, and zonation
- Improved representation of surface water features to simulate groundwater-surface water interactions
- Refined input parameters, including municipal and agricultural pumping
- Updated boundary conditions at the model domain margins

These updates were completed in coordination with MCWDGSA, MCWRA, SGBW, and Arroyo Seco GSA. The SVIHM and SWIM were updated concurrently, using the same aquifer framework and similar model parameters as further described in Section 5.2 below.

The updated SVIHM, referred to herein as SVIHM Version 1 (v1), is improved over the original version and provides a well-calibrated base model for developing the SVOM for simulating future conditions, as further described in Section 6 below. Nevertheless, SVIHM calibration within the Monterey and Seaside Subbasins remains a subject for additional improvement and will be the focus of future model refinements as further described in Section 9 below. A more detailed description of SVIHM (v1) updates and calibration results is provided in the October 2025 technical memorandum titled Updates to the Salinas Valley Integrated Hydrologic and Reservoir Operations Models (M&A, 2025a).

5.2 Seawater Intrusion Model (SWIM) Updates

The Monterey Subbasin Round 2 Grant supported 2 SWIM updates, resulting in Version 3 (v3) in 2025 and Version 4 (v4) in 2026.

5.2.1 SWIM Version 3 (2025)

The SWIM was originally developed by SVBGSA in 2023 as a tool to assess the effectiveness of projects and management actions that address seawater intrusion in the coastal portions of the Salinas Valley (M&A, 2023). SVBGSA updated the model in 2024 to incorporate improvements to the hydrogeological conceptual model (HCM) and ensure consistency between the SWIM and existing adjacent and overlapping groundwater flow models, resulting in Version 1 and Version 2, respectively.

As mentioned above, during 2025 SVBGSA and MCWDGSA modelers completed an additional round of updates to the SWIM to be consistent with the updated SVIHM v1, referred to herein as SWIM v3, Refinements to the SWIM v3 primarily focused on updating boundary conditions, hydraulic conductivity, and storage model parameters to match the SVIHM, including:

- Updating the model hydrogeologic parameter zonation and active extent
- Adjusting recharge assumptions
- Updating well locations, screen intervals, and pumping data to most recent information available as reflected in the SVIHM and GEMS
- Adding flow barriers to represent faults in Monterey and Seaside subbasins
- Implementing hydraulic conductivity and storage parameters consistent with the SVIHM
- Extending the simulation period to October 2022

Both the SVIHM and SWIM were updated simultaneously as information was passed between the models during calibration. These improvements harmonize both models with the current HCM, creating tools that can interact seamlessly to better simulate historical and future groundwater conditions and seawater intrusion in Salinas Valley. A more detailed description of SWIM v3 updates and calibration results is provided in M&A, 2025b.

5.2.2 SWIM Version 4 (2026)

During the update to SWIM v3, it became clear that achieving a tighter water-level calibration across the Deep Aquifers, particularly within the southern Monterey and Seaside Subbasins, and in the Corral de Tierra Area was more challenging than expected. Upon further review and analysis of model outputs, it was determined that more in-depth collaboration with the SGBW and MCWDGSA modeling consultants would be necessary to focus on the hydrogeologic representation of the Paso Robles and Santa Margarita Formations to further improve model calibration in these areas.

During late 2025 and early 2026, modelers from MCWDGSA and SVBGSA collaborated with the SGBW's modeler to complete another round of updates to the SWIM in attempts to address the shortcomings described above, resulting in SWIM v4. These revisions focused on improving groundwater level calibration in the Monterey and Seaside Subbasins and in the Deep Aquifers across the entire domain. Refinements to the SWIM v4 included:

- Further adjusting hydrogeologic zonation and fault representations within the Seaside Subbasin and Corral de Tierra Area
- Adjusting recharge assumptions within the Seaside Subbasin
- Modifying offshore general head boundary condition cell extents and conductance properties
- Reconciling Seaside production well locations, screen intervals, and pumping data based on updated data and interpretations from the SGBW
- Reconciling Seaside monitoring well layer assignments and observation data based on updated data and interpretations from the Seaside Watermaster
- Updating hydraulic conductivity and storage properties throughout all model aquifers and subbasins

The updated SWIM v4 reflects a significant improvement in groundwater level calibration within the Deep Aquifers and in the southern Monterey and Seaside Subbasins and continues to meet acceptable water level and chloride-+ calibration criteria throughout the rest of the model domain. The SWIM v4 is intended to serve as the primary tool for groundwater modeling of regional projects in the coastal subbasins, as well as for analyses of the Corral de Tierra Area and the Deep Aquifers, moving forward. Model documentation for the SWIM v4 is forthcoming. A more detailed description of future groundwater modeling efforts to be completed by the MCWDGSA and SVBGSA is provided in Section 9.

6 REGIONAL PROJECT FEASIBIILITY STUDIES

SVBGSA has been studying several projects to address groundwater conditions and achieve sustainability within its jurisdiction. As noted in the Agreement Number 4600015624 Component 3 work plan, the GSAs have continued to work on implementation of GSP PMAs, including project scoping and analysis of potential project benefits and feasibility, building upon the feasibility study and engineering analysis of regional projects conducted under SVBGSA's Round 1 SGM Grant for the 180/400 Subbasin. The following sections include summaries and key findings of SVBGSA's project feasibility studies focused on addressing seawater intrusion, although most of this work was funded by SVBGSA's other grants.

Further modeling work and coordination with MCWDGSA will continue after this grant term to evaluate regional project benefits and impacts on the Monterey Subbasin. Projects under consideration in the adjacent subbasins are discussed here to inform the Monterey Subbasin GSP 5-year evaluation and review of PMAs. Beyond the grant term in 2026, SVBGSA, MCWDGSA and other interested parties will continue working on modeling and evaluations of multi-project scenarios or combinations of PMA.

6.1 Groundwater Model Baseline Scenarios for Analysis of New PMAs

The potential for PMAs to improve groundwater levels and reduce seawater intrusion is evaluated primarily through groundwater modeling using 2 models: the SVOM and the SWIM. Simulated PMA groundwater impacts are compared against SVOM and SWIM Baseline Scenarios, which represent projected groundwater conditions with no additional projects or management actions. These Baseline Scenarios reflect a status quo condition with respect to land use and agricultural pumping, with current infrastructure and water project operations remaining unchanged. Municipal pumping changes based on population projections. As a result, the Baseline Scenarios may include continued impacts to sustainability indicators, including the potential exceedance of defined minimum thresholds.

The projected hydrology used in the SVOM and SWIM Baseline Scenarios is a representative 25-year climate sequence based on historical hydrology, repeated twice over the projection period to support water budget analysis across a range of hydrologic conditions. Actual future climate is unknown; however, this provides a representative estimate through which the effects of potential projects can be assessed. The Baseline Scenarios include estimates of sea level rise, but do not include potential effects from climate change on precipitation or potential evapotranspiration.

The Baseline Scenarios provide a consistent reference for evaluating the physical effects of new PMAs on pumping, groundwater levels, and seawater intrusion. They allow for comparison of near-term groundwater conditions, assuming minimal changes in agricultural, urban, or other water uses beyond actions already implemented. Their purpose is to support a consistent assessment of physical and technical outcomes across PMAs evaluated in this section.

The Baseline Scenarios are distinct from the No Action Alternative (NAA), which is developed to represent a future "without-project" condition for the 180/400 Subbasin. The NAA is applied to PMA feasibility studies addressing seawater intrusion and considers how basin management and pumping would realistically change in the future in the absence of planned capital projects. The NAA is different than the Baseline Scenarios. The Baseline Scenario reflects pumping continuing at approximate current levels and is a technical reference for physical impact analysis. The NAA reflects plausible future conditions in the absence of a project to address seawater intrusion.

6.1.1 SVOM Projected Baseline Scenario

Project scenarios are derived from a common future SVOM Baseline Scenario (M&A, 2026a), and then results are compared to the Baseline Scenario to isolate the effect of the project. SVOM Version 1 (v1) is based on the SVIHM (v1) described in Section 5.1. above.

Documented in M&A 2026, the Baseline Scenario is a status quo simulation with no additional projects or management actions. It assumes future conditions with urban growth and static agricultural land use and crops at WY 2022. The projected hydrology used in the SVOM and SWIM Baseline Scenarios is a representative 25-year climate sequence based on historical hydrology, repeated twice over the projection period to support water budget analysis across a range of hydrologic conditions. The sequence corresponds to the hydrology of water years 1993, 2019, 1975, followed by 1999-2020 to best match observed recent conditions and provide a representative mix of wet and dry years. Actual future climate is unknown; however, this provides a representative estimate through which potential projects can be assessed.

The SVOM Baseline Scenario uses the Surface Water Operations (SWO) module to dynamically simulate operations of Nacimiento and San Antonio Reservoirs. Reservoir releases are calculated in response to climatic inputs, reservoir operating rules, CSIP demands, and simulated Salinas River flows. Salinas River flows are in turn influenced by reservoir releases, tributary inflows, and surface water–groundwater exchange. For project scenarios aiming to isolate the effect of a particular project or management action, the SWO module was omitted, and reservoir releases and SRDF diversions from the future Baseline Scenario were applied as fixed inputs. This approach isolates the groundwater system response to proposed project actions while maintaining consistency in upstream reservoir operations across scenarios.

6.1.2 SWIM Projected Baseline Scenario

The projected SWIM Baseline Scenario (M&A, 2026b) is developed with SWIM v3 of the SWIM, and it includes similar assumptions to the SVOM Baseline Scenario. It includes the same climate sequence as the SVOM Baseline Scenario. Municipal pumping, agricultural pumping, recharge, and groundwater levels and the Chualar boundary from the SVOM are included in the SWIM Baseline Scenario.

In the SWIM Baseline Scenario, seawater intrusion in the 180-Foot and 400-Foot Aquifers continues advancing inland from 2020 through 2070, as shown on Figure 3. In both the 180-Foot and 400-Foot Aquifers, seawater intrusion advances inland toward the City of Salinas because groundwater elevations remain below sea level.

Figure 4 shows the projected chloride concentrations for the 180-Foot and 400-Foot Aquifers at 2040. Seawater has a concentration of approximately 19,000 mg/L and the threshold for sustainability is set at 500 mg/L. The color gradation shows the chloride concentration, with the red indicating chloride levels closer to seawater, transitioning to lower chloride concentration in blue. The 500 mg/L chloride isocontour is marked by the black dashed line. The blue colors extend into the Eastside Subbasin, projecting that by 2040, chloride concentrations will begin to increase in the Eastside Aquifer at equivalent depths to the 180-Foot and 400-Foot Aquifers.

Finally, Figure 4 marks the seawater intrusion minimum threshold with a black solid line, showing that at 2040 seawater intrusion is inland of the minimum threshold. While the GSP minimum threshold is established based on the mapped 2017 extent of the 500 mg/L chloride isocontour, the SWIM-simulated 2017 500 mg/L chloride isocontour is shown as the minimum threshold for the purposes of comparing modeling results to other modeling results.

Figure 5 shows the 2040 to 2065 groundwater level change in the SWIM Baseline Scenario. It matches the declining trend of the SVOM Baseline Scenario across most of the northern part of the Valley. Toward the northeastern part of the Eastside Subbasin, the SWIM Baseline Scenario shows slightly larger declines than the SVOM Baseline Scenario, mostly in the 5- to 10-foot range but reaching up to 20 feet in the very northeastern corner. Observed groundwater level trends in Eastside Subbasin fall between the more rapid decline simulated by the SWIM and gradual decline simulated by the SVIHM, which suggests projected groundwater levels would decline at rates between the SWIM and SVOM Baseline Scenarios. Overall, both models show a continuation of the declining groundwater level trends.

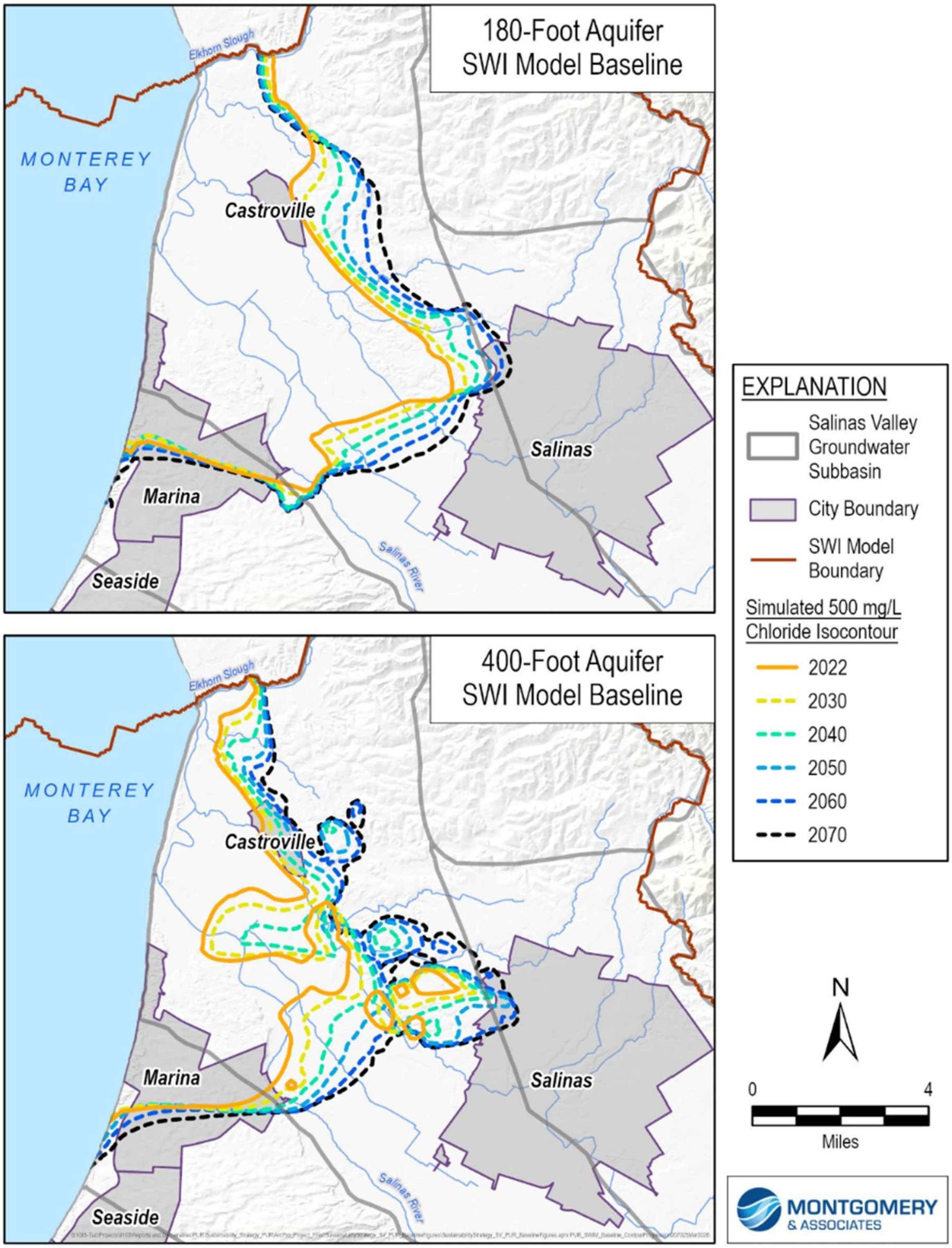


Figure 3. SWIM Baseline Scenario Projected Chloride Isocontour Progression in the 180-Foot Aquifer and 400-Foot Aquifer

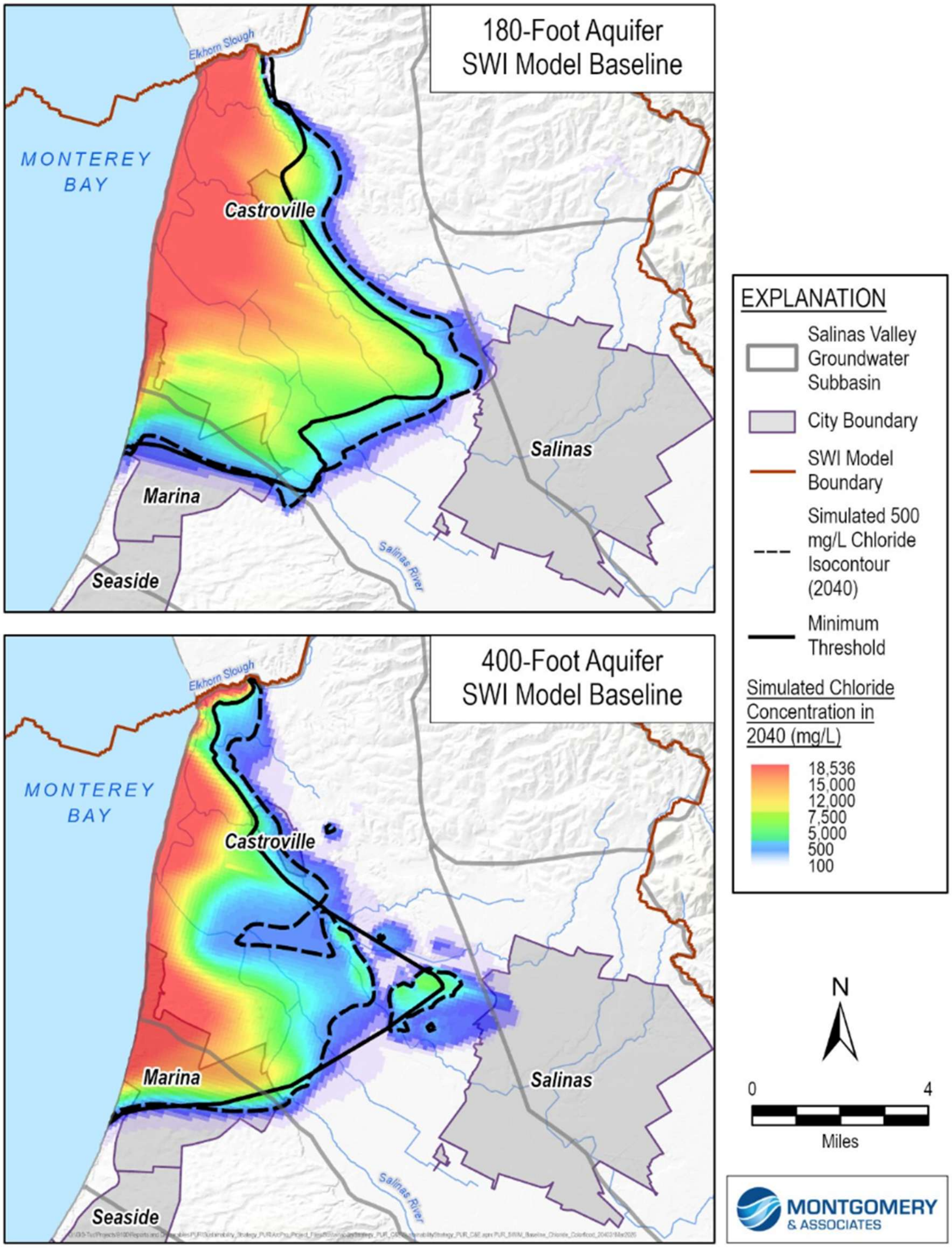


Figure 4. SWIM Baseline Scenario Chloride Concentration in the 180-Foot Aquifer and 400-Foot Aquifer

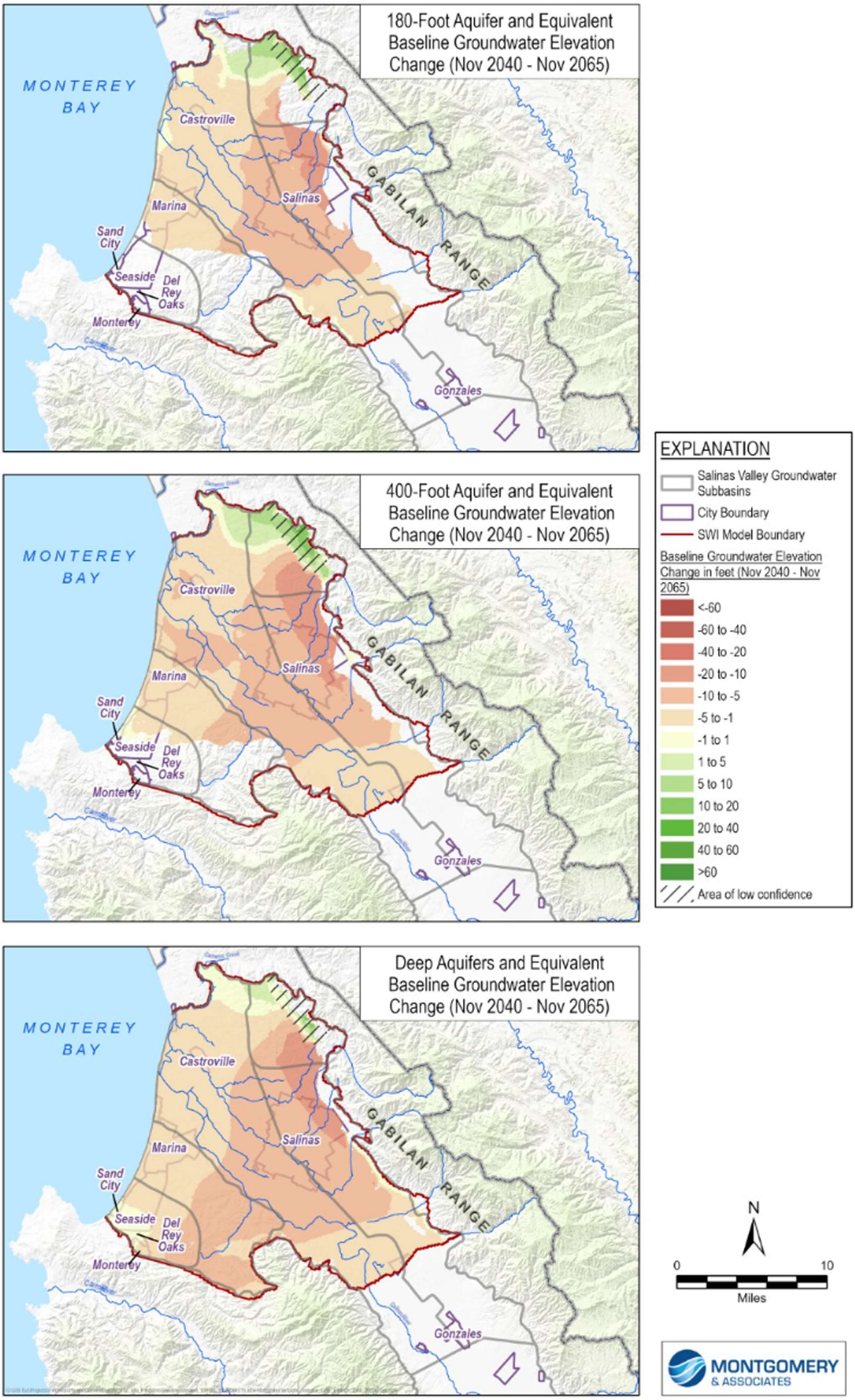


Figure 5. SWIM Baseline Scenario Projected Groundwater Elevation Change

6.2 Aquifer Storage and Recovery

The Monterey Subbasin GSP Chapter 9, Section 9.4.1 identifies a regional project, R1 – Seasonal Releases from Reservoirs, a project also identified in the 180/400 GSP. The GSP project identifies diverting additional wet season flows to aquifer storage and recovery (ASR) for use in either the CSIP area or for direct delivery for municipal use. SVBGSA prepared a feasibility study for the GSP project to use the SRDF and CSIP to further address seawater intrusion in the 180/400 Subbasin. Additional study is needed for a direct delivery project scenario.

SVBGSA and M&A, working together with MCWRA, evaluated whether ASR could serve as a viable tool to slow or reverse seawater intrusion in the critically overdrafted 180/400 Subbasin. These culminated in the Preliminary Feasibility Study: Aquifer Storage and Recovery Projects Concepts to Address Seawater Intrusion (SVBGSA and M&A, 2025)[1]. The ASR approach involves diverting surface water during periods of availability, treating it to appropriate standards, and injecting it into aquifers along the coast. The aquifers effectively function as temporary storage reservoirs, holding the water until it is later withdrawn for beneficial use. By raising groundwater levels inland of the intrusion zone, this concept is intended to create hydraulic pressure that helps repel seawater, while also providing supplemental supplies during the irrigation season.

The goal of the preliminary feasibility study was to complete a conceptual analysis that explored the potential for the ASR project concepts described in the 180/400 Subbasin and Monterey Subbasin GSPs. The study evaluated the ability for ASR to achieve sustainability goals to address seawater intrusion in the 180/400 Subbasin, as well as for using ASR to address related chronic declining groundwater levels below sea level. Tasks focused on key relevant aspects that would inform a more robust and comprehensive feasibility study in a later phase.

Specific objectives of the preliminary feasibility work include the following:

1. Assess if and how the existing infrastructure poses constraints with respect to the project concept.
2. Review water rights and permitting requirements and identify the permitting and regulatory steps that would be needed for the project concept to proceed.
3. Conduct preliminary analysis of water quality and develop a water quality sampling plan.
4. Evaluate the availability of source water for aquifer injection.

[1] Available at: https://svbgsa.org/wp-content/uploads/2025/01/ASR-FS-Report-compressed.pdf.

5. Evaluate if this project concept could effectively achieve GSP goals to mitigate seawater intrusion in the 180/400 Subbasin.

6.2.1 Project Scenarios

The ASR study focused on 2 project scenarios that illustrate different strategies for implementing ASR in the Salinas Valley. The first project concept from the GSP, Seasonal Release with ASR, builds on existing reservoir infrastructure but requires changes to operations. The second project concept was identified through the study, New Diversion of Winter High Flows for ASR, with Alternatives 1 and 1A. This ASR approach proposes new facilities to take advantage of natural high flows. Both share the same overarching goals: raise groundwater levels, reduce seawater intrusion, and strengthen water supply reliability for agriculture and communities.

ASR Project Concept 1: Seasonal Release with Aquifer Storage and Recovery

Seasonal Release with ASR uses existing reservoir and diversion infrastructure in the Salinas Valley and alters their operation. Under current operations, MCWRA releases water from the Nacimiento and San Antonio Reservoirs primarily during the summer and fall months to meet irrigation demands and environmental requirements. This project concept proposes shifting those releases to the winter and spring—when surface water is not needed as much for irrigation—as a source of water to inject into the aquifers for storage and later use.

The water will be diverted at the SRDF and then conveyed to a treatment facility where it will be processed to meet the standards required for groundwater injection. From there, the treated water will be delivered to newly constructed ASR wells located inland of the seawater intrusion front. Separate wells will be installed in both the 180-Foot and 400-Foot Aquifers, along with supporting infrastructure such as back-flush systems, percolation basins, and electrical controls.

The purpose of this injection is twofold. First, it will raise groundwater elevations inland of the intruded area, creating hydraulic pressure to slow or repel the advance of seawater. Second, the aquifers will serve as storage, allowing a portion of the injected water to be recovered later during the summer and fall to supplement supplies for the CSIP, since the SRDF diversions will not be in operation during the typical summer months to supply surface water to CSIP customers. In this way, the Seasonal Release with ASR concept seeks to protect groundwater quality and provide a flexible water supply for agriculture.

ASR Project Concept 2: New Diversion of Winter High Flows for Aquifer Storage and Recovery (Alternatives 1 and 1A)

The second project concept emerged from recognition of the operational challenges associated with shifting reservoir releases and is referred to as New Diversion of Winter High Flows for

ASR. This project concept proposes constructing a 45 cubic feet per second (cfs) new diversion facility along the Salinas River to capture high winter flows directly, rather than relying on stored reservoir water.

By creating a separate diversion system, this approach avoids the complexities of modifying reservoir operations, which must balance flood control, environmental flows, and multiple settlement agreements. Instead, the new facilities will be designed specifically to handle the variable and high velocity flows of the winter season. Water captured through this approach will be conveyed to treatment facilities and then injected into ASR wells in the 180-Foot and 400-Foot Aquifers, similar to the Seasonal Release concept. Two scenarios to this approach were evaluated, with Alternative 1 injecting water into both aquifers, while Alternative 1A injects all diverted water only into the 400-Foot Aquifer to maximize the benefits to this aquifer with the available water to divert.

Like the Seasonal Release with ASR concept, the goal is to raise groundwater elevations inland of the seawater intrusion front, thereby reducing the landward movement of saline water. The main difference is that both Alternatives 1 and 1A scenarios do not change the CSIP surface water supply and therefore, there is no need to pump groundwater out of the ASR wells in the summer months. In other words, by separating the diversion process from SRDF normal operations, in Alternatives 1 and 1A, SRDF diversions and CSIP current operations continue. Therefore, New Diversion of Winter High Flows provides for the design of a parallel system to the current SRDF/CSIP system to avoid existing constraints on integrating ASR. This allows for more flexibility in operations for the ASR project concept.

Figure 6 shows the infrastructure layout for New Diversion of Winter High Flows Alternatives 1 and 1A scenarios. Other than the ASR wells that are based on the location of the seawater intrusion front, general locations were used for development of these scenarios. If project scoping continues, detailed analysis of land use and well siting will be needed.

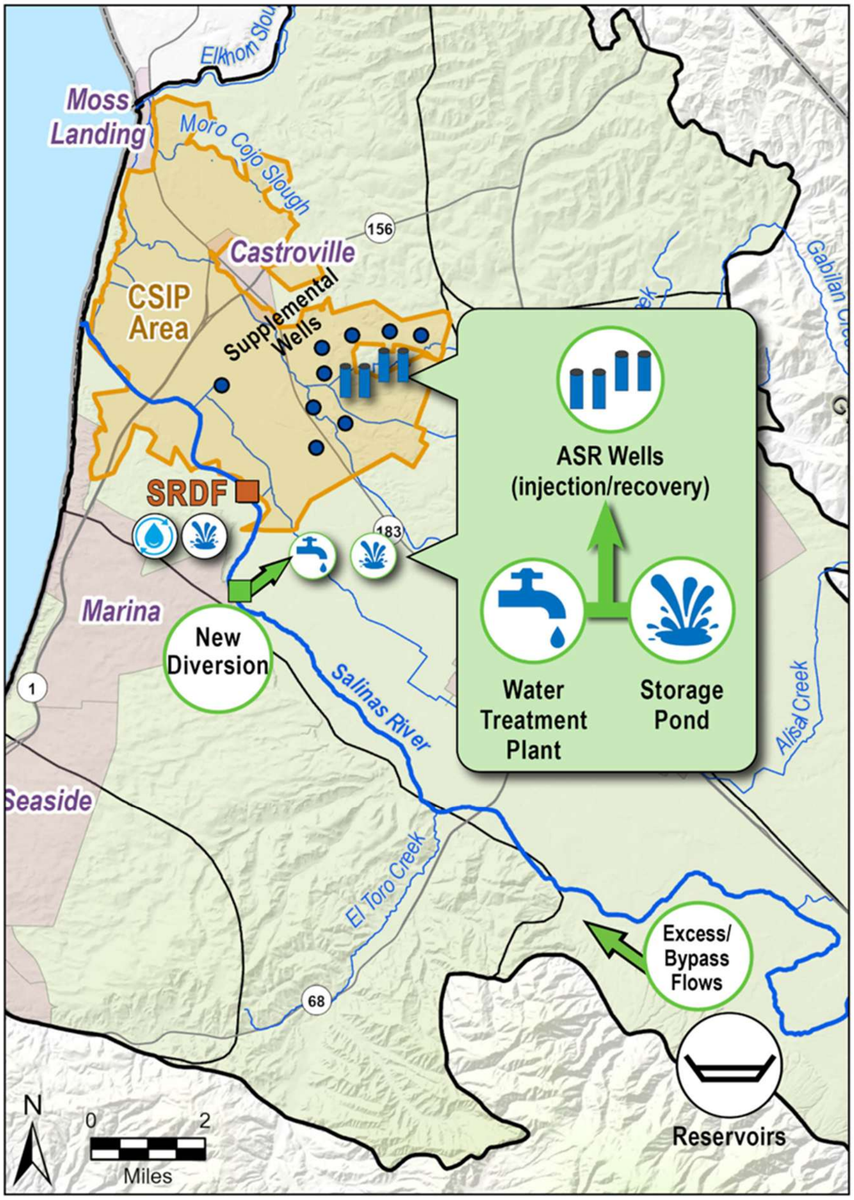


Figure 6. ASR Alternative 1 and 1A System Components

6.2.2 Cost Estimates

The standardized planning-level cost estimates of the ASR scenarios are shown in Table 1. The cost is broken down into total construction costs (including soft costs), annual operations and maintenance (O&M), and replacement costs. The present value costs are shown, the annualized cost, and the cost per AF of project yield. Project yield reflects the maximum amount of water diverted and injected; this differs from the available water identified in the modeling scenarios. Therefore, the $/AF cost reflects the cost per acre-foot of injected water.

Table 1. ASR Estimated Economic Lifecyle Costs

Cost Category	Seasonal Release	Alternative 1/1A - New Diversion of Winter High Flows
Total Construction Cost ($M)	$383	$278
Annual O&M ($M)	$9	$5
Present Value Total Cost ($M)	$593	$403
Annualized Cost ($M)	$27	$18
Annual Yield (Acre-feet)	15,000	8,000
$/Acre-Foot Cost	**$1,781**	**$2,269**

Project costs inputs developed by Wallace Group. Aquifer Storage and Recovery Project Concepts to Address Seawater Intrusion.
January 2025

6.2.3 Effect on Groundwater Conditions

The groundwater modeling simulations conducted for this feasibility study indicate that none of the 3 different 2040 scenarios fully halt seawater intrusion in either the 180-Foot or 400-Foot Aquifers, nor do they meet the minimum threshold. Results are not shown here because these were conducted with a previous version of the SWIM, v2; however, they can be found within the ASR Preliminary Feasibility Study Attachment 4 (SVBGSA and M&A, 2025). While injection reduces chloride concentrations relatively quickly, the injected volumes are insufficient to counter seawater intrusion because surface water availability limits injection.

In the Seasonal Release with ASR scenario, shifting diversions earlier in the year required additional summer pumping to meet CSIP demands. As a result, net pumping averaged -1,400 acre-feet per year (AFY), with ASR injections (12,900 AFY) failing to offset total pumping (14,300 AFY), allowing intrusion to persist. Alternative 1 injected less water, but this was balanced by reduced CSIP pumping needs because summer diversions at SRDF remained available. This scenario resulted in net positive pumping of about +1,200 AFY (6,700 AFY injection minus 5,500 AFY pumping). Despite this improvement, injected volumes were still insufficient to push seawater intrusion back to the minimum threshold.

In the Seasonal Release with ASR scenario, average 180-Foot Aquifer groundwater levels in the coastal 180/400 and northeastern Monterey Subbasin rise up to 5 feet between 2020 and 2070, centered mainly around the injection wells. In the 400-Foot Aquifer, just the immediate area around the 4 injections wells at the leading edge have up to a 5-foot rise by 2070, with other areas staying about the same or decreasing. The groundwater levels in the 180-Foot Aquifer and 400-Foot Aquifer are still projected to be below sea level in 2070, even where average groundwater levels increase. The groundwater depression near the City of Salinas in the Eastside Subbasin is still projected to remain in 2070, and the injection in either scenario is not enough to overcome the chloride movement toward the depression.

Alternative 1a evaluated the same project concept as Alternative 1, except it injected all the water into the 400-Foot Aquifer. While still not fully addressing seawater intrusion, this scenario had the greatest effect on the chloride isocontour. The Coastal Injection Scenario under the Castroville & Eastside Canals Study builds on this scenario and updates it with additional feasibility findings (M&A, *et al.*, 2026).

6.2.4 Feasibility Study Findings

This preliminary feasibility study demonstrates that ASR could contribute to mitigating seawater intrusion in the 180/400 Subbasin but faces significant operational, regulatory, and financial challenges. The Seasonal Release with ASR concept has constraints with existing infrastructure, operations, and water rights. The Alternative 1 and 1A New Diversions of Winter High Flows for ASR concept appears more promising as it addresses constraints in part by relying on a new diversion and SRDF and CSIP continue current operations. While neither ASR scenario meets the seawater intrusion minimum threshold, Alternative 1 is compared to other projects in Section 5.

Key findings on constraints include the following:

- **Infrastructure and Operational Constraints** – The Seasonal Release with ASR project concept faces significant challenges related to winter reservoir operations, which are difficult to manage because of flood risks and uncertain inflows. This shift in releases to earlier in the year could compromise flood control and environmental flow requirements. The SRDF, if used to divert water for injection, is also constrained. High winter flows bring turbidity, debris, and equipment wear, which limit reliable diversion and the diversion structure size is limited. In addition, water quality requirements dictate that diverted water must be treated to Title 22 drinking water standards before injection. Preliminary data suggest that additional treatment may be needed for salts and metals. New infrastructure will be required to implement the project, including conveyance pipelines, regulating storage, treatment facilities, ASR wells, and distribution systems. Alternatives 1 and 1A avoid the diversion constraints but have the additional infrastructure cost of Ranney Collector wells.
- **Water Rights and Permitting** – The Seasonal Release with ASR project concept requires changes to existing water rights, including shifting the timeframe of the SRDF re-diversion of stored water to earlier in the year. This could also affect flood control

operations, groundwater recharge, and environmental obligations such as fish bypass flows. It also requires adding underground storage to the water right licenses and permits used to divert water at SRDF. Alternatives 1 and 1A will require new water rights on the Salinas River to divert excess winter flows, or potentially modifications to Permit 11043, which is being evaluated under a different study. Either project scenario will also need to comply with other state and federal regulatory frameworks, including CEQA and National Environmental Policy Act (NEPA), the Endangered Species Act, and the State Water Board's ASR General Order. Permitting requirements could extend the timeline for implementation.

- **Effectiveness** – Groundwater modeling results showed that while injection can be effective at mitigating seawater intrusion partially, the amount of water available was not sufficient to prevent the advancement of seawater intrusion in any of the simulations. While the Seasonal Release concept offered modest benefits, Alternatives 1 and 1A appeared more promising because they avoid reservoir constraints and instead capture high winter flows directly, potentially providing an additional source of water for injection.
- **Cost Estimates** – The cost of implementing the Seasonal Release with ASR project will be substantial, with a capital cost of approximately $344 million.

The study concludes that the Seasonal Release with ASR concept is constrained by operational, regulatory, and financial challenges. Its effectiveness in halting seawater intrusion is limited, and the costs are significant. Alternatives 1 and 1A appear to offer a more viable path forward. The 2 project concepts summarized in Table 2. To advance the project concept, further work is needed to refine water quality treatment requirements through expanded sampling, conducting detailed engineering and cost-benefit analyses, and pursuing water rights modifications and permitting pathways.

Table 2.Comparison of ASR Project Concepts

Seasonal Release with ASR	Alternative 1 - New Diversion of Winter High Flows
Average diversion for ASR injection: 12,900 AFY	Average diversion for ASR injection: 6,700 AFY
CSIP wells pumping high due to lack of SRDF diversion (max capacity pumping)	CSIP wells do not pump as much
CSIP summer demands require additional pumping from ASR wells	No unmet CSIP demands except during severe drought
More pumping than injection (net -1,400 AFY)	More injection than pumping (net +1,200 AFY)
Seawater intrusion is not stopped (not enough water to inject)	Seawater intrusion is not stopped (not enough water to inject)
Main constraints: SRDF structure limits and not enough supply for CSIP	Main constraints: volume of water available and need for new diversion structure

6.2.5 Castroville and Eastside Canals Feasibility Study Update to ASR Scenarios

In 2025, under the Round 2 SGM Salinas Valley Grant, SVBGSA initiated the Castroville and Eastside Canals and Alternatives Preliminary Feasibility Study (C&E Study). This effort built upon and further refined the ASR Alternative 1a, advancing its concepts through more detailed evaluation and expanded objectives.

The prior ASR Study evaluated Alternatives 1 and 1a, which proposed diverting excess Salinas River flows—defined as surface water not stored in reservoirs for more than 30 days—for ASR. That analysis focused primarily on the ability of injection to mitigate seawater intrusion and did not include an evaluation of the water rights needed to support diversions. In contrast, the C&E Study also assessed the feasibility of a river diversion project but expanded its scope to address 4 SGMA sustainability goals. A key component of the study was an in-depth review of Water Right Permit 11043 and other potential water right options that could enable diversion of Salinas River water that would otherwise flow to the ocean, providing additional supplies to areas experiencing low groundwater levels or seawater intrusion.

MCWRA holds Water Right Permit 11043, which provides a conditional right to divert excess Salinas River flows for irrigation and municipal use. After evaluating multiple water rights options, the C&E Study advanced scoping focused on using Permit 11043, with potential modifications to allow for storage and possible relocation of the diversion point.

The C&E Study advanced the concept of a river diversion project through a comprehensive review of water rights, historical documentation, and infrastructure alternatives. These evaluations informed the development of 4 project concepts aligned with SVBGSA's 4 groundwater sustainability goals, 1 of which directly addresses seawater intrusion. The study summarizes these 4 concepts, develops 8 project scenarios, conducts preliminary feasibility analyses, and identifies key tradeoffs and considerations associated with each.

The C&E Study Coastal Injection project concept specifically targets seawater intrusion and builds upon ASR Alternative 1a. As part of this effort, the C&E Study analyzed the timing and magnitude of historical and projected Salinas River flows available for diversion—updating the estimates in the ASR Study. In addition to incorporating a detailed water rights evaluation, the study did an evaluation of the most appropriate infrastructure options, and replaced the Ranney collector subsurface diversions from the ASR Study with a pumped river intake due to previous studies that found high clays and low yields near this reach of the river. It also evaluated options for off-stream storage prior to treatment and injection, refined the overall infrastructure layout, and updated cost estimates.

Consistent with ASR Alternative 1a, the Coastal Injection concept diverts river water just upstream of the Salinas River Diversion Facility (SRDF). The proposed diversion capacity is comparable—50 cfs for the Coastal Injection scenario compared to 45 cfs under ASR Alternative 1a. Diverted water would be conveyed to the Merritt Lake storage area, where it would be stored prior to treatment and injection into the 400-Foot Aquifer.

Groundwater modeling was performed using updated versions of the SVOM v1 and SWIM v3. The results are similar to those for ASR Alternative 1a, showing increased groundwater levels in the vicinity of the injection wells but limited influence on the position of the chloride isocontour by 2040, as illustrated on Figure 7 for the 400-Foot Aquifer. The 180-Foot and Deep Aquifers, which do not receive injection under this scenario, exhibit minimal change in the location of the 500 mg/L chloride isocontour. Over time, simulated seawater intrusion in the 400-Foot Aquifer diverges slightly from baseline conditions, but intrusion continues to move inland rather than stabilizing or retreating. The modest magnitude of this benefit is likely due to the relatively small diversion capacity of 50 cfs, which is constrained by available storage at Merritt Lake.

Figure 8 illustrates the relative increase in simulated groundwater levels in the 180-Foot, 400-Foot, and Deep Aquifers in 2040–2041 under the Coastal Injection scenario compared to baseline conditions. In the 400-Foot Aquifer, groundwater levels in the vicinity of the injection wells are approximately 3 to 6 feet higher than under baseline conditions. The figure shows that in the northern Monterey Subbasin, this project may raise groundwater levels up to 2 feet.

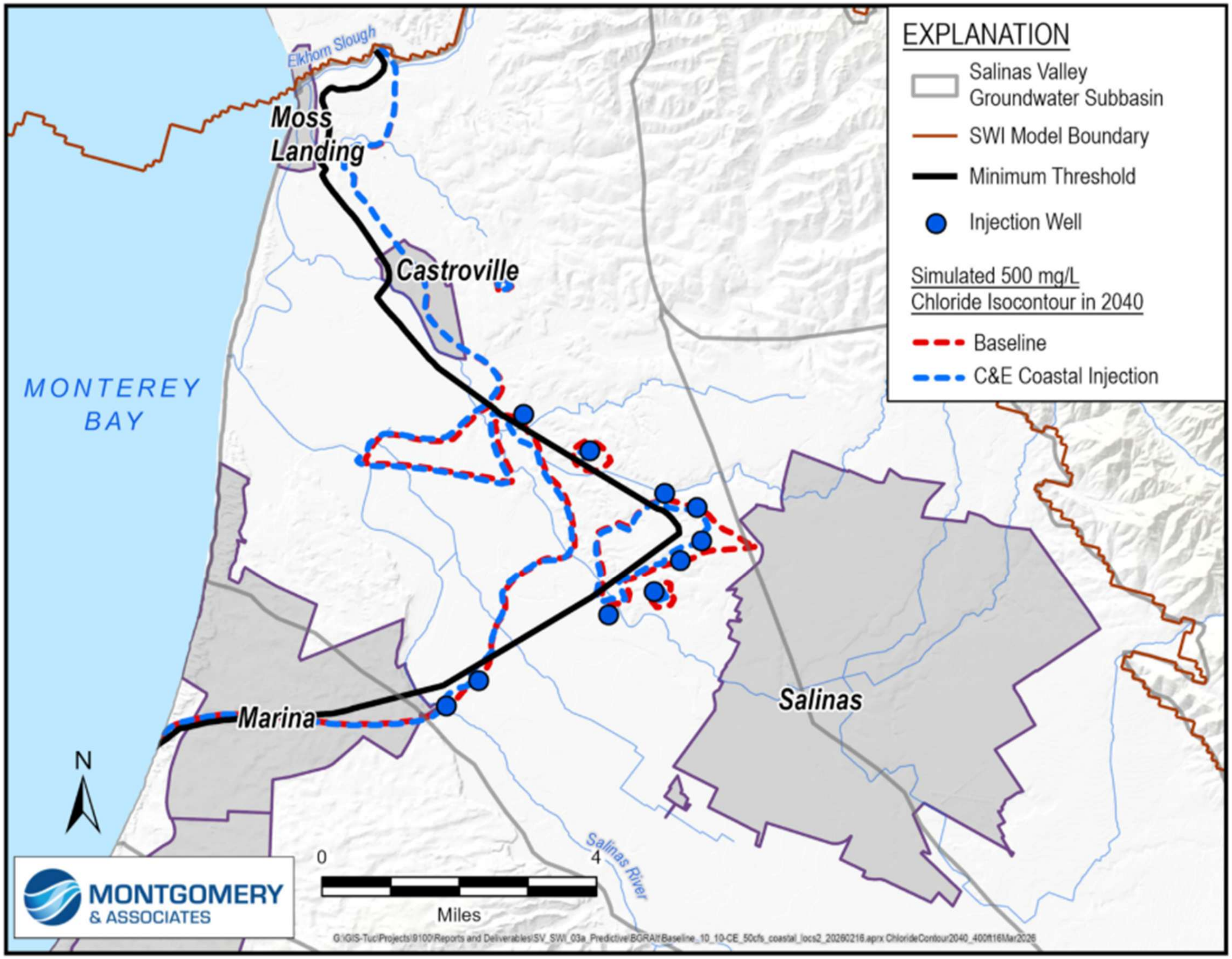


Figure 7. C&E Study Coastal Injection Scenario Simulated 500 mg/L Chloride Contour in the 400-Foot Aquifer in 2040 Compared to Baseline Scenario

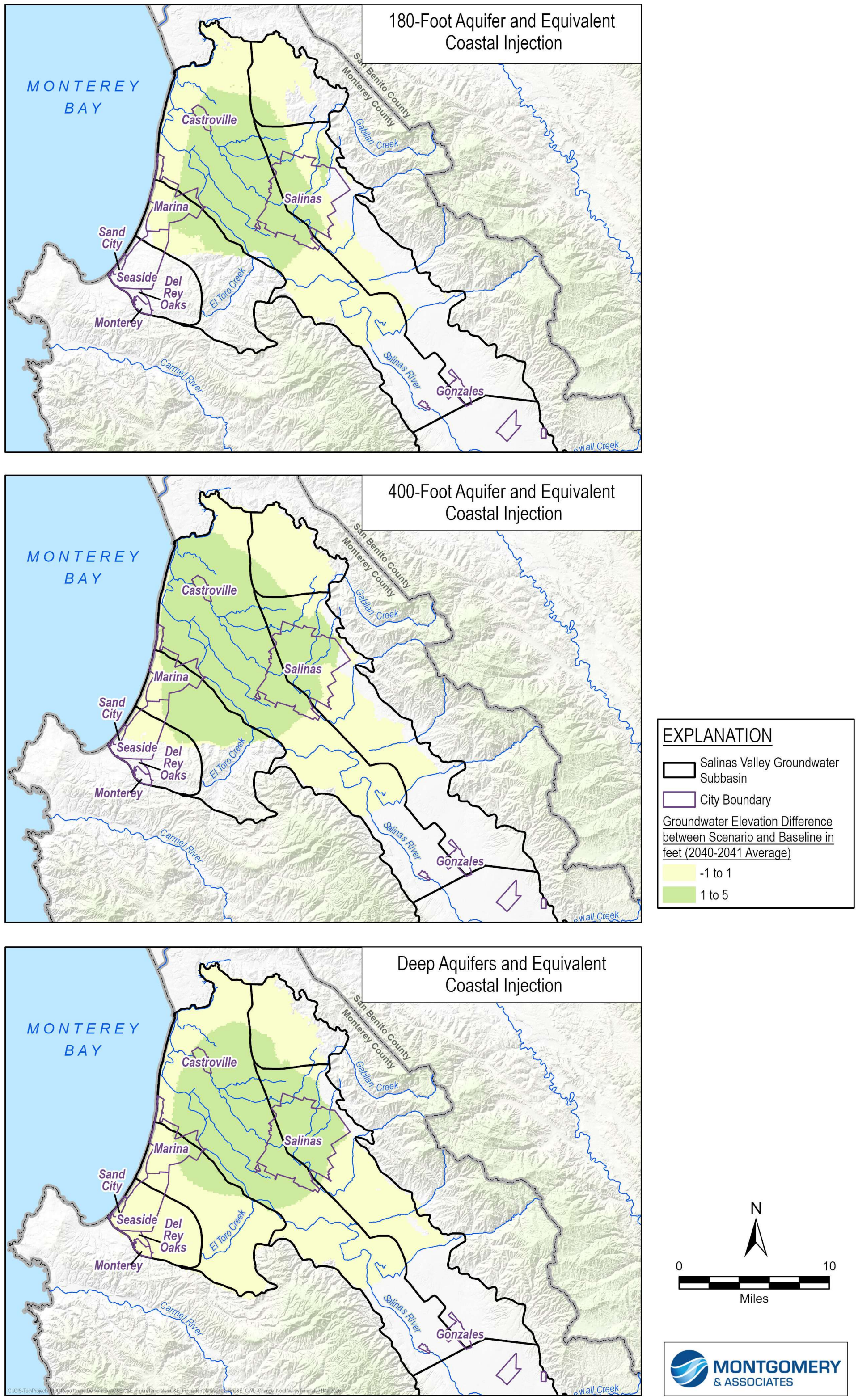


Figure 8. C&E Study Coastal Injection Scenario Groundwater Levels Difference from Baseline Scenario

The C&E Study developed a cost estimate for the Coastal Injection Scenario. Table 3 includes the capital cost, including land purchase, and O&M; the estimate does not include the cost of electrical infrastructure improvements required to serve the loads of the proposed facilities. Annual O&M costs include those for energy and treatment as well as diversion facility, pump station, sedimentation basin, pipeline, reservoir, and injection well maintenance activities. The annual cost/AF is based on the amount of water injected should not be construed with the cost of water or distribution of costs, as that analysis has not been completed.

Table 3. C&E Study Coastal Injection Scenario to Address Seawater Intrusion Preliminary Cost Estimate

Scenario	Total Capital Cost	Annualized Capital Cost	Annual O&M	Total Annualized Cost	Average Project Yield, AFY	Annual $/AF
50 cfs	$399,800,000	$11,705,000	$4,895,000	$16,600,000	5,100	$3,255

6.3 Brackish Groundwater Restoration Project

SVBGSA has prepared a U.S. Bureau of Reclamation (USBR) Title XVI Feasibility Study Report for Large, Recycled Water or Desalination Projects (USBR Report)[2] for the BGRP (Carollo, 2026a). This project was originally conceptualized as 2 individual projects in the 180/400 Subbasin GSP: 1) a Seawater Intrusion Extraction Barrier and 2) a Regional Municipal Supply Project. The Regional Municipal Supply Project is also included in the Eastside, Monterey, and Langley GSPs.

Historical groundwater extractions created a landward hydraulic gradient from the ocean towards supply wells due that allowed seawater to migrate inland. The BGRP is designed to reverse this gradient, drawing existing brackish water back toward the coastline, improving groundwater quality over time. The BGRP is intended to protect against further intrusion in the 180/400 and Monterey Subbasins, thus preventing seawater intrusion from reaching the Eastside or Langley Subbasins. It is designed to improve current groundwater quality within the existing seawater intruded area and push seawater intrusion back to the minimum threshold.

SVBGSA has proceeded with a feasibility study for a single combined project, renamed BGRP. The extraction barrier portion of the BGRP includes a series of extraction wells near the coastline in the 180/400 and Monterey Subbasins that continuously extract brackish groundwater—a mixture of freshwater and seawater—and form a hydraulic barrier by lowering groundwater levels and capturing seawater. This prevents seawater from advancing inland of the extraction well barrier. The BGRP would generate significant volumes of brackish water that

[2] Available at: https://svbgsa.org/wp-content/uploads/2026/04/BGRP-Feasibility-Study-20260331.pdf.

could be desalted and used as a new potable or non-potable water supply, or for injection back into the 180-Foot and 400-Foot Aquifers.

Figure 9 is a conceptual diagram outlining the BGRP. The left side of the figure shows the extraction wells drawing water from both the ocean and land sides, as depicted by the arrows. Extraction wells would be placed in the intruded zone where the seawater enters the groundwater basin and mixes with the freshwater. Both brackish water and seawater would be extracted from the barrier of several extraction wells to prevent seawater from continued progression inland toward the City of Salinas. The extracted water is then treated and can be used as a new regional water supply and/or for injection. The figure also shows how groundwater levels at the extraction barrier wells are lower than surrounding groundwater levels, preventing water from moving past the extraction barrier, while inland groundwater levels will rise due to injected water and offsetting pumping with the new supply.

The treated extracted brackish water could be used either in-lieu of groundwater for potable and non-potable uses, or for groundwater injection directly improving groundwater levels and helping to push the seawater intrusion back toward the ocean. As described below, the preferred scenario is to use the treated brackish water for injection only. This maximizes benefits to all groundwater users in the basin and is effective at raising groundwater levels.

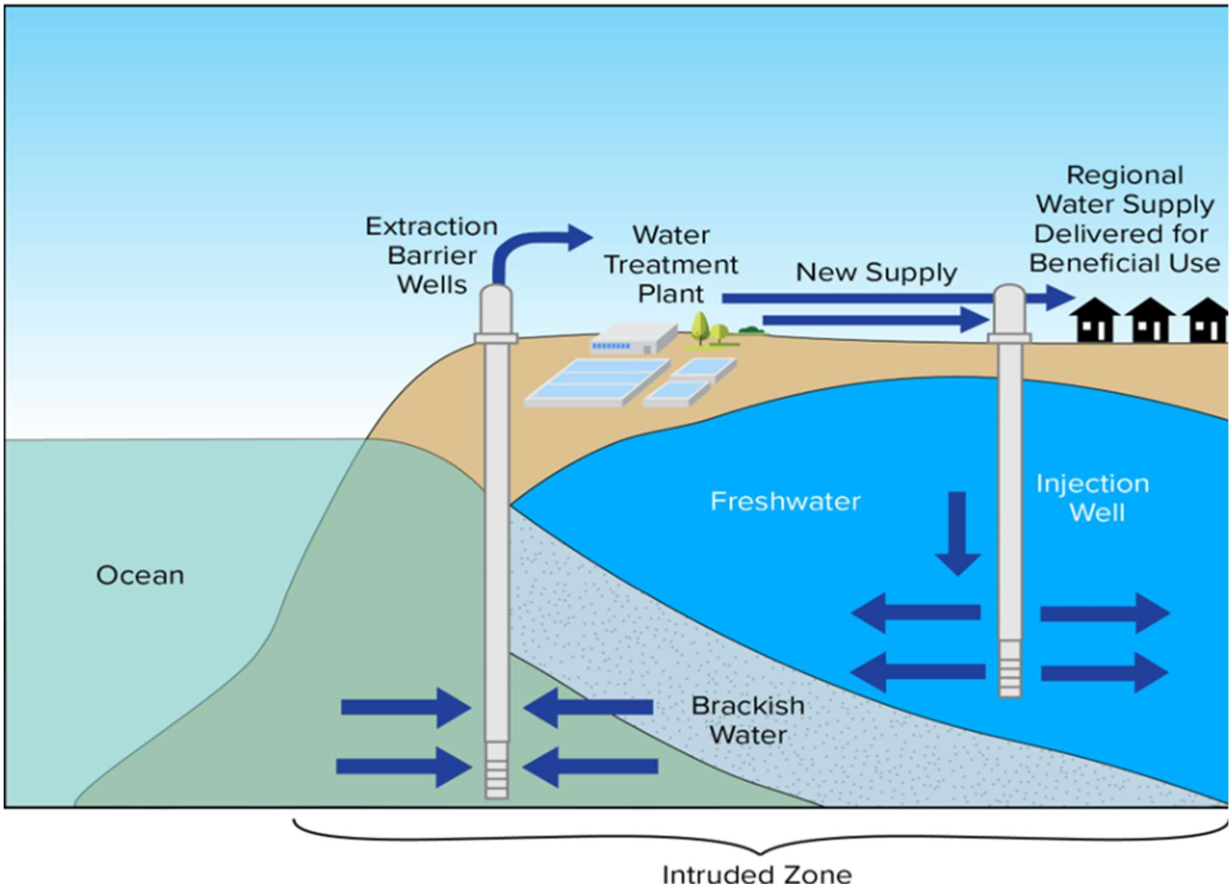


Figure 9. BGRP Concept

The USBR Report includes a refined preferred project scenario, an AWSP that also meets the seawater intrusion SGMA goals, and evaluation of a NAA as a non-infrastructure state intervention action that would likely occur if SVBGSA does not adequately meet SGMA requirements. SVBGSA has also completed a CEQA Initial Study that outlines what would need to be addressed in an Environmental Impact Report (EIR) for the BGRP.

The USBR Report includes information on the current supplies and demands in the northern area of the Salinas Valley, end user analysis, description of project alternatives, an economic analysis, an overview of why the injection only scenarios is the preferred project, as well as discussion on environmental considerations, water rights and legal requirements, project costs and potential funding sources, as well as research needs.

To support this effort, SVBGSA contracted Carollo Engineers to lead the effort and draft the USBR Report, M&A to provide technical support and groundwater modeling, and ERA Economics to complete an economic and financial analysis. In addition, Larry Walker Associates provided guidance on NPDES issues and outfall dilution modeling, LSA Associates provided environmental permitting support, ConfluenceES provided groundwater and seawater intrusion mitigation strategy support, and Wallace Group Engineers worked with M&A to develop the AWSP Alternative. Minasian Law provided analysis of legal and institutional requirements for the BGRP.

The following sections describe the BGRP project scenarios developed during Phase 1, descriptions of the alternatives discussed in the USBR Report, cost estimates, modeled effects on groundwater conditions for each alternative, and key findings from the study.

6.3.1 Phase 1 BGRP Scenarios

Phase 1 evaluated effectiveness of 7 BGRP scenarios at stopping and pushing seawater intrusion back beyond the GSP minimum threshold line and toward the measurable objective line. Each scenario's production capacity (treated water for injection or direct delivery), hydrogeologic characteristics, conveyance and treatment infrastructure components, overall cost, and implementation strategies were developed and used to compare scenarios for effectiveness in meeting the GSP requirements. The BGRP Feasibility Study Phase 1 Report[3] (SVBGSA, 2025b), as well as in the Scenarios Analysis (Carollo, 2025b) and Modeling Results Technical Memoranda (M&A, 2025c) included these 7 scenarios:

1. Extraction, Treatment, and Direct Deliveries Plus Injection – Small
2. Extraction, Treatment, and Direct Deliveries Plus Injection – Medium
3. Extraction, Treatment, and Direct Deliveries Plus Injection – Large
4. Extraction, Treatment, and Injection Only
5. Extraction, Treatment, and Eastside Injection
6. Extraction North of the Salinas River, Treatment, and Direct Deliveries Plus Injection
7. Extraction From the 180-Foot Aquifer, Treatment, and Injection in the 400-Foot Aquifer

The 7 BGRP scenarios and No Project Scenario modeled during Phase 1 were simulated using SWIM v2; therefore, the No Project Scenario differs slightly from the Baseline Scenario presented in Section 6.1.2 above. The preferred scenario identified during Phase 1 was modeled using SWIM v3 and is presented in Section 6.3.2.

Figure 10 shows the chloride contours in 2040 for the 180-Foot Aquifer compared to Baseline Scenario. It is separated into 2 maps for clarity: the first contains the 3 direct delivery scenarios (Small, Medium, and Large), and the second shows the additional BGRP scenarios (Injection Only, Eastside Injection, North of River, and Extract in 180/Inject in 400). Figure 11 shows the chloride contours in 2040 for the 180-Foot Aquifer compared to Baseline Scenario. It is

[3] Available at: https://svbgsa.org/wp-content/uploads/2026/04/BGRP-Feasibility-Study-20260331.pdf.

separated into 2 maps for clarity: the first contains the 3 direct delivery scenarios (Small, Medium, and Large), and the second shows the additional BGRP scenarios (Injection Only, Eastside Injection, North of River, and Extract in 180/Inject in 400).

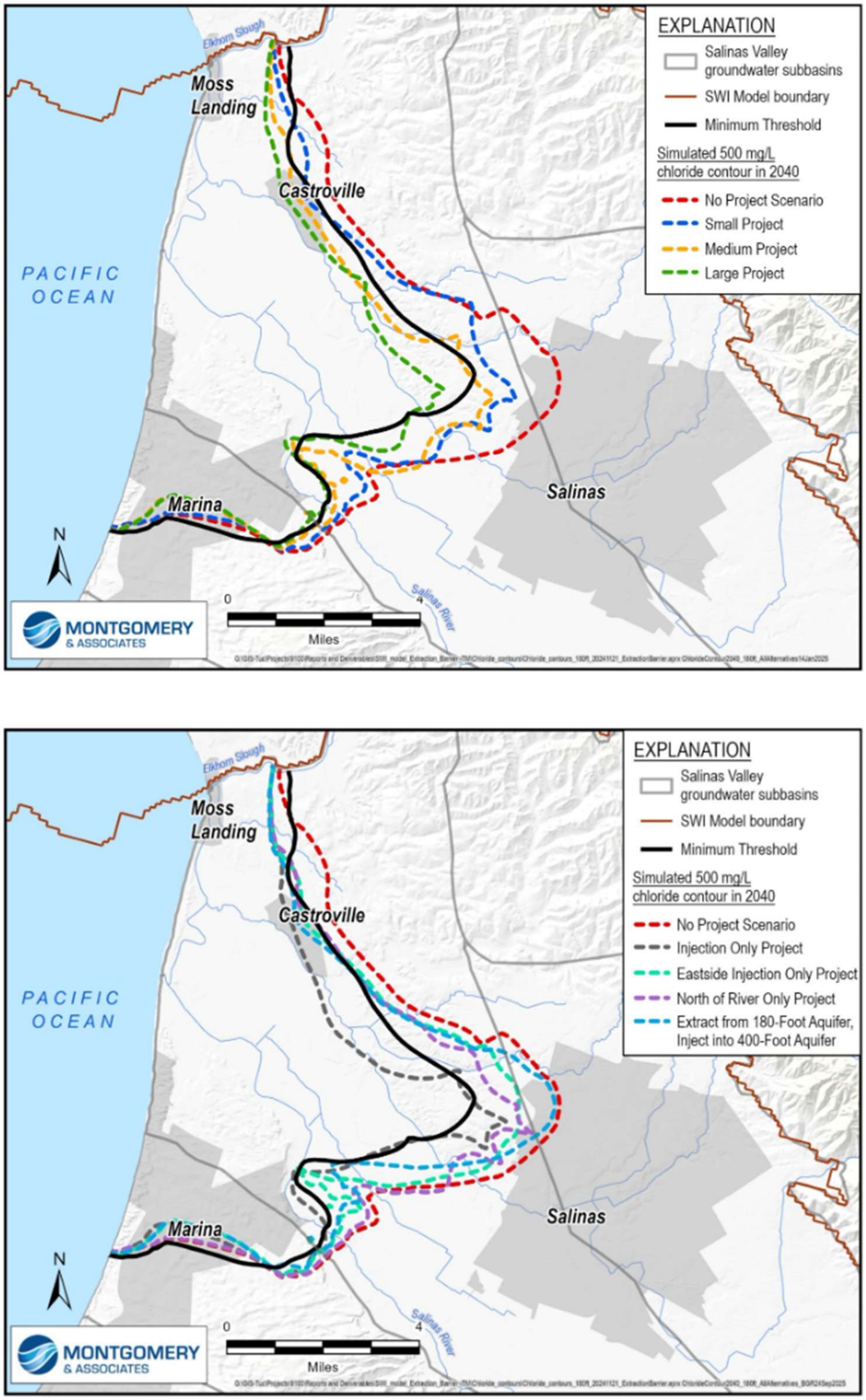
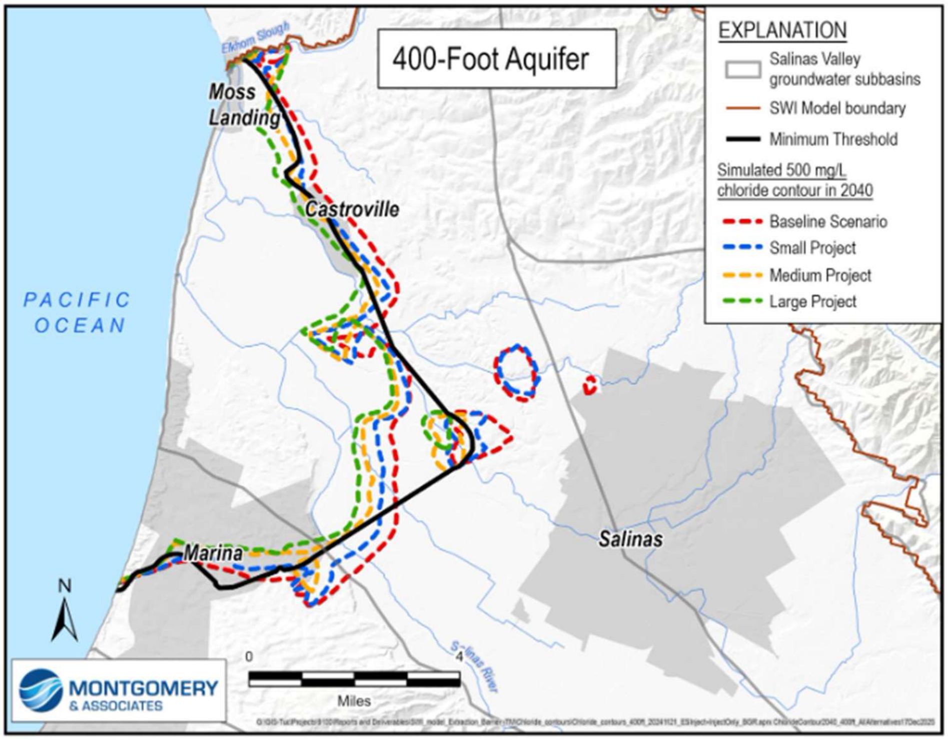


Figure 10. Chloride Isocontour for the 7 BGRP Scenarios Compared to Baseline Scenario and Minimum Threshold in the 180-Foot Aquifer



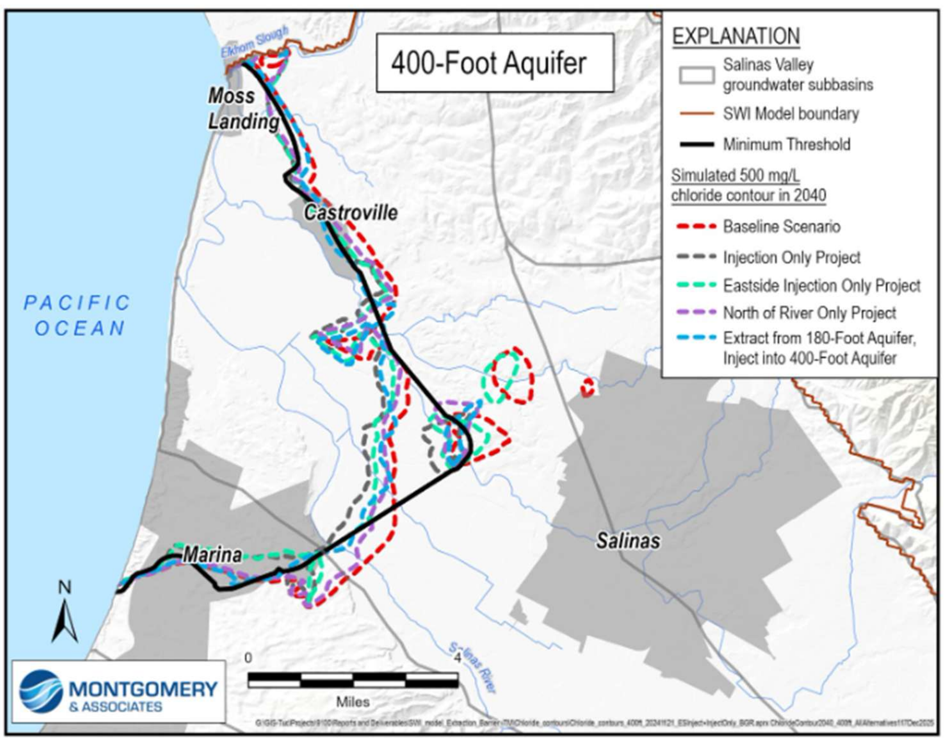


Figure 11. Chloride Isocontour for the 7 BGRP Scenarios Compared to Baseline Scenario and Minimum Threshold in the 400-Foot Aquifer

Standardized costs were developed for the 7 BGRP scenarios based on preliminary design and engineering cost estimates. Table 4 summarizes the standardized costs of the BGRP alternatives. The table shows total construction costs (including soft costs), annual O&M, and replacement costs. The present value costs are shown, the annualized cost, and the cost per AF of project yield. Project yield reflects injected water for the BGRP alternatives. Therefore, the $/AF cost reflects the cost per acre-foot of injected water. Costs range from $3,155 to over $6,000 per AF.

Table 4. Cost Summary of BGRP Phase 1 Scenarios

Cost Category	Small	Medium	Large	Injection Only	Eastside Injection	N of Salinas River	180 to 400-Foot
Total Construction Cost ($M)	$709	$1,002	$1,465	$951	$947	$629	$951
Annual Treatment O&M ($M)	$51	$80	$110	$80	$80	$80	$80
Annual O&M ($M)	$18	$27	$38	$33	$33	$21	$46
Present Value Total Cost ($M)	**$2,254**	**$3,376**	**$4,750**	**$3,459**	**$3,453**	**$2,862**	**$3,728**
Annualized Cost ($M)	$101	$152	$214	$156	$155	$129	$168
Annual Yield (Acre-feet)	28,000	46,900	67,800	46,900	46,900	20,900	29,000
$/Acre-Foot Cost	**$3,625**	**$3,241**	**$3,155**	**$3,321**	**$3,315**	**$6,166**	**$5,788**

In October 2025, SVBGSA's Board supported the staff recommendation that the Injection Only Scenario, with refinements, be carried forward as the preferred BGRP scenario for further evaluation in the USBR feasibility study. Along with meeting the seawater intrusion minimum threshold, a key advantage of the Injection Only Scenario is that it does not require existing groundwater users to receive treated water in lieu of pumping. In the preferred BGRP project, treated water is injected inland of the seawater intrusion front to raise groundwater levels and replenish the groundwater. This approach does not deliver water to end users; instead, both urban and agricultural users continue to operate their own wells and water systems.

6.3.2 Alternatives Included in the USBR Report

The description of alternatives included in the USBR Report begins with the Baseline Scenario described in Section 4.2.2. This is modeled with the SWIM Baseline Scenario for comparison of project effects. The USBR Report also identifies a NAA, which reflects expected future conditions in the absence of the planned PMA or any other engineered solution. Unlike the Baseline Scenario, which assumes continued pumping regardless of whether it causes undesirable results and does not meet SGMA sustainability requirements, the NAA considers compliance with existing laws (e.g., SGMA) and assumes the State will intervene and manage groundwater if local agencies fail to meet SGMA requirements. The USBR Report includes other projects that had been proposed in the GSPs; however, because none of these projects on their own achieve the seawater intrusion minimum threshold, they are not considered to be equivalent projects and are not carried forward in the economic analysis of the alternatives. No other GSP projects achieved the seawater intrusion minimum threshold, so an Alternative Water Supply Project (AWSP) was developed as an alternative to BGRP. This AWSP provides similar effects on seawater intrusion and similar supply benefits to the region, as required by the USBR feasibility study guidelines.

Within each alternative, multiple project scenarios have been considered and identified. Alternatives refer to different project types, whereas scenarios refer to variations of the same project type.

6.3.2.1 No Action Alternative (NAA)

An NAA includes no new infrastructure. Without constructing a project the seawater intrusion minimum threshold is projected to be exceeded, causing an undesirable result, and violating SGMA law. Therefore, the NAA considers what might happen with SWRCB intervention. SWRCB would not develop new structural solutions (i.e., projects), but it would impose management actions such as pumping limits. Accordingly, the assumptions underpinning the NAA are:

- Seawater intrusion continues and the minimum threshold is exceeded in the absence of a project.
- The SWRCB designates 1 or more subbasins as probationary and intervenes with management actions.
- SWRCB intervention includes administrative fees, pumping limits/reductions (location, timing, and magnitude not yet specified), and other management actions to address seawater intrusion.
- Because subbasins are hydraulically connected, pumping limits could extend beyond the 180/400 Subbasin.

The NAA assumes that the SWRCB would implement certain pumping reductions to manage seawater intrusion recognizing that the minimum threshold may not be fully achieved by 2040. Domestic water users would be limited to the target of 42 gallons per capita per day (gpcd) for indoor use. Since the location and magnitude of agricultural pumping reductions are not known, a range of pumping reductions up to full cessation of pumping were considered.

Groundwater modeling was used to evaluate potential SWRCB pumping reductions to address seawater intrusion. The groundwater modeling shows that pumping reduction alone, even complete cessation of all agricultural pumping in the entire Salinas Valley, cannot meet the seawater intrusion minimum threshold by 2040. In addition to not meeting the seawater intrusion minimum threshold, the NAA assumption that all agricultural groundwater pumping is eliminated in the 180/400 and other subbasins in the Salinas Valley does not appear to be politically plausible and certainly violates any notion of an economically sustainable solution. Therefore, because ceasing all agricultural pumping is not viable, a reasonable NAA was developed and applied to evaluate project economic benefits.

In summary, the NAA considers SWRCB intervention that would impose administrative fees, reduce domestic water use to minimum requirements, and limit agricultural pumping. A range of agricultural pumping limits were evaluated and then modified for the economic analysis.

NAA Groundwater Modeling

Under the NAA, the SWRCB would only use demand management; however, where it would reduce pumping is unclear. To meet SGMA requirements, the SWRCB may need to reduce pumping in subbasins that are not currently seawater intruded.

Five pumping reduction scenarios were modeled:

- No agricultural pumping in 180/400 and Monterey Subbasins
- No agricultural pumping in 180/400, Northern Eastside, and Monterey Subbasins
- No agricultural pumping in 180/400, Eastside, Monterey, and Langley Subbasins
- No agricultural pumping in 180/400, Eastside, Monterey, Langley, and Forebay Subbasins
- No agricultural pumping in all SVBGSA subbasins

Additionally, all 5 NAA scenarios limited municipal pumping to no more than 42 gallons per capita per day matching the California minimum indoor standard for 2030. Domestic pumping from *de minimis* usersis not subject to pumping reductions.

The 5 NAA scenarios were all ineffective at moving the 500 mg/L chloride isocontour in the 180-Foot and 400-Foot Aquifers back to the required minimum threshold line by 2040. Figure 1 shows the simulated 500 mg/L isocontour in 2040 in the 180-Foot and 400-Foot Aquifers resulting from the 5 NAA scenarios. None of these meet the minimum threshold, which is shown by the black line.

Groundwater modeling of the NAA shows that it is not possible to meet the minimum threshold for seawater intrusion by 2040 even under the unrealistic scenario where all agricultural groundwater pumping is eliminated in the Salinas Valley and domestic pumping is limited to 42 gpcd. These scenarios are not intended to represent realistic or politically plausible solutions, but rather they investigate whether agricultural land fallowing by itself could meet the seawater intrusion minimum threshold by 2040. The scenarios do not meet the seawater intrusion minimum threshold due to the slow process of natural recharge resulting from land fallowing, combined with the SGMA 2040 deadline.

As further shown in Appendix B of the USBR Report, over time land fallowing enables the 500 mg/L chloride isocontour to move toward the coast and to the north. With time, it becomes more evident that fallowing agricultural lands in the 180/400, Monterey, and northern portion of the Eastside Subbasins have the most significant effect on the progression of the 500 mg/L chloride isocontour. Fallowing agricultural lands in the Forebay, Upper Valley, and southern portion of the Eastside Subbasins have lesser, although measurable, effects on the progression of the 500 mg/L chloride isocontour. This study did not specifically address the relative effect of fallowing the limited agricultural lands in the Langley Subbasin.

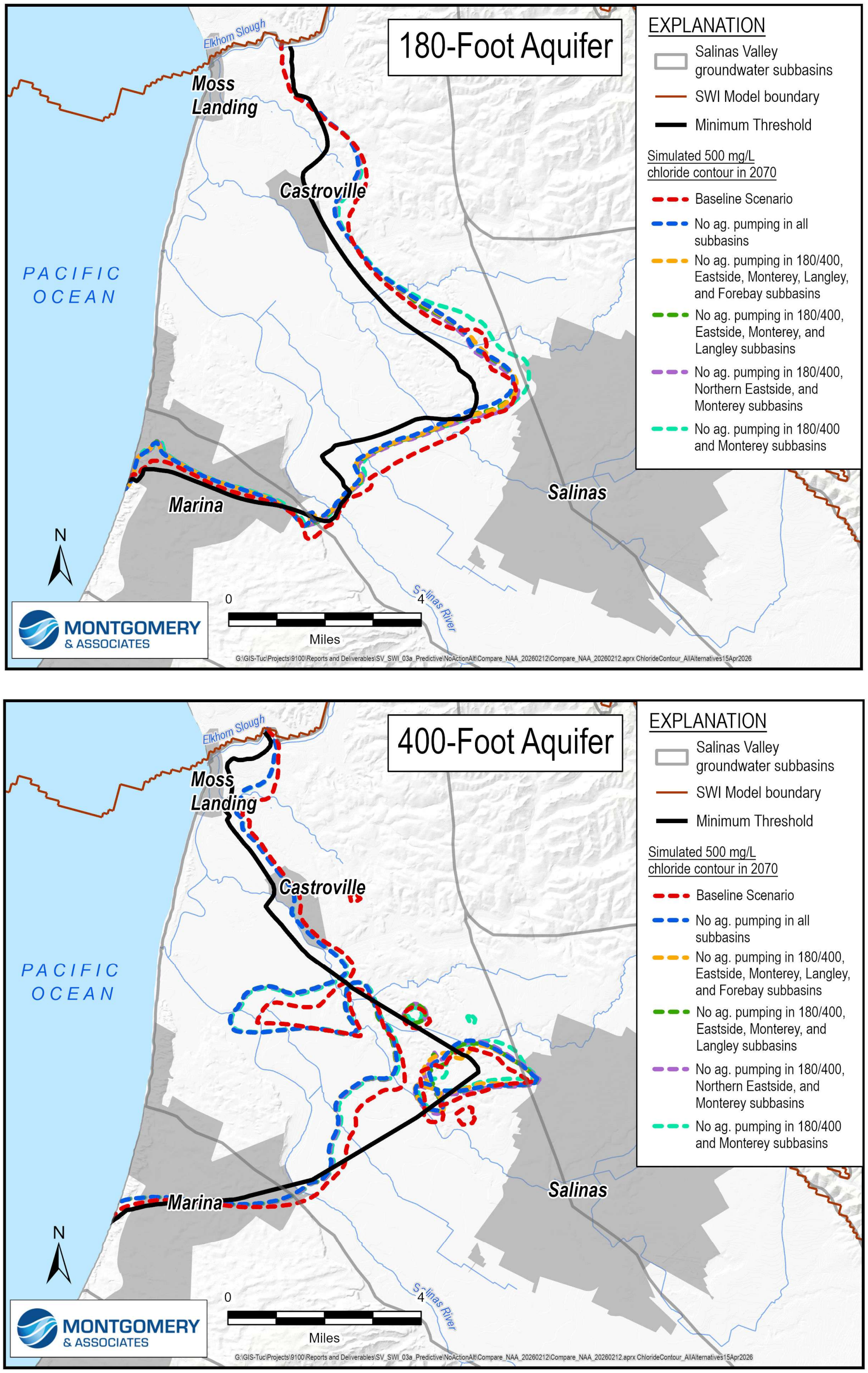


Figure 12. 2040 500 mg/L Chloride Contours Comparison of NAA to Baseline Scenario and Minimum Threshold

6.3.2.2 BGRP Injection Only Alternative

The USBR Report carries forward the Injection Only Scenario as the BGRP Alternative, along with the AWSP. The BGRP and AWSP are both evaluated relative to the NAA. The BGRP Injection Only infrastructure—shown on Figure 13—includes groundwater extraction wells located near Highway 1 parallel to the coastline to establish a barrier where seawater intrusion is observed in the 180/400 Subbasin and Monterey Subbasins. Instead of delivery of desalinated brackish groundwater to urban or agricultural end users coupled with injection, this project only includes injection into the 180-Foot and 400-Foot Aquifers inland of the seawater intrusion front.

The BGRP Injection Only Alternative includes a total of 20 extraction barrier wells, with 10 in the 180-Foot Aquifer and 10 in the 400-Foot Aquifer. The total volume extracted is 41,500 gpm or approximately 67,000 AFY. The extracted brackish water is then treated by Reverse Osmosis (RO). The total available treated water volume for injection is approximately 46,900 AFY. All extracted groundwater would be conveyed to a centralized brackish water treatment facility. The BGRP includes a 2-pass, multi-stage RO system to achieve the necessary removal of boron, which could have elevated concentrations in the influent water. Concentrate/Brine produced at the treatment facility is assumed to be discharged using the existing M1W ocean outfall. The injection only BGRP includes a reverse osmosis concentrate (ROC) storage pond that will be used to store ROC if the outfall is offline or is unable to accept additional flows during significant wet weather events. The distribution piping would convey treated brackish groundwater to inland injection wells. As shown on Figure 13, there are a total of 21 injection wells, with 11 in the 180-Foot Aquifer and 10 in the 400-Foot Aquifer.

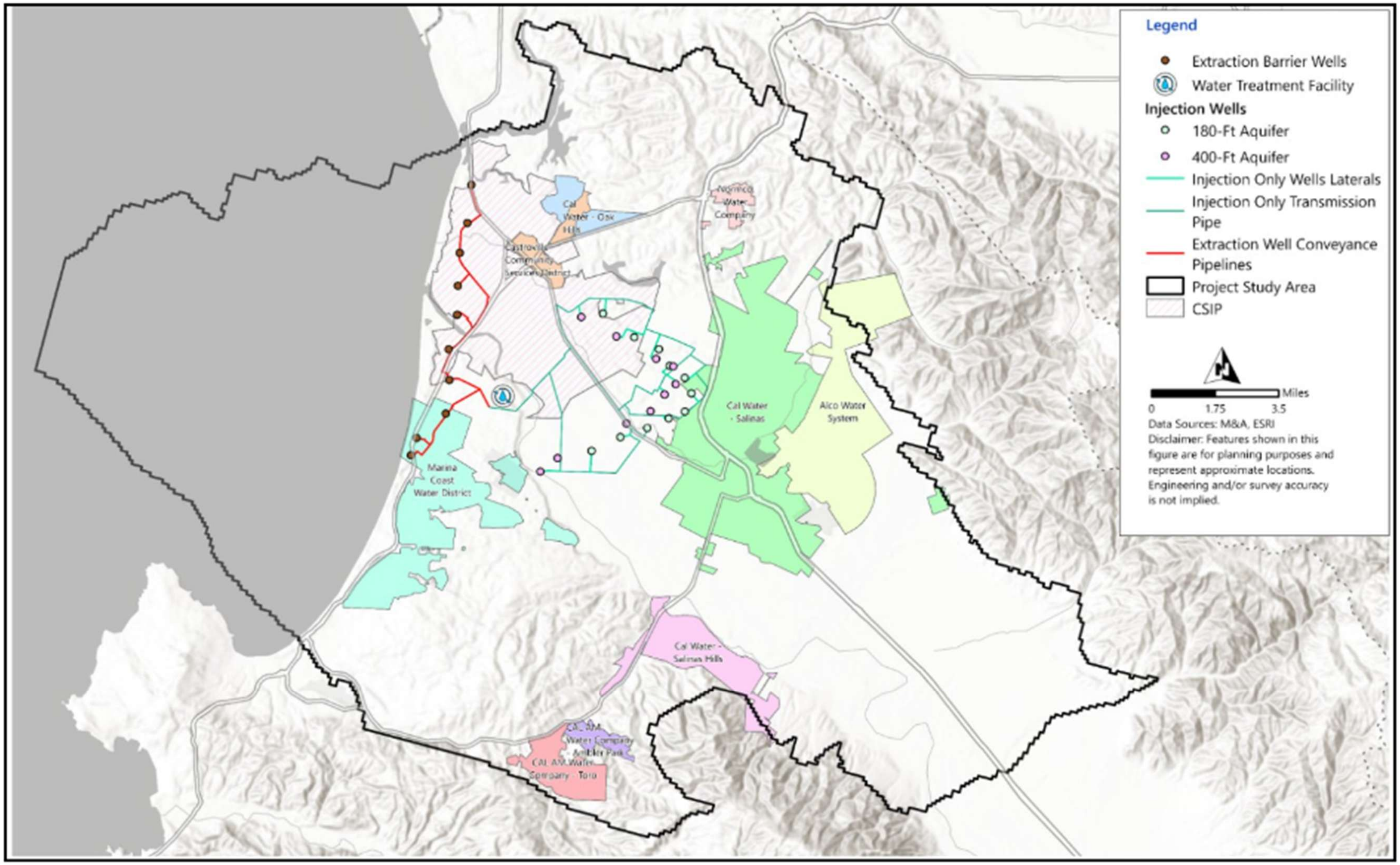


Figure 13. Conceptual Infrastructure Layout for the BGRP Injection Only Alternative

BGRP Injection Only Costs

Total project costs include both construction direct cost and soft costs. Soft costs included estimated costs for planning, design, administrative, legal, and construction management cost and are based on percentages of the direct construction costs subtotal. Construction costs have a 30% contingency applied on each line item—an escalation to midpoint of a 0.25% cost increase per month (3% annual escalation) on present day costs to a midpoint of a July 2030 construction date—and sales tax on an assumed 50% of the total direct costs. The total lifecycle cost is calculated over 40 years of operations starting in 2036.

The BGRP addresses seawater intrusion by installing an extraction barrier near the coast with injection wells farther inland to create a freshwater mound. Seven BGRP scenarios were considered. Table 5 summarizes the standardized costs of the BGRP Injection Only Alternative. The table shows total construction costs (including soft costs), annual O&M, and replacement costs. The present value costs, the annualized cost, and the cost per AF of project yield are also shown. Project yield reflects injected water for the BGRP Alternatives; therefore, the $/AF cost, $3,321, reflects the cost per acre-foot of injected water.

Table 5. BGRP Injection Only Alternative Estimated Economic Lifecyle Costs

Cost Category	Injection Only
Total Construction Cost ($M)	$951
Annual Treatment O&M ($M)	$80
Annual O&M ($M)	$33
Present Value Total Cost ($M)	**$3,459**
Annualized Cost ($M)	$156
Annual Yield (Acre-feet)	46,900
$/Acre-Foot Cost	**$3,321**

BGRP Injection Only Groundwater Modeling

Groundwater modeling of the BGRP Injection Only Alternative was refined using the October 2025 updated version of the SWIM (v3). Due to updated planning and design timelines, the refined model pushed the project's start date from 2030 to 2035. The modeling showed the impact of the BGRP Injection Only Alternative on seawater intrusion to be generally consistent with the previous modeling, with some local differences.

The BGRP Injection Only Alternative is effective at reversing seawater intrusion and avoiding undesirable results. Figure 14 shows the simulated 500 mg/L isocontour in 2040 in both the 180-Foot and 400-Foot Aquifers, resulting from the BGRP Injection Only Alternative. This figure additionally uses a black line to show the minimum threshold line that must be achieved by 2040, and a dashed red line to show the location of the 500 mg/L isocontour under the Baseline Scenario.

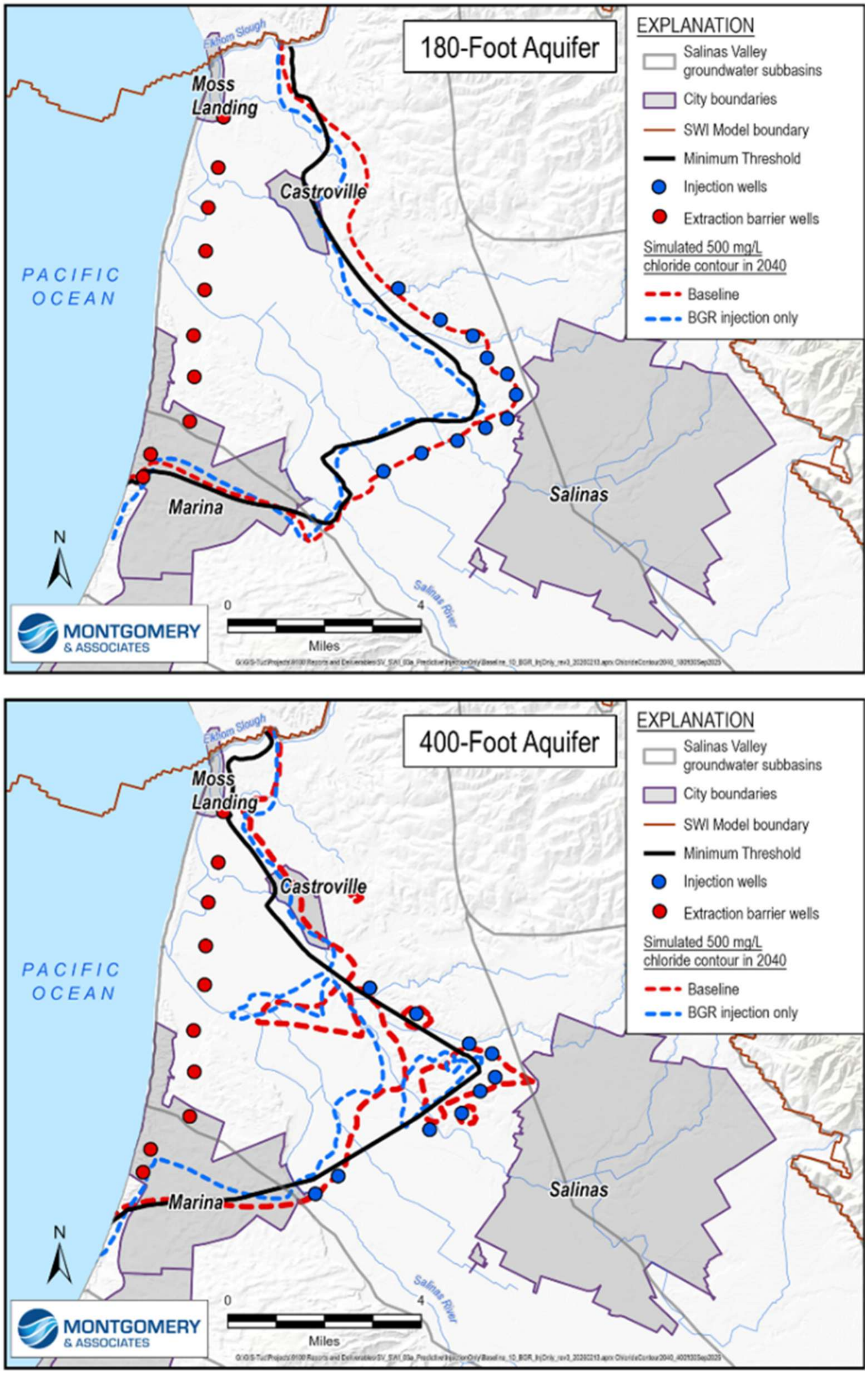


Figure 14. 2040 500 mg/L Chloride Contours Comparison of Preferred BGRP Alternative to Baseline Scenario and Minimum Threshold

6.3.2.3 Alternative Water Supply Project (AWSP)

The USBR Report includes the AWSP. The AWSP is designed to provide benefits equivalent to the BGRP Injection Only Alternative. The BGRP Injection Only Alternative meets the seawater intrusion minimum threshold requirement of holding the 500 mg/L chloride line at, or seaward of, the 2017 extent of seawater intrusion by 2040. The AWSP must meet the same minimum threshold requirements.

The AWSP provides an injection barrier inland of existing seawater intrusion. Injection is more effective at halting seawater intrusion than providing in-lieu supplies to reduce pumping because injection directly and immediately targets the areas of seawater intrusion. Providing in-lieu supplies relies on the slower process of natural recharge and might not raise groundwater levels in the specific areas needed to control seawater intrusion. Therefore, any available water supplies are used for injection in this project. Any demand management is in the form of either limits on municipal pumping or permanent land fallowing.

The AWSP includes 4 sources of water: excess river water diverted under a modified Permit 11043 at its maximum capacity, agricultural tile drain water, Salinas industrial wastewater, and water currently passing the SRDF. It provides 44,000 AFY, just slightly less than the preferred BGRP scenario's 47,000 AFY. All of these supplies are used to increase recharge and raise groundwater levels through direct injection of the treated supplies into the groundwater subbasin.

A conceptual infrastructure layout and cost for collecting, treating, and injecting the AWSP water were developed. The conceptual AWSP infrastructure is shown on Figure 25. Diverting, treating, storing, and delivering water derived from Permit 11043 will require a 400 cfs diversion structure with fish screen, a sedimentation basin to remove the high turbidity of winter river flows, a pump station and conveyance piping to transfer water to the reservoir, a new 110,000 AF reservoir, and a 21 million gallon per day (MGD) surface water treatment plant to treat surface water diverted under Permit 11043. The other 3 water sources would share a new collection and conveyance piping system, new water tanks and storage ponds, and a 20 MGD brackish water RO plant to remove salt from the agricultural tile drain and Salinas Industrial Waste Pond sources. Stored and treated water from all 4 water sources would require distribution piping and 27 injection wells to inject the water into the 180-Foot and 400-Foot Aquifers.

Figure 15 shows the conceptual infrastructure layout for the AWSP.

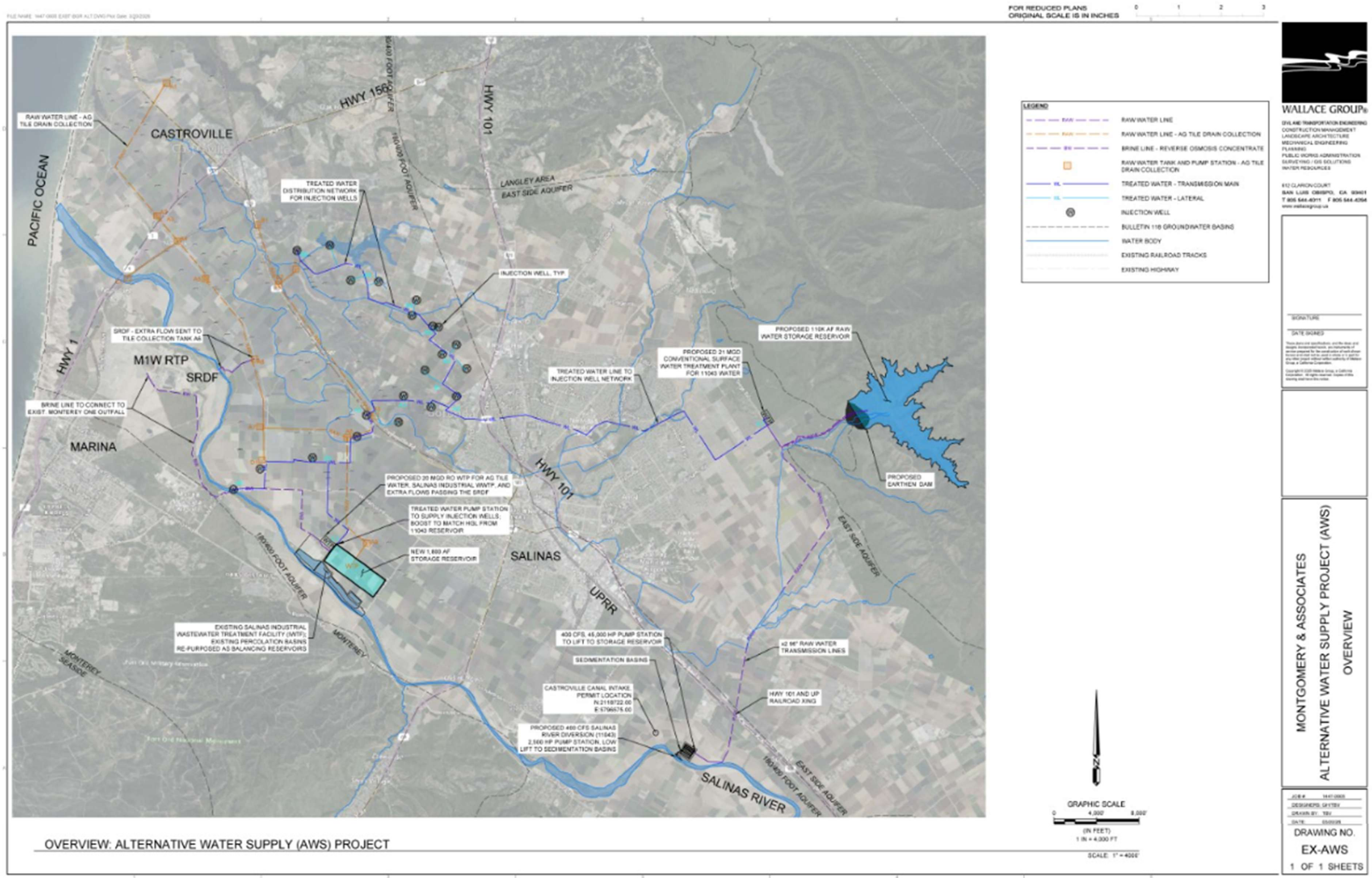


Figure 15. Conceptual Infrastructure Layout for the AWSP

AWSP Cost Estimate

Cost estimates for the AWSP are categorized as Class 5 under the Association for the Advancement of Cost Engineering (AACE) framework. Class 5 estimates represent the lowest level of project definition and accuracy, while Class 1 reflects the highest. The estimates provided here reflect an early project definition level of approximately 0–2% and are intended for concept-screening purposes.

The preliminary estimates are largely based on developing unit costs for major project components—such as dollars per unit of flow capacity for a low-lift river pump station, including the intake structure, pumps, electrical systems, and associated facilities—using data from comparable projects with known construction costs. As the project advances and more detailed design information becomes available, the estimates can be refined using more specific unit costs, material quantities, and other detailed inputs. The AWSP Alternative Costs are presented in Table 6. All costs include: 30% construction contingency, Monterey County sales tax of 7.75% applied to 50% of costs, and 3% annual escalation to July 2030 as the estimated midpoint of construction. Costs are presented in current (2026) dollars.

Table 6. AWSP Estimated Economic Lifecyle Costs

Cost Category	AWSP
Total Construction Cost ($M)	$3,847
Annual Treatment O&M ($M)	$34
Annual O&M ($M)	$50
Present Value Total Cost ($M)	$5,730
Annualized Cost ($M)	$258
Annual Yield (Acre-feet)	44,208
$/Acre-Foot Cost	**$5,836**

AWSP Groundwater Modeling

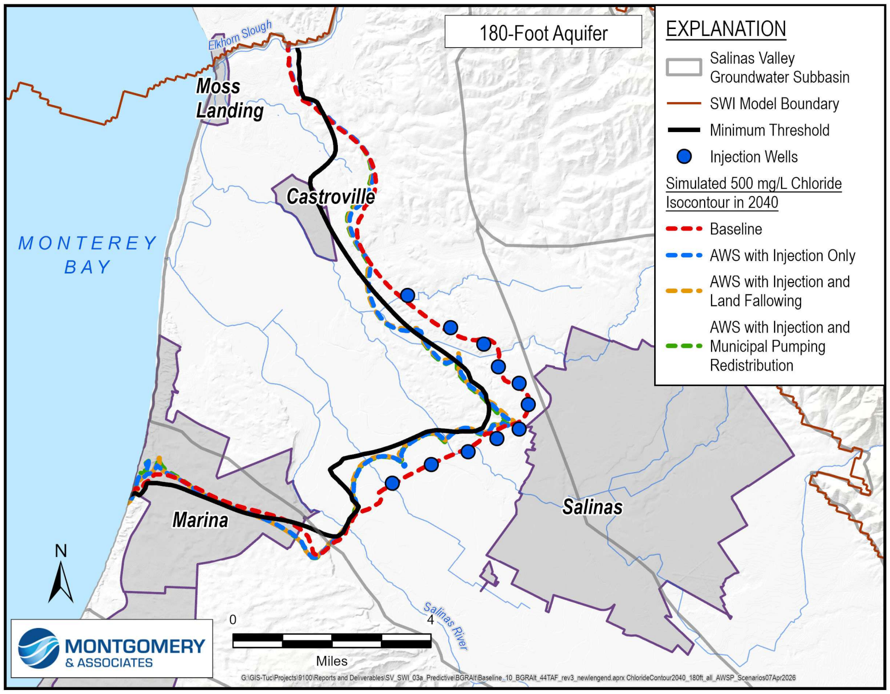
While the AWSP was designed to only include injection, 3 AWSP scenarios were simulated to assess different options:

- AWSP with injection only
- AWSP with injection and land fallowing
- AWSP with injection and municipal pumping redistribution

Groundwater modeling showed that the land fallowing and municipal pumping redistribution had insignificant impacts on controlling seawater intrusion when coupled with the AWSP injection;

therefore, only results from the AWSP with injection only scenario are presented in the section below comparing them to the NAA and BGRP.

Figure 16 shows the simulated 500 mg/L isocontour in 2040 in both the 180-Foot and 400-Foot Aquifers, resulting from the 3 AWSP scenarios. This figure additionally uses a black line to show the minimum threshold line that must be achieved by 2040, and a dashed red line to show the location of the 500 mg/L isocontour under the baseline simulation. Results show that the AWSP project is generally as effective as the BGRP Injection Only Scenario at preventing the 500 mg/L isocontour from progressing beyond the minimum threshold line, although the preferred BGRP scenario is slightly more effective near the community of Castroville. All 3 AWSP scenarios result in about the same 500 mg/L chloride isocontour by 2040, as evidenced by how difficult it is to distinguish between them on the figure.



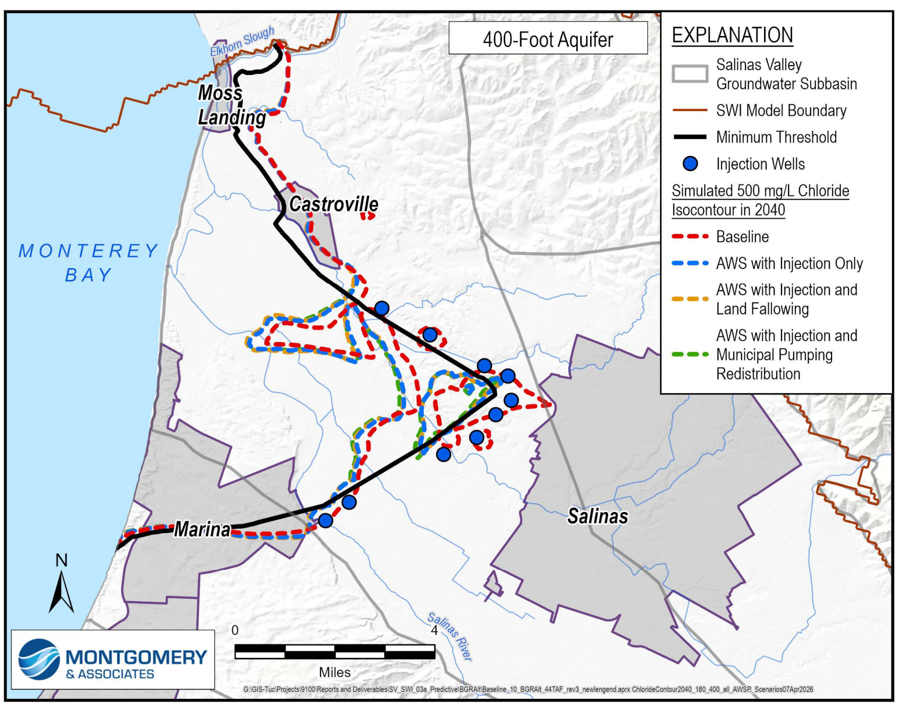


Figure 16. 2040 500 mg/L Chloride Contours Comparison of 3 AWSP Scenarios to Baseline Scenario and Minimum Threshold

6.3.3 Effect on Groundwater Conditions

Groundwater flows from areas of higher groundwater levels toward areas of lower groundwater levels. Under natural conditions, groundwater in this region flowed toward the ocean. However, as pumping lowered inland groundwater levels, the hydraulic gradient reversed and, for decades, groundwater has been flowing toward a depression northeast of the City of Salinas. This reversed gradient, coupled with a pathway for seawater to migrate inland, resulted in seawater intrusion.

The NAA, BGRP, and AWSP alternatives represent 3 different approaches to addressing seawater intrusion:

- NAA reduces extraction, allowing groundwater elevations to rise, which alters the steepness of the hydraulic gradient toward the Eastside groundwater level depression
- AWSP injects water immediately inland of the intrusion to quickly alter the gradient affecting the leading edge of seawater intrusion
- BGRP couples inland injection with extraction wells near the coast to pull back brackish groundwater and prevent further intrusion of higher saline water

The figures below illustrate these dynamics through modeling comparisons of groundwater levels, chloride concentrations, and the seawater intrusion isocontour for the Baseline, NAA, BGRP, and AWSP. Although multiple scenarios were run, for the NAA the scenario with no agricultural pumping in all subbasins is shown for the NAA, and the scenario with injection only is shown for the AWSP. All 3 alternatives were modeled using SWIM v3.

Figure 17 shows how groundwater levels respond to the alternatives as of the 2040-2041 evaluation period, with the 180-Foot Aquifer displayed on the top set of maps and 400-Foot Aquifer displayed on the bottom set of maps. The Baseline Scenario maps show the prominent low groundwater levels of the Eastside groundwater level depression. In the NAA, groundwater levels rise relative to the Baseline across a broad area, raising it above sea level outside of the Eastside alluvial fans. In the AWSP, groundwater levels rise just in the vicinity of the injection wells, raising them to above sea level in the 180-Foot Aquifer; however, in the 400-Foot Aquifer groundwater levels are still below sea level except for in the immediate vicinity of the injection wells. In the BGRP, groundwater levels are raised near the injection wells, and the extraction barrier wells lower groundwater levels from near the coast..

Figure 18 shows the chloride concentration at 2040 for each scenario, with red indicating concentrations close to seawater and the 500 mg/L chloride isocontour marked with a black dashed line. Chloride concentrations of the NAA are almost exactly the same as the Baseline Scenario. The AWSP and BGRP show how effective the injection wells are at stopping and pushing the seawater intrusion back with sufficient volumes for injection. However, high saline water continues to intrude with the AWSP, which causes the chloride concentrations west of the injection wells to increase, while the BGRP decreases the chloride concentrations in the existing seawater intruded area east of the extraction barrier wells.

Figure 19 shows the progression of the 500 mg/L chloride isocontour over time. Seawater intrusion continued to progress in all scenarios before agricultural pumping was stopped or the project came online. Then, even by 2040, just 5 years into the BGRP and AWSP, the chloride isocontour is already pushed back to where it was in 2022.

Figure 20 shows where the 500 mg/L chloride isocontour is at 2040 for each alternative in comparison to the seawater intrusion minimum threshold. The seawater intrusion minimum threshold is set at the 2017 extent of seawater intrusion, and to compare model results to model results, the figures show the 2017 simulated extent. It shows that by 2040, the AWSP and BGRP have greater effect on the chloride isocontour than the NAA, pushing it close to the minimum threshold line. The differences from baseline become even more prominent over time, as illustrated by Figure 21, which shows the 2070 500 mg/L chloride isocontour.

The results across scenarios also illustrate a fundamental distinction between groundwater level and seawater intrusion responses to recharge and pumping changes. From a groundwater level standpoint, injecting a given volume near a pumping well is nearly equivalent to reducing pumping by that amount, regardless of source water quality or timing. Chloride concentration responses, however, are driven by flow paths and conduits for seawater intrusion, source water quality, and mixing and spreading processes in ways that are highly sensitive to the configuration and timing of sources (including recharge and pumping reductions) and sinks (continued pumping). This means scenarios with similar groundwater level effects may produce markedly different chloride outcomes. For PMAs specifically targeting seawater intrusion, the details of location, timing, and water quality therefore matter considerably more than they do for groundwater level management.

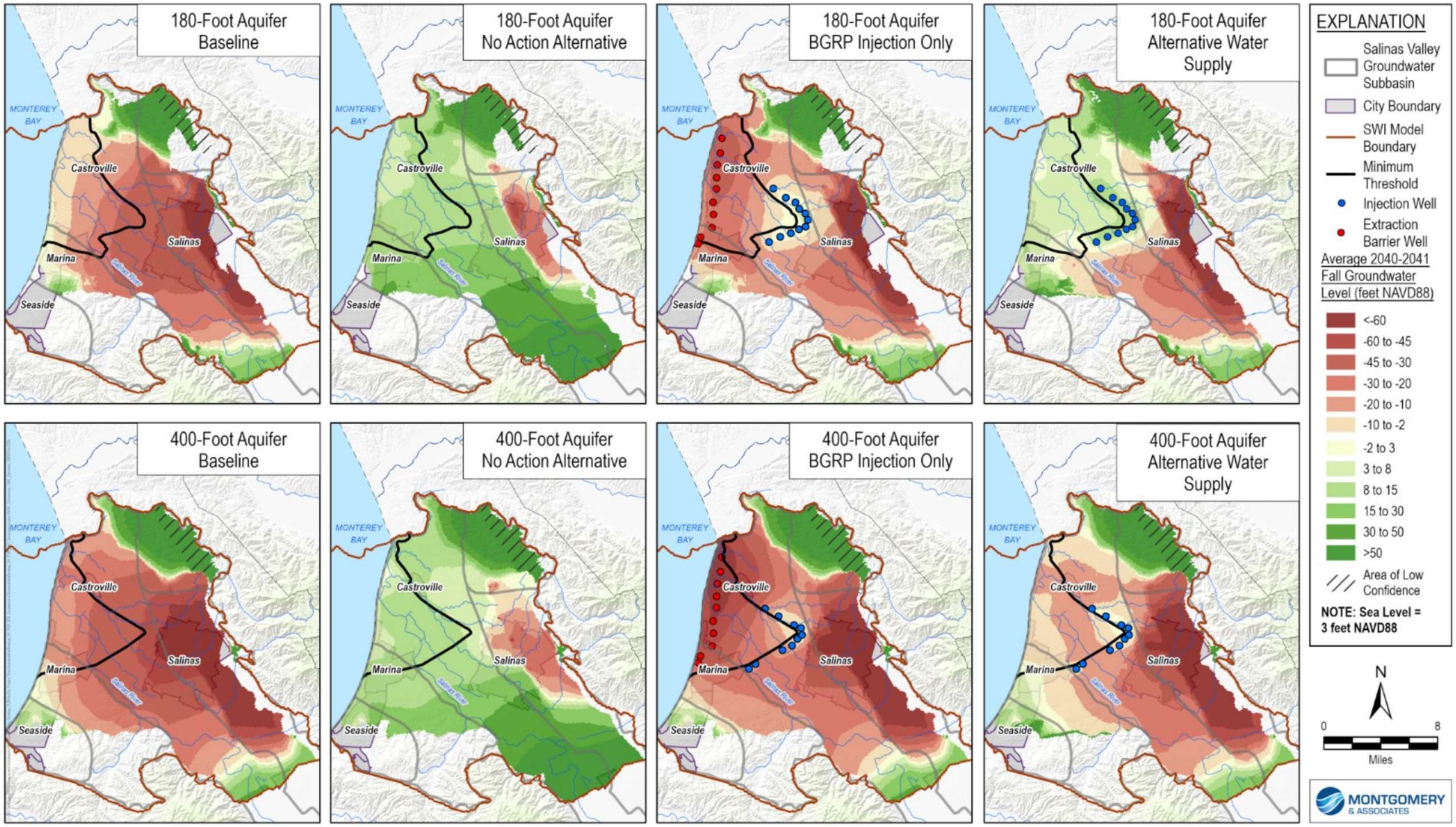


Figure 17. Groundwater Elevations for the Baseline Scenario, NAA, BGRP, and AWSP Alternatives

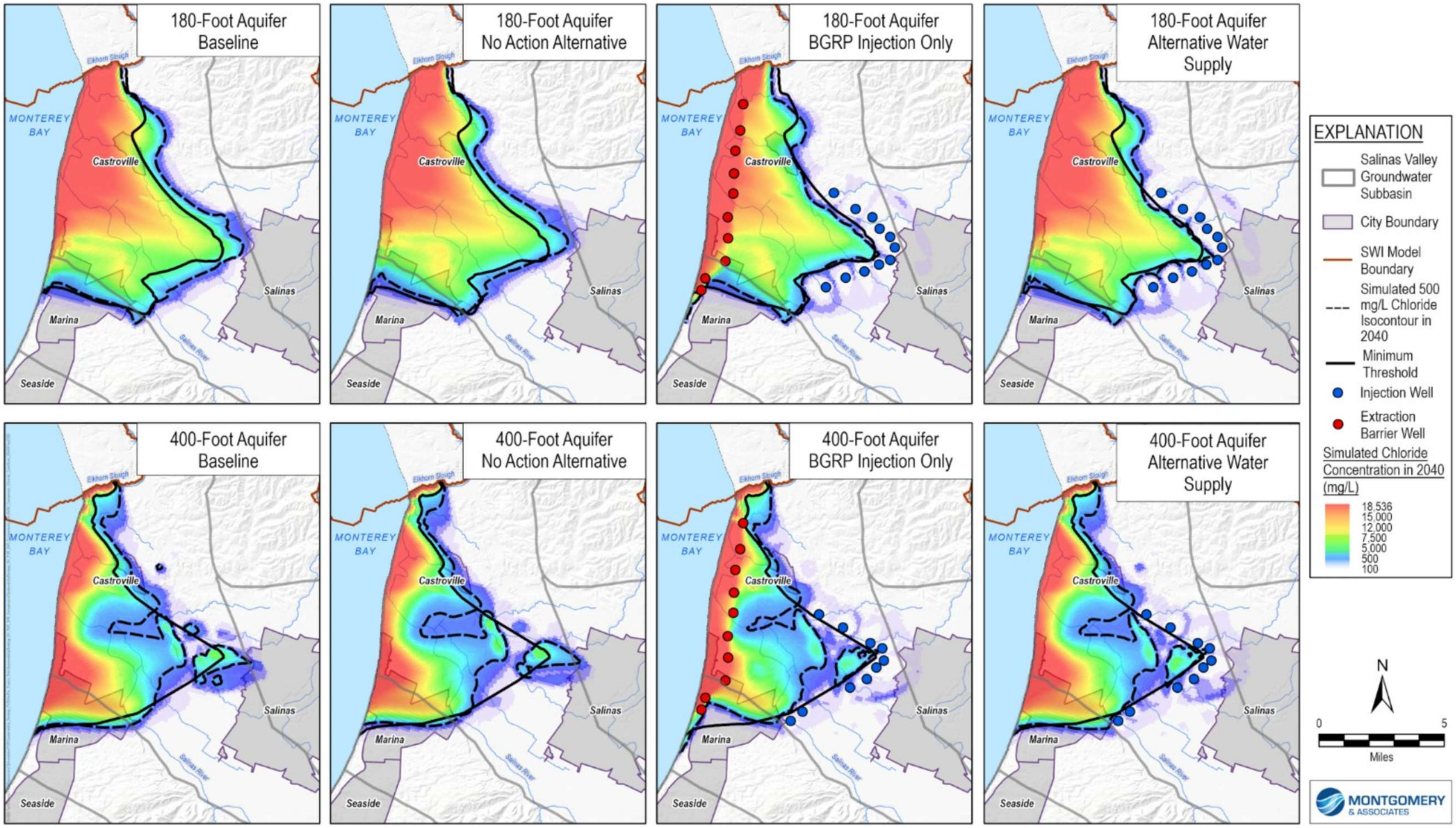


Figure 18. 2040 Chloride Concentrations for the Baseline Scenario, NAA, BGRP, and AWSP Alternatives

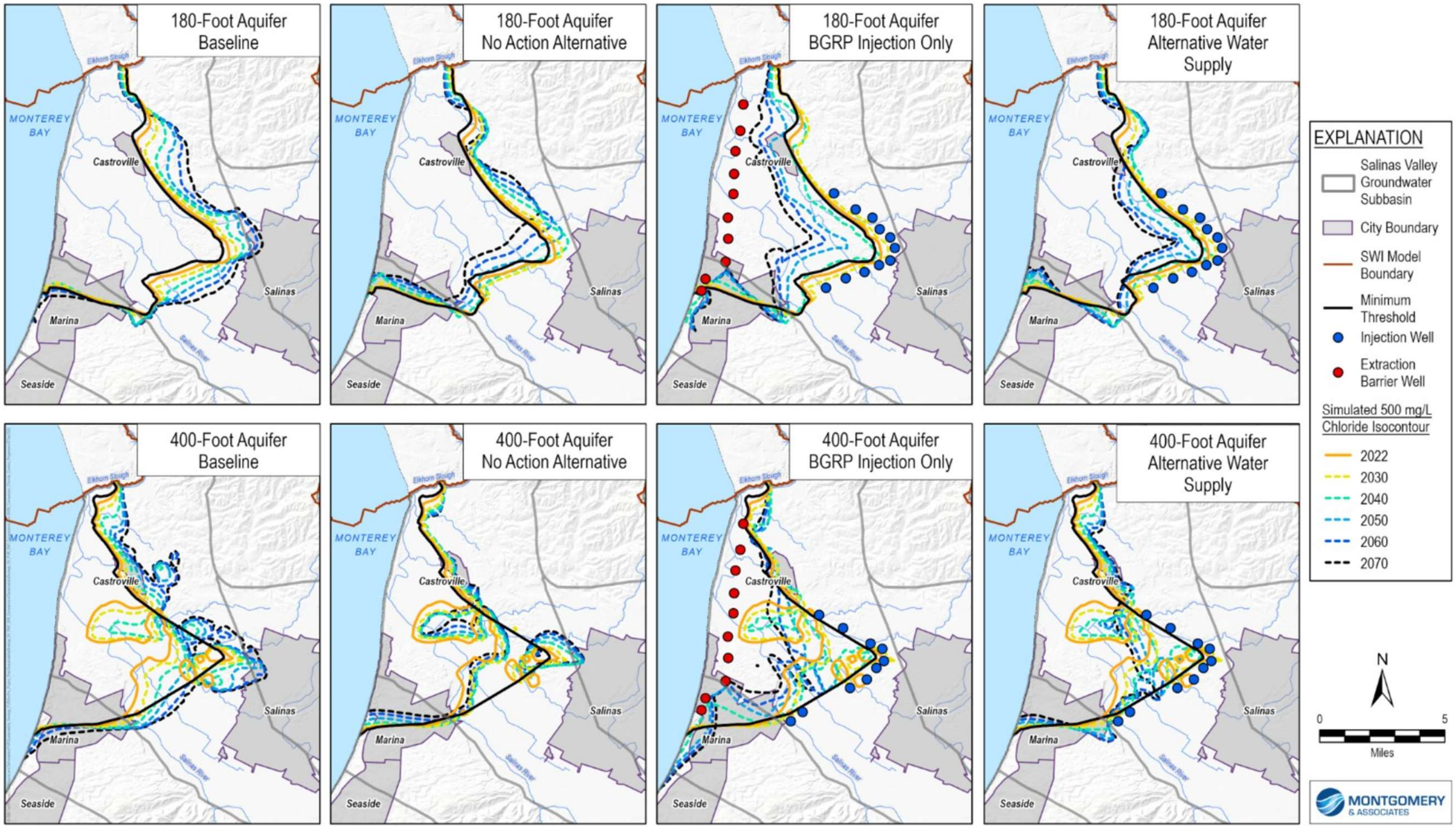


Figure 19. Simulated Progression of 500 mg/L Chloride Isocontour for the Baseline Scenario, NAA, BGRP, and AWSP Alternatives

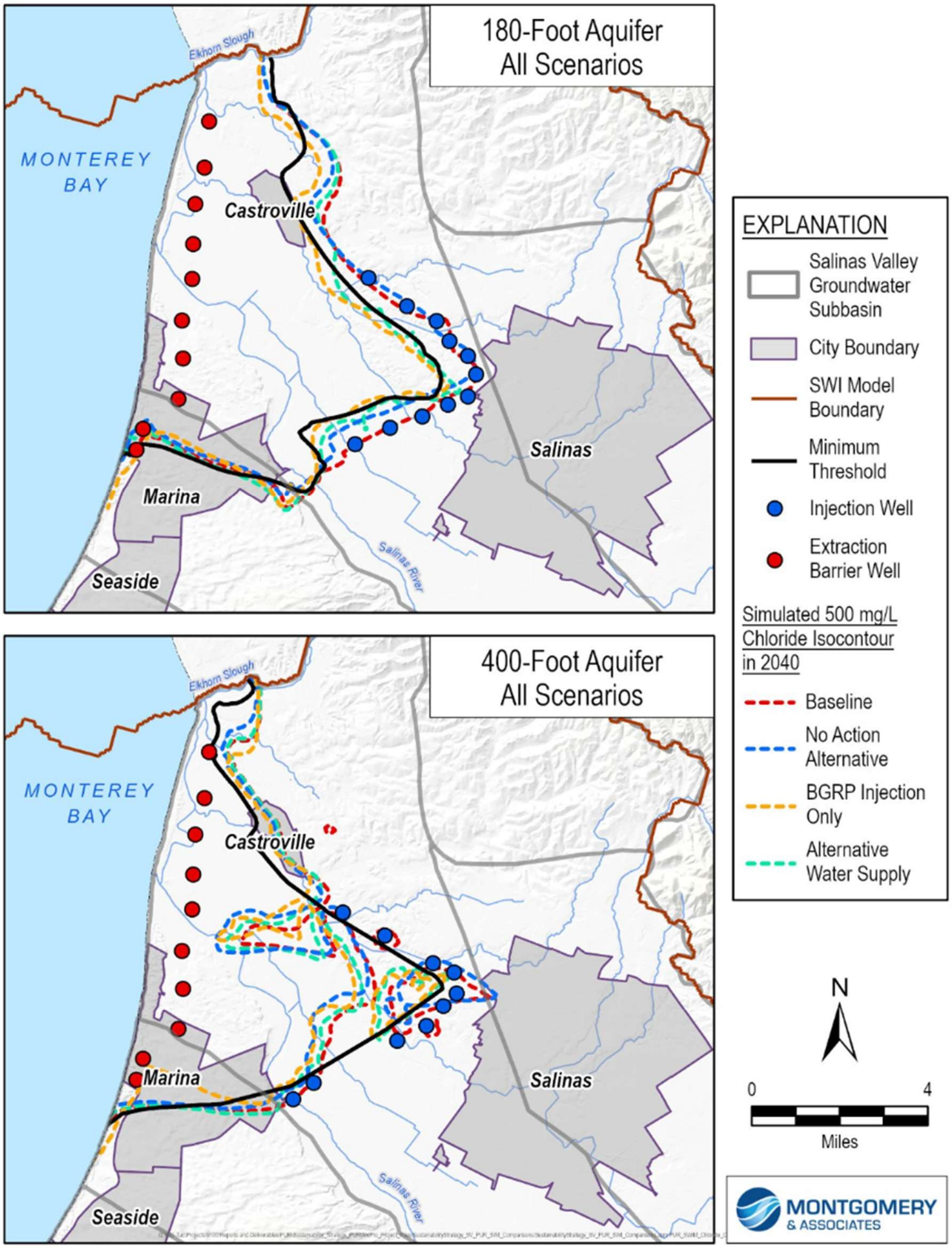


Figure 20. 2040 500 mg/L Chloride Isocontours Comparison of the NAA, BGRP, and AWSP to Baseline Scenario and Minimum Threshold

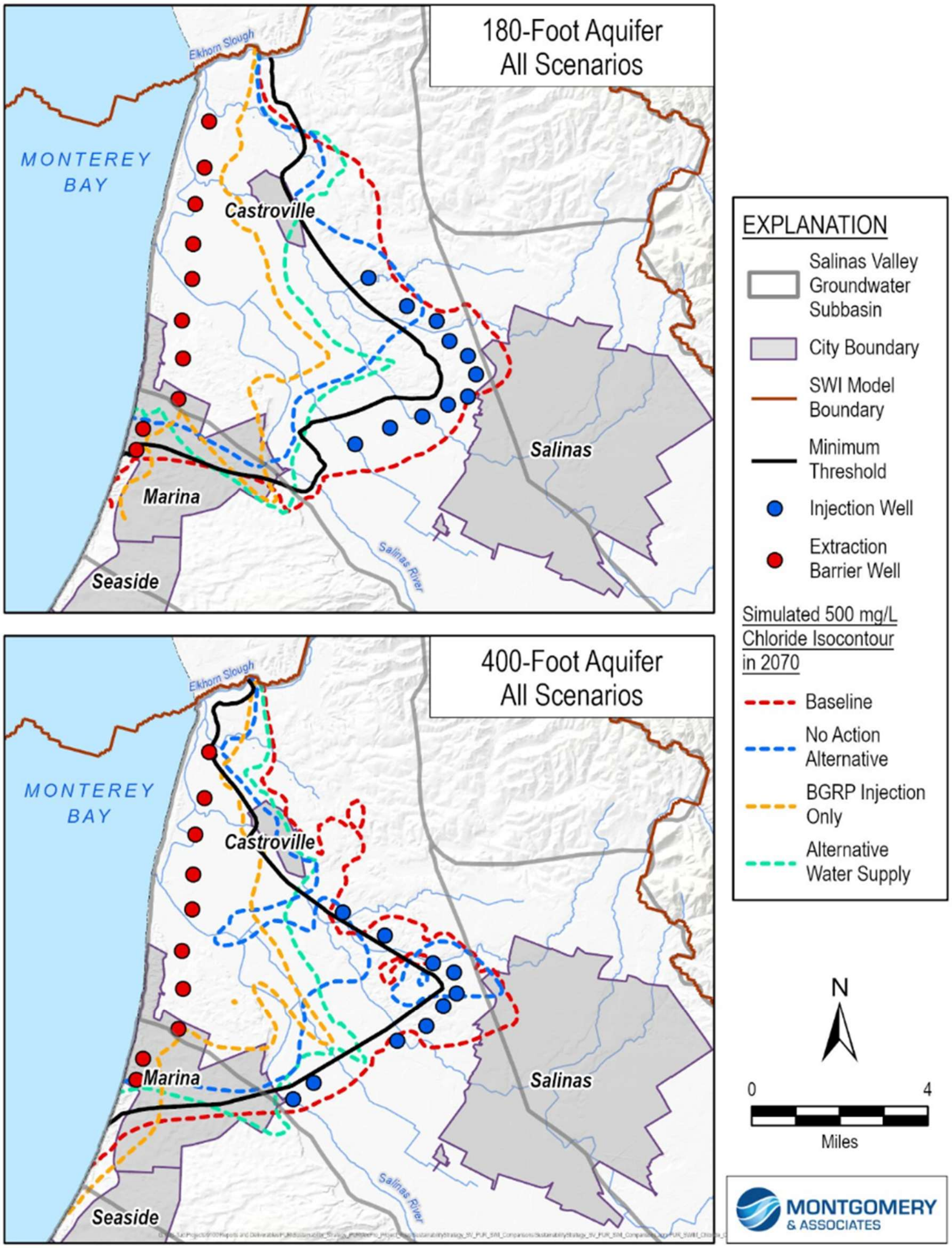


Figure 21. 2070 500 mg/L Chloride Isocontours Comparison of AWSP to Baseline Scenario and Minimum Threshold

Table 7 compares simulated change in chloride mass and change in seawater intruded area between the Baseline, the BGRP, and the AWSP Scenarios. Both the BGRP and AWSP Scenarios reduce the chloride mass and seawater intruded area in the 180-Foot Aquifer. However, in the 400-Foot Aquifer, only the BGRP Scenario results in reductions according to both metrics. The BGRP Scenario results in the greatest reduction in both chloride mass and intruded area of the 3 options. Future studies will refine the project location and extraction and injection rates in association with further feasibility work.

Table 7. BGRP Modeling Results Summary Calculations

	180-Foot Aquifer		400-Foot Aquifer	
Model Run	2035-2040 Change in Chloride Mass (kg)	2035-2040 Change in Seawater Intruded Area (acres)	2035-2040 Change in Chloride Mass (kg)	2035-2040 Change in Seawater Intruded Area (acres)
Baseline Scenario	98,200	900	333,000	1,700
AWSP	-97,300	-1,500	172,200	400
NAA	-81,600	0	36,300	400
BGRP Injection Only	-643,800	-3,800	-320,100	-1,000

Only addresses model areas with >500 mg/L concentration
and east of the extraction barrier regardless of scenario (for comparison purposes).
kg = kilogram
Red cells in this table show areas where chloride mass or intruded area increases. Green cells in this table show areas where chloride mass or intruded area decreases.
Because the 180-Foot Aquifer is simulated by 3 model layers, the change in chloride mass sums the chloride mass in all 3 layers. The change in seawater intruded area is only for Layer 5, which corresponds to the Lower 180-Foot Aquifer and generally presents more advanced seawater intrusion.

6.3.4 Economic and Financial Analysis

An economic feasibility analysis and financial analysis was developed for the BGRP and AWSP alternatives. The economic feasibility analysis evaluates the benefits of the project and compares them to the standardized costs of the project, using appropriate methods. The analysis is conducted from the perspective of the Salinas Valley in Monterey County and is used to determine if the project represents a justifiable use of resources by creating benefits that exceed the costs. The financial feasibility analysis evaluates whether sufficient resources are available to cover all construction and long-term O&M costs of the project. It is evaluated separately from economic feasibility and ensures that the project can be paid for, from initial construction to operations. Financial feasibility is determined after a cost allocation step that apportions project costs among parties (e.g., in proportion to project benefits received). Project cost allocation has not been determined at this stage, and as such a preliminary financial analysis is presented.

Addressing seawater intrusion and protecting groundwater quality is important for all water users and the greater Monterey County economy. Over 400,000 residents depend on local water supplies. Agriculture is a major industry in Monterey County. The U.S. Department of

Commerce Bureau of Economic Analysis estimates the total gross domestic product (GDP) of Monterey County to be about $36.86 billion as of 2023. Agriculture generates nearly one-quarter of this value, about $8.04 billion annually. Transportation, warehousing, processing, and other wholesale trade industries that are directly tied to the local farming industry contribute an additional $3-$4 billion in annual GDP. Salinas Valley communities have substantial linkage to the agricultural industry.

The economic analysis evaluates project benefits and determines whether each project alternative represents an efficient use of resources for the Salinas Valley. This involves monetizing economic benefits and comparing them to project costs. The economic analysis evaluated economic benefits, in addition to other economic effects, and regional economic effects. These separate components (economic benefits, other economic effects, regional effects) are summarized in the following sections. Other economic effects and regional effects are not added to project economic benefits. The project may provide other intangible (i.e., currently non-monetized) economic benefits such as improved water supply reliability by developing a stable, drought-resistant supply for the region, benefits for broader water resources system conjunctive operations, and environmental benefits. These are qualitatively described.

Table 8 summarizes the economic benefits, economic and regional effects, and other considerations attributable to the BGRP or AWSP.

Table 8. Economic Benefits, Economic Effects, and Regional Effects Summary

Component	Component	Evaluation	Monetized
Economic Benefits	Domestic water shortage costs	Avoided costs benefit relative to NAA	Yes
	State Board administrative costs	Avoided costs benefit relative to NAA	Yes
	Agricultural land fallowing	Avoided costs benefit relative to NAA	Yes
Other Economic Effects	Agricultural water quality	Economic effect relative to baseline	Yes
	Domestic water quality	Economic effect relative to baseline	No
	Well deepening and replacement	Economic effect relative to baseline	No
	CSIP improvements	Economic effect relative to baseline	Qualitative overview
	Pumping lift / groundwater levels	Economic effect relative to baseline	Yes
Regional Economic Effects	Regional effects	Distributional effects	Yes
Other Qualitative Factors	Water supply reliability	Potential benefit	Qualitative overview
	Deep aquifers	Potential benefit	Qualitative overview
	System operations	Potential benefit	Qualitative overview
	Environment	Potential benefit	Qualitative overview

The economic benefits of a project—BGRP or AWSP—are measured relative to the NAA. As described earlier, in the absence of a project there would be undesirable results that would trigger SWRCB intervention. Groundwater modeling was used to evaluate potential SWRCB pumping limits or reductions to address seawater intrusion. The modeling shows that pumping reduction alone, even complete cessation of all agricultural pumping in the Salinas Valley, cannot meet the seawater intrusion minimum threshold by 2040. A NAA that assumes that all agricultural pumping is cut off in the 180/400-Foot Aquifer and other Subbasins in the Salinas Valley does not appear to be politically plausible and certainly violates any notion of an economically sustainable solution.

The NAA assumes that the SWRCB would implement certain pumping reductions to manage seawater intrusion recognizing that the minimum threshold may not be fully achieved by 2040. Domestic water users would be limited to the target of 42 gallons per capita per day (gpcd). Since the location and magnitude of agricultural pumping reductions are not known, a range of pumping reductions up to full cessation of pumping were considered in the economic analysis. The level of pumping reduction at which the economic cost of the reductions would exceed the cost of the project was determined. At this level of pumping reduction, any NAA that meets or exceeds that level of reductions is economically inferior to a structural alternative (e.g., BGRP or AWSP). This occurs at around a 30% cut in pumping (valley wide). The NAA range shows a 30% and 50% cut. This would result in economic costs that exceed the cost of the BGRP and AWSP alternatives.

In summary, the NAA considers SWRCB intervention that would impose administrative fees, reduce domestic water use to minimum requirements, and limit agricultural pumping. A range of agricultural pumping limits were evaluated, with 30% and 50% shown here as the economic costs exceed the cost of the project alternatives.

The economic benefits of the AWSP or BGRP are the increase in economic value to society that occurs because the project is implemented. Benefits are measured relative to the NAA (the most likely conditions in the future). Economic benefits are defined as the avoided costs, avoided damages, or increased productivity that result from the project compared to what would otherwise occur under the NAA. The economic benefits of the project include the avoided cost of:

- Domestic water shortage costs
- State Board administrative costs
- Agricultural land fallowing (State Board agricultural pumping reductions)

Table 9 summarizes the results of the analysis of economic benefits (avoided costs) attributable to the project. The annual and present value of each economic benefit is shown under the 30%

and 50% pumping reduction scenarios. The annual benefit of the project (BGRP or AWSP alternative) is between $220 million and $365 million. The present value (PV) of the project is between $4.88 billion and $8.11 billion. This does not include other economic effects attributable to the project (summarized in the subsequent section). The economic benefits are the same for the BGRP and AWSP alternatives because both alternatives would avoid the same costs under the NAA.

Table 9. Summary of NAA Scenario Benefits at 30% or 50% Pumping Reduction

Benefit (Avoided Cost)	30% Reduction	50% Reduction
PV Agricultural Water Supply ($ M)	$3,798	$7,107
PV Municipal Water Supply ($ M)	$787	$787
PV State Board Fees ($ M)	$295	$215
Total PV ($ M)	$4,880	$8,108
Annualized Benefits ($ M)	$220	$365

Table 10 summarizes the BGRP and AWSP benefit-cost analysis. The BGRP annualized cost equals $155.7 million, or $3,321 per AF of injected project water, and the present value (PV) of those costs equals $3.46 billion. The annualized BGRP economic benefits are between $4.88 billion and $8.11 billion under the 30% and 50% cut scenarios. The BGRP benefit-cost ratio is between 1.41 and 2.34 with NPV benefits of $1.4 to $4.6 billion. The AWSP annual cost equals $257.9 million, or $5,836 per AF of injected project water, and the present value of those costs equals $5.7 billion. The annualized AWSP economic benefits are between $4.88 billion and $8.11 billion under the 30% and 50% cut scenarios. The AWSP benefit-cost ratio is between 0.85 and 1.42 with NPV benefits of ($0.85 billion) to $2.4 billion.

Table 10. Summary of Project Alternatives Economic Evaluation

Item	BGRP	AWSP
PV Cost	**$3,459M**	**$5,730M**
Annualized Cost per AF Injected	**$3,321 ($/AF)**	**$5,836 ($/AF)**
30% Agricultural Cut, 42 gpcd domestic, SWRCB Fees		
PV Benefit	$4,880M	$4,880M
B/C Ratio	1.41	0.85
NPV	$1,420M	-$850M
50% Agricultural Cut, 42 gpcd domestic, SWRCB Fees		
PV Benefit	$8,108M	$8,108M
B/C Ratio	2.34	1.42
NPV	$4,650M	$2,378M
B/C Ratio Range	**1.41 - 2.34**	**0.85 – 1.42**

The economic feasibility analysis finds that the BGRP has a benefit cost ratio greater than 1.41 and generates net benefits of $1.4 to $4.6 billion, which is greater than the AWSP alternative.

There are other monetizable economic values generated by the project, but they are measured relative to baseline conditions (Baseline Scenario) of continued pumping at current levels and not the NAA; therefore, these other economic effects are not economic benefits of the project. However, as the project is refined, and additional data is developed, these other economic effects may become important project economic benefits. These additional economic effects of the project include the avoided cost of the following:

- Water quality impacts (crop yield losses) to agriculture
- Water quality impacts to domestic water users
- Well deepening and replacement costs
- CSIP improvements
- Additional pumping lift and energy costs

Table 11 summarizes other economic effects, the annual value at 2040 conditions, and the PV of the effect over the project planning horizon. The monetized economic effects are shown for the AWSP and BGRP separately because the effects are measured for each project relative to baseline conditions (Baseline Scenario). The PV of BGRP economic effects equals $220.54 million. The PV of AWSP economic effects equals $160.64 million.

Table 11. Other Economic Effects Summary

	BGRP		AWSP	
Effect	**Annualized ($ Millions)**	**Present Value ($ Millions)**	**Annualized ($ Millions)**	**Present Value ($ Millions)**
Agricultural water quality	$9.66	$214.54	$6.74	$149.60
Domestic water quality	Not evaluated	Not evaluated	Not evaluated	Not evaluated
Pumping lift / groundwater levels	$0.27	$6.00	$0.50	$11.04
Avoided CSIP costs	Not evaluated	Not evaluated	Not evaluated	Not evaluated
Total	**$9.93**	**$220.54**	**$7.24**	**$160.64**

Other economic effects were evaluated relative to the baseline conditions. These can be evaluated in future iterations of this analysis and compared to the NAA to establish project economic benefits.

Other economic outcomes of the project that were considered but not monetized include but are not limited to avoided deep aquifer pumping, improved regional water supply reliability, operational value to broader conjunctive use of the regional water system, and other environmental effects.

Regional effects evaluate how changes in economic activity caused by the project ripple through the regional economy, affecting jobs, income, output, and business activity. These effects measure distributional changes in gross economic activity, not the net economic value of the project, and are not a measure of project benefits. Regional economic effects include changes in:

- Jobs. Full time equivalent jobs in local communities in Monterey County.
- Output value. A measure of the gross value of goods and services produced by a firm, industry, or economy.
- Value added. The net value that a producer creates for the Monterey County economy by transforming inputs into final goods or services.
- Income. The wage earnings generated in Monterey County from production activities.

Regional economic effects are evaluated for the NAA. That is, the regional economic effects illustrate the regional implications of the BGRP or AWSP in terms of jobs, output value, and related metrics for local (county) economic activities by keeping more agricultural land in production. The regional economic effects do not consider expenditures for project construction and operations, as well as any offsetting costs of additional water charges to users to pay for the project. These may be evaluated in future iterations of the analysis.

The regional economic effects of the project translate changes in agricultural production into associated spending in the regional economy. Outputs of the analysis include the change in total output, labor income, value added, and employment. The regional effects are reported separately for the 30% and 50% pumping reduction NAA scenarios.

Table 12 shows the regional effects of the project for the 30% pumping reduction scenario. The project is associated with an increase of (i.e., would protect) 9,495 full time equivalent (FTE) jobs (over 18,000 seasonal jobs as is typical in farming), $1,559 million in value added annually, and $1,845 million in gross output value annually for the 30% pumping reduction NAA scenario.

Table 12. NAA 30% Cut Scenario Regional Economic Effects

Effect	Employment (FTE)	Labor Income ($ Millions)	Value Added ($ Millions)	Output ($ Millions)
Direct	-5,238	-$732	-$1,133	-$1,196
Indirect	-1,794	-$117	-$164	-$229
Induced	-2,463	-$144	-$263	-$421
Total	**-9,495**	**-$993**	**-$1,559**	**-$1,845**

Table 13 shows the regional effects of the project for the 50% pumping reduction NAA scenario. The project is associated with an increase of (i.e., would protect) 14,224 FTE jobs (over 28,000 seasonal jobs as is typical in farming), $2,353 million in value added annually, and $2,781 million in gross output value annually for the 50% pumping reduction NAA scenario.

Table 13. NAA 50% Cut Scenario Regional Economic Effects

Effect	Employment (FTE)	Labor Income ($ Millions)	Value Added ($ Millions)	Output ($ Millions)
Direct	-7,806	-$1,107	-$1,711	-$1,802
Indirect	-2,695	-$176	-$245	-$343
Induced	-3,723	-$218	-$397	-$636
Total	**-14,224**	**-$1,501**	**-$2,353**	**-$2,781**

A financial feasibility analysis of the BGRP evaluates how the project would be funded, financed, and if it can be paid for. This includes identifying how project costs are allocated among stakeholders and determining potential funding sources such as grants, loans, or user fees. At this stage, detailed cost allocation methods and specific funding mechanisms have not been established. Therefore, illustrative financial estimates were developed for the estimated project capital costs, annual operating expenses, and borrowing, providing a preliminary basis for assessing affordability and guiding future financial planning.

The financial cost of the BGRP Alternative (the alternative with the greater benefit-cost ratio and net benefits) after 25% Reclamation cost share is $425 per acre-foot if spread over all Salinas Valley groundwater pumping (in 2035 dollars). This is an illustrative cost allocation approach (spreading costs over all groundwater pumping) and will be revised as part of future project evaluation and planning, which will change the financial cost of the project. Project financial costs change over time with debt repayment, inflation, and system replacement.

The financial analysis suggests there is sufficient overall payment capacity to support the project, although the affordability to individual payers will depend on the final cost allocation approach. In general, the Monterey County economic base and the scale of anticipated project benefits suggest that project costs can be supported if costs are distributed in a manner that is equitable and aligned with beneficiaries. As the project is refined and a funding plan is developed, the allocation of costs among groundwater users, landowners, other beneficiaries, and other potential funding sources will be developed. Accordingly, preliminary findings indicate that payment capacity is expected to be adequate, subject to development of a feasible and appropriately structured cost allocation methodology.

The economic benefits and other economic effects of addressing seawater intrusion in the Salinas Valley exceed several billion dollars in present value terms. Both project alternatives avoid State Board intervention, with loss of local control over groundwater management, imposition of fees, and management that, for the NAA, was evaluated as pumping curtailments up to 50%. The regional economic effects of the NAA are also substantial and would result in profound implications for Salinas Valley and broader Monterey County communities. This includes the loss of tens of thousands of farm jobs, loss of labor wage income, and losses to farming businesses and communities across the county.

The analysis illustrates that there are economic benefits from managing seawater intrusion in the Salinas Valley, and importantly, that the seawater intrusion minimum threshold cannot be achieved by pumping reductions alone. The BGRP and AWSP alternatives both raise groundwater levels, improve water quality, and help push seawater intrusion back toward the coast. The economic analysis shows that the BGRP is lower cost than the AWSP alternative and results in a benefit cost ratio between 1.41 and 2.34, and PV of net benefits between $1.42 and $4.65 billion. The financial analysis provides a preliminary overview of financial costs with an example cost allocation approach and payment capacity.

6.3.5 Summary of Findings

The BGRP Injection Only and AWSP Alternatives would meet the seawater intrusion goals outlined in the Salinas Valley GSPs by halting and reversing seawater intrusion in the 180/400 Subbasin and improving groundwater quality in the region. The BGRP Injection Only Alternative's capital cost of approximately $950 million is less expensive than both the capital cost of the AWSP, which provides similar benefits, and the economic cost likely to occur if the SWRCB intervened as assessed with the NAA Alternative. While the BGRP Injection Only Alternative addresses the seawater intrusion minimum thresholds, and in some areas also groundwater level minimum thresholds, it would need to be modified or combined with other PMAs to address all groundwater goals in the Salinas Valley.

Several other findings in the USBR Report include:

- The configuration of the BGRP Injection Only Alternative offers flexibility to be increased in scale in the future to extend the seawater barrier with some expansion of infrastructure to potentially serve agricultural or urban end users.
- The BGR Injection Only Alternative allows the existing agricultural operations in the area and domestic well usage be maintained while also addressing seawater intrusion. Conversely, the NAA shows that even foregoing all pumping in the subbasins, which would have a critical impact on the agricultural economy in the area, was ineffective at moving the 500 mg/L chloride isocontour in the 180-Foot and 400-Foot Aquifers back to the required minimum threshold line by 2040.
- An EIR/Environmental Impact Statement (EIS) will be needed to address environmental considerations identified in the USBR Report and CEQA Initial Study, along with numerous regulatory permits. Significant environmental impacts and mitigation measures will be identified during the environmental review process.

6.3.5.1 Groundwater Modeling Key Findings

Table 14 summarizes the findings from the groundwater modeling for the NAA, BGRP Injection Only, and AWSP Alternatives, as compared to the SWIM Baseline Scenario.

Table 14. NAA, BGRP, and AWSP Groundwater Modeling Summary

	Baseline Scenario	NAA	BGRP Injection Only Alternative	AWSP Alternative
Projects' ability to meet the SGMA seawater intrusion minimum threshold	Does not meet the SGMA seawater intrusion minimum threshold	Does not meet the SGMA seawater intrusion minimum threshold	Meets the SGMA seawater intrusion minimum threshold	Meets the SGMA seawater intrusion minimum threshold
Compliance with SGMA	No	Through the State Board intervention process	Yes, pushes seawater intrusion back to minimum threshold	Yes, pushes seawater intrusion back to minimum threshold
Reduce chloride mass by 2040	Significant increase in chloride mass	Significant increase in chloride mass	Largest decrease in chloride mass among all alternatives	Increase in chloride mass
Reduce area of seawater intrusion by 2040	Significant increase in area of seawater intrusion	Significant increase in area of seawater intrusion	Largest decrease in area of seawater intrusion among all alternatives	Small decrease in area of seawater intrusion

Additionally, the following observations from the SWIM modeling help guide the selection of projects for managing seawater intrusion:

- Injection helps raise groundwater levels immediately inland of the seawater intrusion front and reduce or reverse advancement.
- Coupling extraction barrier wells with injection wells helps counteract the strong inland groundwater gradient driving seawater intrusion, clean up existing intrusion, and prevent further intrusion of high chloride seawater.
- Supplementing treated water injection with redistributing municipal pumping or fallowing agricultural lands has minimal benefit to managing the location of the 500 mg/L chloride isocontour.

6.3.5.2 Economic Analysis Key Findings

The regional economic effects of the NAA have substantial implications for Salinas Valley and broader Monterey County communities. This includes the loss of tens of thousands of farm jobs, loss of labor wage income, and losses to farming businesses and communities across the County.

The economic benefits and other economic effects of addressing seawater intrusion in the Salinas Valley exceed several billion dollars in present value terms. Both project alternatives in the USBR Report avoid SWRCB intervention, with loss of local control over groundwater management, imposition of fees, and management that, for the NAA, was evaluated as pumping curtailments up to 50%. The monetized benefits and costs were applied to calculate the benefit-cost ratio for the BGRP and AWSP Alternatives. The benefit-cost ratio divides the present value of project benefits by the present value of project costs. A benefit cost ratio of 1 indicates benefits exceed costs.

Table 15 summarizes the BGRP and AWSP benefit-cost analysis. The BGRP annualized cost equals $155.7 million, or $3,321 per AF of injected project water, and the PV of those costs equals $3.46 billion. The annualized BGRP economic benefits are between $4.88 billion and $8.11 billion under the 30% and 50% cut scenarios. The BGRP benefit-cost ratio is between 1.41 and 2.34 with NPV benefits of $1.4 to $4.6 billion. The AWSP annual cost equals $257.9 million, or $5,826 per AF of injected project water, and the present value of those costs equals $5.7 billion. The annualized AWSP economic benefits are between $4.88 billion and $8.11 billion under the 30% and 50% cut scenarios. The AWSP benefit-cost ratio is between 0.85 and 1.42 with NPV benefits of ($0.85 billion) to $2.4 billion.

Table 15. Summary of Project Alternatives Economic Evaluation

Item	BGRP	AWSP
Present Value Cost	**$3,459M**	**$5,730M**
Annualized Cost per AF	**$3,321 ($/AF)**	**$5,826 ($/AF)**
30% Agricultural Cut, 42 gpcd domestic, SWRCB Fees		
PV Benefit	$4,880M	$4,880M
B/C Ratio	1.41	0.85
NPV	$1,420M	-$850M
50% Agricultural Cut, 42 gpcd domestic, SWRCB Fees		
PV Benefit	$8,108M	$8,108M
B/C Ratio	2.34	1.49
NPV	$4,650M	$2,378M
B/C Ratio Range	**1.41 - 2.34**	**0.85 – 1.42**

The economic feasibility analysis finds that the BGRP alternative has a benefit-cost ratio greater than 1.41 and generates net benefits of $1.4 to $4.6 billion, which is greater than the AWSP alternative. The USBR Report also discusses other economic effects, and regional economic effects, some of which are monetized and others with a qualitative assessment.

The analysis illustrates that there are economic benefits from managing seawater intrusion in the Salinas Valley, and importantly, that the seawater intrusion minimum threshold cannot be achieved by pumping reductions alone. The BGRP Injection Only and AWSP Alternatives both raise groundwater levels, improve water quality, and help push seawater intrusion back toward the coast.

6.3.5.3 Legal and Institutional Requirements

The proposed project involves several state, federal, and local regulatory approvals and other discretionary actions necessary to construct and begin operations. While complex, the BGRP is legally feasible and capable of successful implementation. Key to navigating the myriad third-party approvals is early coordination and collaboration with the various decision-making agencies, especially prior to the development of an EIR under the CEQA and EIS under the NEPA.

The CEQA and NEPA analyses could serve as the clearinghouse for the collection of technical support, environmental impact analyses and mitigation, and other information gathering necessary for each third-party agency to exercise discretion on approval of the proposed BGRP. A multi-party memorandum of understanding setting forth coordination and collaboration in the development of the CEQA and NEPA documents and other information may be necessary for each party to consider approval of the BGRP.

6.3.5.4 Next Steps

If the BGRP is further pursued, key next steps to be taken include:

- Collection of more data to refine project:
    - Drill monitoring wells and collect soil for aquifer characterization – in extraction zone
    - Use monitoring wells to collect water quality in extraction zone and perform RO modeling with water quality data
    - Drill injection wells to pilot injection rates
    - Pilot RO if can collect water from extraction zone
- Refinement of project based on data collected in a Basis of Design report (Conceptual Design)
    - Number of extraction and injection wells
    - Location of extraction and injection wells
    - Design criteria for RO
    - Identify location for treatment and alignment of pipelines
- Update project economic benefits as project operations, costs, and alternatives are refined
- Prepare project financial feasibility analysis including cost allocation, financial planning, and funding
- Identify project partners and governance structure
- Prepare an EIR/EIS

6.4 New Seawater Intrusion Project

SVBGSA contracted Carollo Engineers to assess the feasibility of expanding CSIP or developing a new water supply and delivery system—referred to as the New Seawater Intrusion Project (NSIP)—to address ongoing seawater intrusion and groundwater overdraft in the Salinas Valley. This project could offset demands in the Deep Aquifers where it overlaps with the seawater intruded area. It would replace pumping in all aquifers, enabling groundwater levels to rise over time. These improvements to groundwater conditions in the 180/400 Subbasin may also improve groundwater conditions in adjacent subbasins.

The NSIP Evaluation[4] (Carollo, 2026c) identifies the need for supplemental, non-groundwater irrigation supplies to stabilize aquifer conditions and sustain agricultural productivity in the study area. Current groundwater demand in the study area averages approximately 28,000 AFY, with peak seasonal demands in summer months. Five-year monthly average demands for all wells in the study area are shown on Figure 22. However, available alternative water supplies—such as recycled water, river diversions, industrial wastewater, and agricultural drainage—are highly variable and largely concentrated in winter months, creating a mismatch between supply availability and irrigation demand.

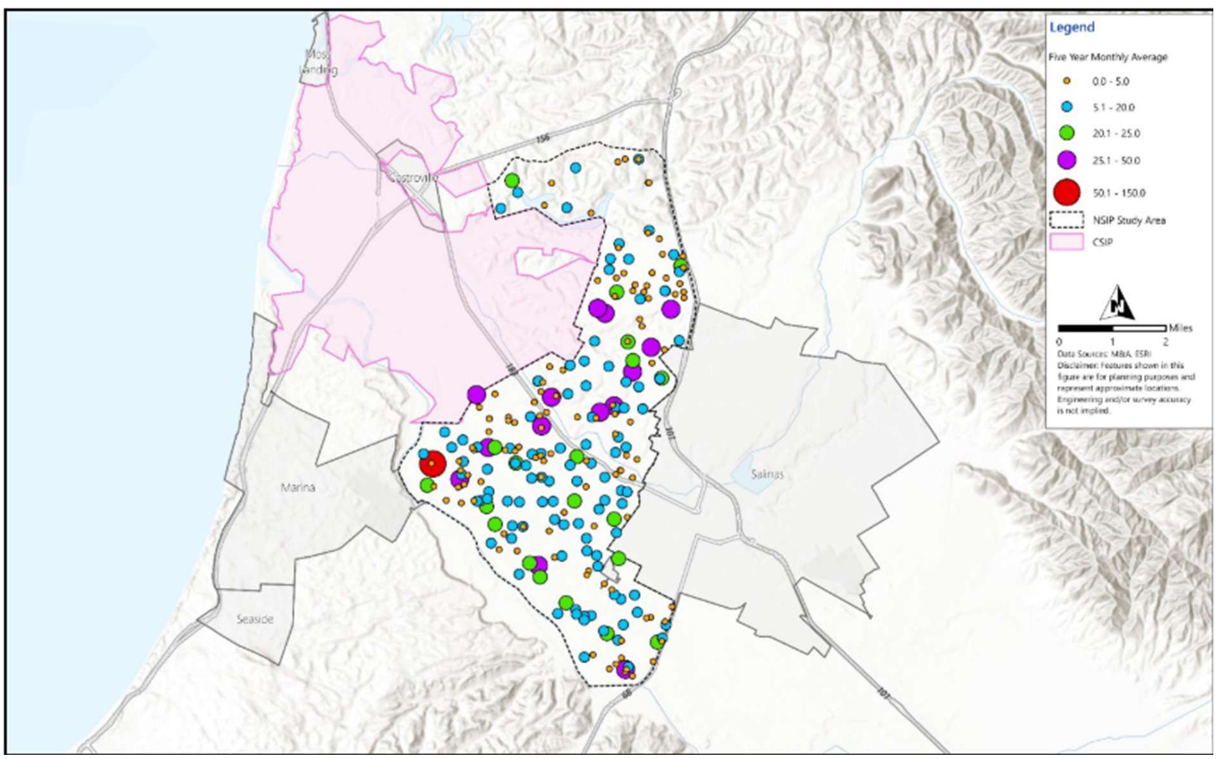


Figure 22. Five-Year Monthly Average Demand of All Wells in NSIP Study Area

[4] Available at: https://svbgsa.org/nsip/

To address this imbalance, the NSIP Evaluation assesses the availability, reliability, and water quality of multiple regional supply sources and assesses their ability to offset groundwater pumping. The analysis indicates that while sufficient total annual supply may be available under representative hydrologic conditions, seasonal variability necessitates substantial storage or demand management strategies to ensure reliable delivery during peak irrigation periods. Conceptual analysis identifies a storage requirement on the order of 15,000 acre-feet to balance seasonal supply and demand under full build-out.

MCWRA prepared a source water analysis focused on quantifying the volume, reliability, seasonality, and operational constraints associated with multiple candidate source waters under MCWRA control or influence. The evaluation is based primarily on historical hydrologic and operational data spanning approximately 2016 through 2025, supplemented with longer-term datasets where available. This approach captures a representative range of hydrologic conditions while reflecting current system operations and regulatory frameworks. Seven primary source water categories were evaluated:

- Secondary effluent from the Monterey One Water Regional Treatment Plant
- Industrial wastewater from the City of Salinas
- Excess reservoir releases available for rediversion at the SRDF
- Reclamation Ditch flows (Application A032263D)
- Tembladero Slough flows (Applications A032263C/D)
- Blanco Drain return flows (Application A032263D)
- Salinas River diversions under Permit 11043

For each source, MCWRA developed estimates of usable supply by applying water rights constraints, operational limitations, instream bypass requirements, diversion capacities, and data availability. Where direct measurement data were limited (e.g., Blanco Drain and Tembladero Slough), surrogate methods and prior technical studies were used to estimate flows and data uncertainties are acknowledged in the analysis.

6.4.1 Project Scenarios

NSIP defined the study area as the area with agricultural users historically reliant on groundwater pumping in or near the seawater intruded area and from the Deep Aquifers. It targets the area of heavy agricultural use in the area between the City of Salinas, CSIP service area and North of the Salinas River and south of the rural communities of Oak Hills and Prunedale. The 5-year total annual usage of the wells within the study area is between 27,000 and 30,000 AFY with peak uses in the summer months between April to November.

This study developed 3 scenarios:

1. **CSIP Expansion (Recycled Water Direct Delivery)** focuses on conveying excess recycled water from the SVRP directly to select new NSIP users. Given the limited capacity of the existing infrastructure, it would require a new, single recycled water conveyance system directly from SVRP to be used year-round with the available recycled water supplies. This provides a relatively low-cost, near-term option that primarily benefits winter demands and serves as a supplemental or first-phase project.

2. **Maximum (Max) Size NSIP (Standalone System)** envisions a fully independent regional system sized to offset all groundwater pumping within the NSIP area by serving approximately 248 wells. This scenario integrates multiple water sources, centralized treatment, and large-scale storage (e.g., Merritt Lake Reservoir with multiple source waters, centralized treatment, and substantial seasonal storage on the order of 15,000 AF) to reliably meet peak irrigation demands. It includes Permit 11043 as a source water, assuming a modification to allow storage. The analysis considers supply availability ranges of high, medium, and low.

3. **NSIP Serving Wells Only Within 500 mg/L Chloride Isocontour Zone (Phased or Hybrid NSIP Implementation)** bridges these approaches by initially delivering recycled water directly to users and incrementally expanding infrastructure, storage, and treatment over time—potentially incorporating direct capture of available supplies during high-flow periods—to ultimately transition toward a comprehensive NSIP system while managing costs and adapting to supply availability and user needs. This targets service to regions within the NSIP Study Area that are affected by seawater intrusion in the 180- and 400-foot aquifers, as defined by the 500 milligrams per liter (mg/L) chloride isocontour. It includes Permit 11043 as a source water under the current permit conditions (no storage over 30 days). The analysis considers supply availability ranges of high, medium, and low.

The key infrastructure components of these 3 configurations are summarized in Table 16.

Table 16. Summary of Infrastructure of NSIP Scenarios

	Expansion of CSIP	Max NSIP	Intruded Area Only
Number Wells Served	18	248	88
Demands Served, AFY	5,320 (19% of all wells within NSIP)	28,020	11,020
Supply Used	Recycled Water	All Supplies	All Supplies
Supply, AFY	5,320	25,080	25,780
Required Storage Volume	3.5 MG	≈ 15,000 AF	≈ 8,000 AF
Miles of Treated Water Transmission Lines	18	38	16
Miles of Raw Water Transmission Lines	6	14	14
Miles of Laterals	TBD	39	12
Treatment size, mgd	N/A	50	20

6.4.2 Cost Estimates

Planning-level cost estimates for the NSIP project scenarios were developed by the engineering teams. Project economic costs were developed using a standardized framework that includes and schedules out capital (construction and soft costs), O&M, and long-term replacement components. Project costs are expressed as the present value and the annualized cost per acre-foot of project water developed and delivered. The NSIP project water is defined as the average annual volume of water that the project delivers. NSIP developed new or reallocated surface and recycled supplies that partially offset groundwater extraction. These estimates are considered conceptual and are expected to be refined as project configurations, infrastructure requirements, and operational assumptions are further developed.

NSIP could serve up to approximately 17,600 acres in the area between the existing CSIP system and the City of Salinas. Two project concepts—Intruded Area Only and Max NSIP—were developed with scenarios considering supply availability ranges of high, medium, and low. Due to the limited ability of the CSIP Expansion Scenario to offset demands in the seawater intruded zone, it was clear that this scenario would not meet minimum thresholds and therefore lifecycle costs for it as a standalone scenario were not developed.

The cost estimates for the Intruded Area Only and Max NSIP scenarios reflect preliminary construction costs organized by major infrastructure components. Storage costs include the improvements needed at Merritt Lake to provide the required impoundments and associated facilities. Treatment costs include onsite treatment facilities and related process infrastructure. These estimates are expressed in current dollars and include a 30% construction contingency, Monterey County sales tax of 7.75% applied to half of construction costs, and 15% for contractor general conditions, overhead, and profit. Land acquisition costs are not included.

Table 17 summarizes the standardized economic costs of the NSIP scenarios. The table shows total construction costs (including soft costs), annual O&M, and replacement costs. The NSIP scenarios (High, Medium, and Low) vary by the annual yield (AF); O&M costs have been scaled by the corresponding yield for each scenario. The present value costs are shown, the annualized cost, and the cost per AF of project water. Economic costs range from $2,957 per AF to $7,434 per AF.

Table 17. Max NSIP and Intruded Wells Only Estimated Economic Lifecyle Costs

Cost Category	Intruded Only			Max		
	High	Medium	Low	High	Medium	Low
Total Construction Cost ($M)	$698	$698	$698	$1,428	$1,428	$1,428
Annual Treatment O&M ($M)	$6	$5	$3	$11	$9	$5
Annual O&M ($M)	$13	$12	$7	$7	$6	$3
Present Value Total Cost ($M)	$1,120	$1,087	$910	$1,840	$1,761	$1,618
Annualized Cost ($M)	$50	$49	$41	$83	$79	$73
Annual Yield (Acre-feet)	11,020	10,160	5,512	28,020	22,570	12,790
$/Acre-Foot Cost	**$4,575**	**$4,818**	**$7,434**	**$2,957**	**$3,513**	**$5,697**

Notes:
Lifecyle costs for 40 years of operations with replacement costs at 20 years of operations
The CSIP Expansion Scenario

6.4.3 Effect on Groundwater Conditions

The NSIP project concept was evaluated using the SWIM to assess its impact on seawater intrusion and groundwater levels, as described in Appendix D of the NSIP Evaluation. Only the Max NSIP High Scenario was modeled. NSIP operates by eliminating groundwater pumping within the seawater intrusion area and providing an alternative water supply beginning in 2035. Pumping outside of the NSIP area occurs as it does in the Baseline Scenario, including CSIP supplemental and private standby well pumping.

The elimination of up to 28,000 AFY of groundwater extraction under the Max NSIP scenarios resulted in substantial groundwater level increases. Figure 23 shows the groundwater levels compared to baseline for the 3 aquifers for the Max NSIP. By the 2040-2041 evaluation period, in the 180-Foot and 400-Foot Aquifers groundwater levels are up to 40 feet higher than in the Baseline Scenario in the proximity of the NSIP area. In the Deep Aquifers, groundwater levels are up to 5 feet higher than in the Baseline Scenario.

While the groundwater level response is substantial, results for seawater intrusion are more mixed and the Max NSIP scenario does not meet the seawater intrusion minimum threshold by 2040-2041. Along most of the 180-Foot Aquifer intrusion front, seawater progression is modestly slowed relative to baseline, consistent with reduced landward hydraulic gradients across the NSIP area where pumping was eliminated. However, the prominent seawater intrusion bulge just west of the City of Salinas advances more rapidly under the NSIP Scenario than under baseline conditions, as shown on Figure 24. This localized outcome occurs in an area where seawater has already substantially intruded; modeling shows that groundwater level increases in this zone intensify gradients that drive chloride further inland rather than flushing it seaward. Changes in the chloride isocontour in the 400-Foot Aquifer are very slight, with only a slight bit less advancement than in the baseline near the City of Salinas in 2070. No change in seawater intrusion is simulated in the Deep Aquifers.

Figure 25 shows the chloride concentration in both the 180-Foot and 400-Foot Aquifers at 2040. It shows minimal difference from the Baseline Scenario. In both the 180-Foot and 400-Foot Aquifers, the 500 mg/L isocontour is far from the minimum threshold. The contrast between the Max NSIP's large groundwater level response and its mixed seawater intrusion outcomes reflects fundamental differences in how pumping removal and active injection near the intrusion front affect chloride movement.

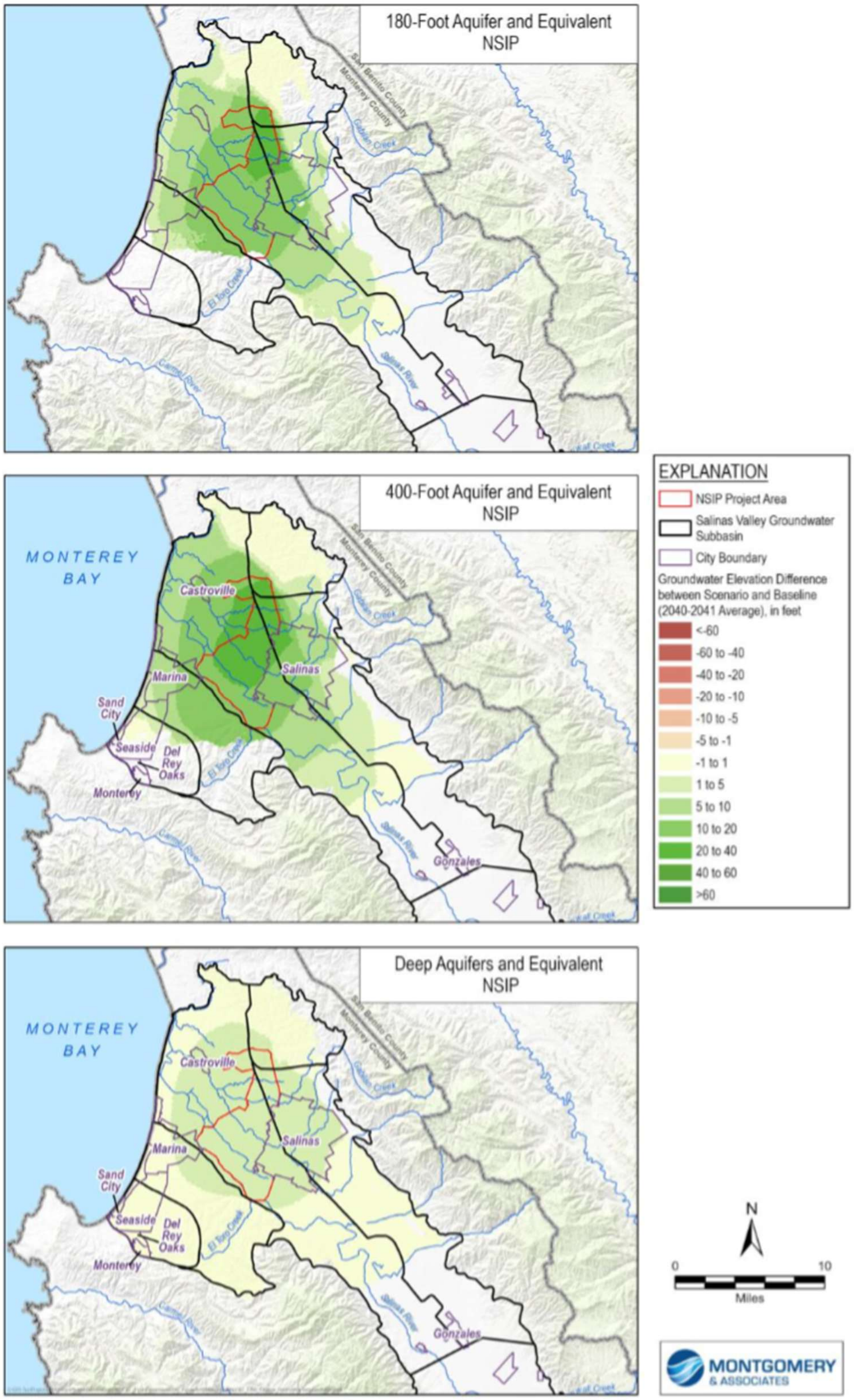


Figure 23. Maximum NSIP Scenario Groundwater Levels Difference from Baseline Scenario

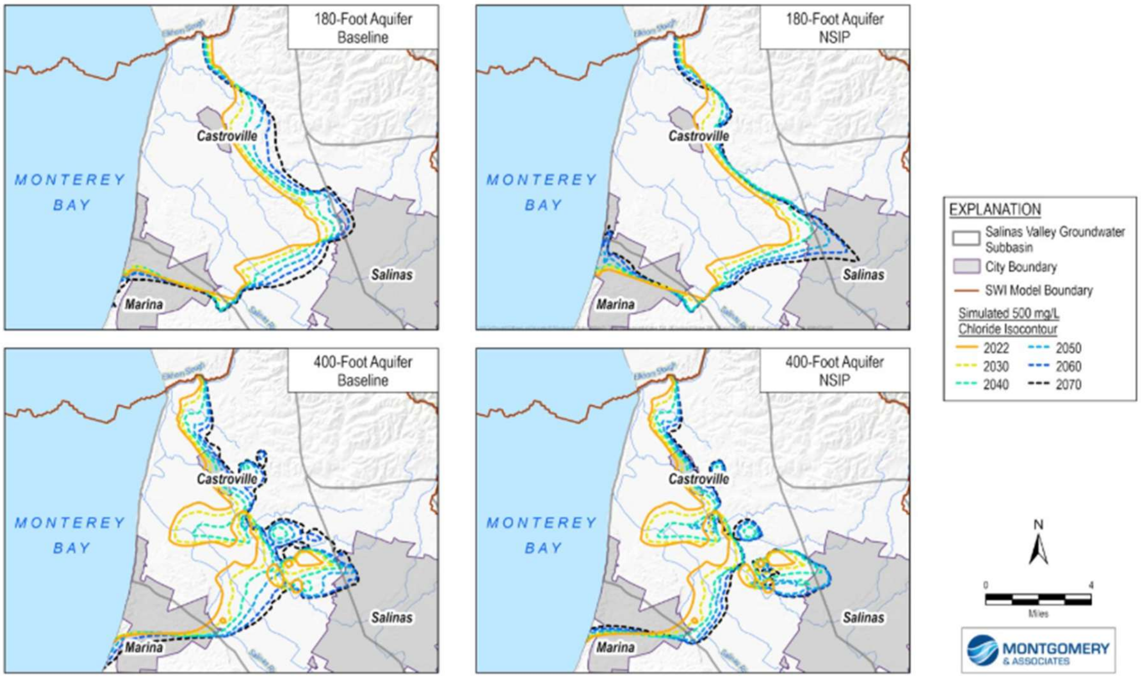


Figure 24. Maximum NSIP Scenario Simulated Progression of Chloride Isocontour

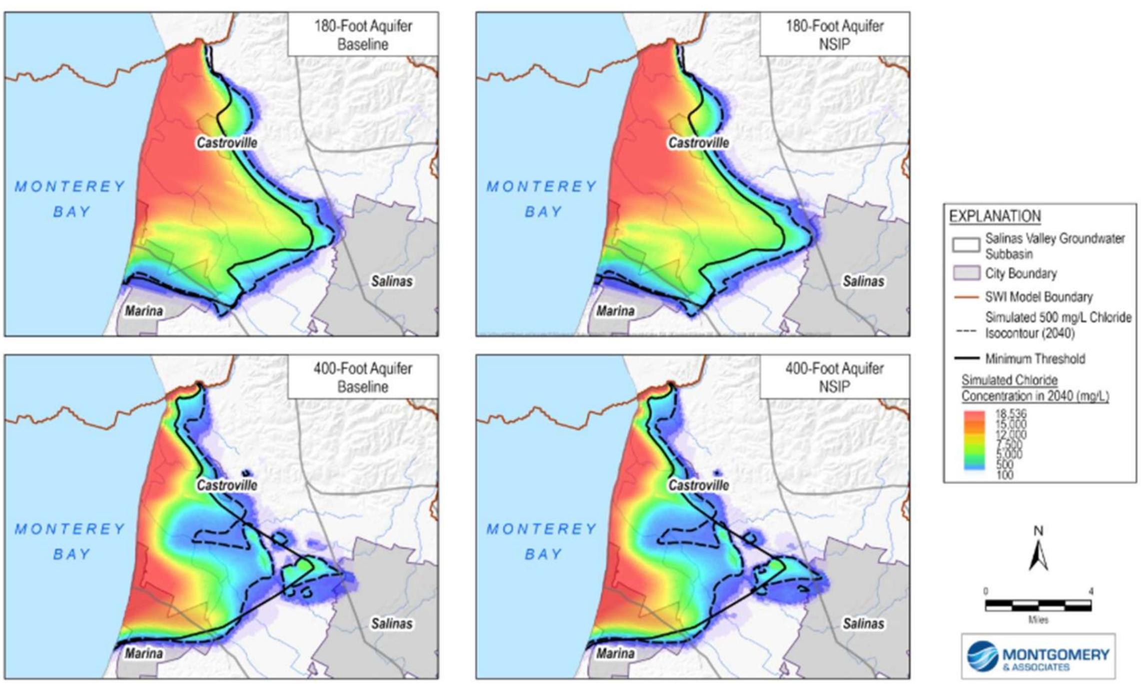


Figure 25. Maximum NSIP Simulated Chloride Concentration Compared to Baseline Scenario

6.4.4 Economic and Financial Analysis

The economic and financial feasibility analysis has not been developed for the NSIP project scenarios. Preliminary cost estimates provide an initial basis for comparing scenarios, but additional analysis would need to be completed to evaluate economic and financial feasibility. This would include defining and monetizing the economic benefits of the project scenarios and comparing those benefits to the costs described above. An economic and financial feasibility assessment would be completed for any NSIP project scenarios that are advanced as part of the IIS.

6.4.5 Summary of Findings

Across all scenarios, the analysis demonstrates that:

- Achieving sufficient supply for the NSIP area will require a combination of alternative supply development, storage, and operational flexibility.
- Recycled water is a critical and reliable component of supply but is insufficient as a standalone solution.
- Surface water and drainage-derived supplies are highly variable and dependent on hydrologic conditions.
- Even under optimized conditions, demand management or supplemental groundwater use may be required during extended drought periods.
- Since NSIP effectively reduced groundwater extraction, it enables groundwater levels to rise in the study area; however, seawater intrusion continues to progress inland at only a slightly slower rate than the Baseline Scenario.
- Water quality evaluation indicates that treatment to meet agricultural irrigation standards—particularly maintaining chloride concentrations below 500 mg/L to protect crop yields—is feasible using conventional treatment processes for blended surface supplies.

NSIP represents a scalable project to reduce groundwater extraction and mitigate seawater intrusion in the Salinas Valley. A phased implementation approach is possible, beginning with expansion of recycled water delivery and advancing toward a larger integrated system as additional supply reliability, storage, permitting, and funding pathways are developed.

Key next steps to be taken for any NSIP scenario to be further considered include:

- Refinement of source water availability and quality data
- Advancement of water rights and regulatory approvals
- Evaluation of storage feasibility (including Merritt Lake)
- Economic and financial analysis
- Progression through preliminary design, environmental review (CEQA/NEPA), and final design and construction

7 MARINA-ORD AREA PROJECTS AND MANAGEMENT ACTIONS

This section summarizes PMA implementation efforts since GSP adoption within the Marina-Ord Area. These efforts are completed outside the Round 2 Grant. However, PMA implementation within the Marina-Ord Area will be further supported by the updated groundwater models described in Section 5 and the groundwater modeling efforts described in Section 9.

7.1 Recycled Water Reuse Through Landscape Irrigation and Indirect Potable Reuse

The Monterey Subbasin GSP Chapter 9 identifies project M3 – Recycled Water Reuse Through Landscape Irrigation and Indirect Potable Reuse (IPR), which consists of recycled water reuse through landscape irrigation and/or IPR within MCWD's service area.

7.1.1 Recycled Water Reuse Through Landscape Irrigation

MCWD began providing recycled water for irrigation to the Seaside Golf Course and other customers in the Seaside Subbasin in 2021. Within the Monterey Subbasin, MCWD has been expanding its recycled water distribution system for landscape irrigation. Expansion efforts were completed in the California State University Monterey Bay subarea and completed in the Dunes Development Area in 2025. Delivery of advanced treated water is anticipated to begin in 2026.

7.1.2 Indirect Potable Reuse

In 2022, MCWD completed the feasibility study that confirmed the possibility of implementing an IPR project and recommended injection into the Deep Aquifers as the preferred option. The study was partially funded by a grant through the SWRCB's Water Recycling Funding Program and was finalized and submitted to the SWRCB in November 2022.

The study aimed to identify a preferred project for injecting 827 AFY advanced treated recycled water into the Subbasin for future extraction by MCWD's municipal production wells. Injection of advanced treated recycled water and IPR is intended to utilize recycled water from M1W to replenish groundwater and supplement MCWD's groundwater supplies. The study:

- Identified existing MCWD and M1W facilities related to water, wastewater, and recycled water
- Determined the projected quantity of advanced-treated recycled water available based on MCWD's existing recycled water agreements

- Outlined relevant permitting requirements for an IPR project through groundwater replenishment and recovery
- Conducted a screening of project alternatives operating in the 180-Foot, 400-Foot, and/or Deep Aquifers, considering factors such as costs, implementability, groundwater management benefits, flexibility, and technical feasibility, while highlighting the project's goal to improve groundwater conditions in the Marina-Ord Area
- Performed numerical modeling for alternatives selected for detailed evaluation to define the capture zone of the project extraction wells and verify that siting of the alternatives provides sufficient aquifer residence times
- Performed engineering evaluation, including analyses of economic and energy impacts, as well as non-quantified benefits and costs
- Recommended injection to the Deep Aquifers at MCWD's Well 9 site or Sand Tank site for extraction by production wells MCWD-10 and MCWD-11
- Developed an implementation plan and financing plan for the recommended project, including projections of costs and revenues

MCWD is currently advancing planning efforts for an IPR project at the Sand Tank site, 1 of 2 sites evaluated in the 2022 IPR Feasibility Study. As of March 2026, MCWD retained an Owner's Advisor to assist with overall program management, technical coordination, and implementation strategy. MCWD also anticipates initiating preliminary design and environmental review in 2026. Project planning is being coordinated with anticipated new developments in the surrounding area to optimize integration with the regional pipeline and MCWD's recycled water distribution system. Additional modeling evaluations of the IPR project with the SWIM are ongoing, including evaluating the implications of the proposed Sand Tank alternative on water level, groundwater storage, and seawater intrusion conditions within the Monterey Subbasin.

Construction of the IPR project is currently included in MCWD's Capital Improvement Program (CIP) as a grant-funded project. MCWD continues to develop a funding strategy and actively explore state and federal funding opportunities. If grant funding is not secured, the project may be financed through GSA funds or alternative financing mechanisms. Project completion is currently estimated within approximately 3.5 to 5 years, depending on funding availability and financing structure.

7.2 Armstrong Ranch Aquifer Storage and Recovery Feasibility Assessment

MCWD completed a feasibility assessment for an Armstrong Ranch Aquifer ASR Project in May 2025. The Armstrong Ranch Property is a 220-acre vacant site located northeast of the MCWD service area. The ASR Project would consist of infiltration ponds to recharge surface water from the SRDF or alternatively sourced water into the Dune Sand Aquifer at the site and recover stored water through an extraction wellfield at the site. The primary purpose of the feasibility assessment was to analyze the maximum storage and recovery capacity of an ASR project. The feasibility assessment involved identifying potential water supply availability assumptions associated with optimization of the SRDF and/or additional recycled water supplies from the Pure Water Monterey project and conducting a detailed modeling evaluation of Project recharge and recovery well infrastructure design and operational alternatives with the MBGWFM. Modeling results indicated that the maximum infiltration capacity of the ASR Project is approximately 2,500 AFY with an estimated recovery yield of 76%.

7.3 Reservation Road Desalination Plant Renovation

In 1996, MCWD constructed a pilot seawater desalination facility to explore the feasibility of extracting seawater through shallow wells along the beach. The facility, located at the former wastewater treatment plant site on Reservation Road between Dunes Drive and the Monterey Bay, has a capacity of 0.3 million gallons per day (MGD). The plant was operated between 1997 and 2003 and has been idle since.

MCWD is currently advancing rehabilitation of the Reservation Road Desalination Plant as a supplemental water supply source. In 2023, MCWD completed a facility condition assessment and prepared a preliminary cost estimate. Following additional data collection and video inspection of key infrastructure components, the District initiated design of the Reservation Road Desalination Plant Renovation Project. The design consultant has completed Phase 1 design documents and is progressing subsequent phase designs. In parallel, MCWD has coordinated with multiple state agencies to address permitting and regulatory requirements.

Phase 1 of the project involves replacing the well pump, piping, vault, the intake well and brine discharge piping, including pipe inspection and testing and comprehensive facility electrical systems. Phase 1 rehabilitation is planned for 2026, and MCWD awarded a construction contract for Phase 1 in January 2026. The facility is projected to come online in early 2027, delivering 300 AFY of treated water to MCWD customers.

8 CORRAL DE TIERRA AREA PROJECTS AND MANAGEMENT ACTIONS

SVBGSA has been advancing key PMA implementation efforts since GSP adoption within the Corral de Tierra Area. These efforts are largely completed outside the Round 2 Grant. However, PMA implementation within the Corral de Tierra Area will be further supported by the updated groundwater models described in Section 5 and the groundwater modeling efforts described in Section 8.

8.1 Demand Management Strategy and Framework

SVBGSA has undertaken investigations of the potential for demand management to help support GSP implementation. In contrast to supply augmentation projects, demand management focuses on managing groundwater extractions to better align pumping with sustainable basin conditions. Demand management requires actively managing net pumping to keep groundwater in balance and avoid undesirable results. The Monterey Subbasin GSP includes Pumping Allocations and Controls as a potential management action for the Corral de Tierra Area. As described in the Monterey Subbasin annual reports since then, SVBGSA has broadened this to include other demand management measures. Effective demand management requires controlling net groundwater pumping to maintain long-term balance and avoid undesirable results. Demand management focuses on actively managing net pumping to keep groundwater in balance, and pumping allocations and controls are just 1 type of demand management measure.

As part of its broader planning for potential SGMA compliance tools, SVBGSA initiated evaluation of demand management in 2022 with a stakeholder assessment (California State University Sacramento, 2023). Based on the results and direction from the Board, SVBGSA proceeded with several tasks to complete broader outreach and engagement and assess the viability of demand management measures to meet SGMA goals. To support this effort, SVBGSA contracted directly with Dave Ceppos, who conducted the Stakeholder Assessment, to provide continued facilitation, along with Miller Maxfield for communications and outreach assistance, Minasian Law for legal analysis, ERA Economics for a Valley-wide economic analysis, and M&A for technical support and groundwater modeling.

Through this multi-year effort, SVBGSA evaluated a range of demand management measures and developed a comprehensive strategy that expanded from outreach workshops to a coordinated Valley-wide framework. Subbasin-level planning began with the 180/400 Committee under the SGM R1 Grant, with SGM R2 Grant funding supporting similar efforts in the remaining 5 Salinas Valley subbasins. This approach ensured that input from all subbasins informed development of the Valley-wide Demand Management Framework.

The Demand Management Framework was complemented by groundwater modeling in some subbasins to evaluate the effect of reduced pumping on groundwater levels, as well as an economic analysis to assess potential regional impacts of activating demand management measures. Demand management modeling has yet to be completed for the Corral de Tierra Area because the SWIM v4 has better groundwater calibration in the Corral de Tierra Area than previous SWIM versions and other models. As noted in Section 9, SVBGSA anticipates completing this modeling in late spring 2026.

In addition, SVBGSA developed the Water Efficiency Pilot Program (WEPP) to support rural residents. The WEPP is described below as an example of a demand management measure implemented by SVBGSA and represents a management action well suited to the Langley Subbasin.

8.1.1 Demand Management Strategy and Framework

SVBGSA advanced demand management planning through several related efforts:

- Community workshops "Our Water Future in the Salinas Valley: Planning for Uncertainty" (2024)
- Demand management dialogue process with subbasin committees (2024-2025)
- A Legal White Paper (2024) summarizing demand management considerations under California law was prepared collaboratively with MCWDGSA
- Development of the Valley-wide Demand Management Framework (2024–2025)

The Board directed SVBGSA staff to hold public outreach workshops and expand demand management outreach to a Valley-wide dialogue prior to development of policies. Demand management outreach began with community workshops designed to emphasize the importance of demand management and expand public understanding of the wide range of available demand management measures. These workshops were complemented by subbasin-specific dialogues with subbasin committees, which provided focused input on demand management measures appropriate to each subbasin. Together, these efforts gathered input that informed development of the Demand Management Framework (SVBGSA *et al.*, 2025). Table 18 summarizes the Valley-wide public outreach workshops and the public subbasin committee meetings.

Table 18. Summary of Public Outreach Workshops and Subbasin Committee Meetings

<table>
<tr><th colspan="7">Public Outreach Workshops</th></tr>
<tr><td colspan="2">Public Outreach Workshops</td><td>4/12/24 – Castroville</td><td>4/19/24 – Salinas</td><td>5/3/25 – Greenfield</td><td>5/10/24 – King City</td><td>5/11/24 - Salinas</td></tr>
<tr><th colspan="7">Subbasin Committee Meetings</th></tr>
<tr><th>Subbasin Meetings</th><th>Meeting #1</th><th>Meeting #1b</th><th>Meeting #2</th><th>Meeting #3</th><th>Meeting #3b</th><th>Meeting #4</th></tr>
<tr><td>180/400</td><td>9/5/24 - Salinas</td><td>10/3/24 - Salinas</td><td>11/21/24 - Salinas</td><td rowspan="2">4/14/25 - Salinas</td><td rowspan="2">5/20/25 - Salinas</td><td rowspan="2">9/24/25 - Salinas</td></tr>
<tr><td>Eastside</td><td>9/27/24 - Salinas</td><td></td><td>10/14/24 - Salinas</td></tr>
<tr><td>Forebay</td><td rowspan="2">4/28/25 Greenfield</td><td rowspan="2"></td><td rowspan="2" colspan="2">7/16/25 Greenfield</td><td rowspan="2"></td><td rowspan="2">9/26/25 Greenfield</td></tr>
<tr><td>Upper Valley</td></tr>
<tr><td>Monterey</td><td>12/18/24 - Salinas</td><td></td><td>2/26/25 - Salinas</td><td>6/25/25 - Salinas</td><td></td><td>9/25/25 - Salinas</td></tr>
<tr><td>Langley</td><td>3/5/25 - Salinas</td><td></td><td colspan="2">6/4/25 - Salinas</td><td></td><td>9/25/25 - Salinas</td></tr>
</table>

In parallel with the public input process, SVBGSA retained Dustin Cooper from Minasian Law to summarize demand management considerations under California law and prepare the Demand Management Legal White Paper[5] (SVBGSA, 2025c). This analysis provides legal considerations to support informed decision making related to demand management.

In fall 2025, informed by the subbasin committee dialogues, SVBGSA staff and consultants prepared the Demand Management Framework[6] (ERA Economics, *et al.*, 2025). The Framework provides an overview of demand management, potential measures for application in the Valley, and a process for evaluating and activating measures as needed. It includes a summary of 10 stakeholder-identified demand management options and a demand management economic analysis.

The Demand Management Framework defines potential measures or options for managing net groundwater pumping identified as appropriate to the Salinas Valley: 6 agricultural measures and 4 domestic measures, as summarized in Table 19.

[5] Available at: https://svbgsa.org/wp-content/uploads/2025/05/Demand-Management-White-Paper-2025.pdf.
[6] Available at: https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/3727939/6.4_DM_Framework_2025-11.pdf.

Table 19. SVBGSA Demand Management Framework Measures

Category	Measure	Type	Description
Agriculture	On-farm Water Use Efficiency	Irrigation efficiency	Incentivize water efficiency practices through technical assistance or financial support
	Demand Management Fee	Financial incentives	Tiered pricing or per-acre-foot extraction fees to disincentivize pumping
	Rotational Fallowing / Fallow Bank	Temporary fallowing	Incentivize temporary fallowing of land
	Land Repurposing	Permanent fallowing	Develop programs to incentivize transition of land use to less water-intensive beneficial uses
	Pumping Limits / Allocation System	Temporary fallowing	Design and implement pumping limits, such as through a groundwater allocation system
	Penalty Charges	Financial incentives	Charges applied for pumping above allocated amounts, may be tied to replacement cost
Domestic	Education and Outreach	Water use efficiency	Provide resources and guidance to support household water efficiency
	Incentivized Efficiency	Water use efficiency	Rebates or incentives for indoor and outdoor efficient appliances or practices
	Mandatory Efficiency	Water use restrictions	Required efficiency standards for landscape, appliances, or plumbing
	Water Pricing Mechanisms	Financial incentives	Tiered pricing or rebate structures to encourage water efficient behavior

Along with describing the 10 identified demand management measures, key elements of the Framework include the following:

- **Stages and Triggers** is a system for classifying subbasin conditions (Stages 0–4) tied to groundwater conditions and SMC, used to guide the timing, scale, and type of demand management measures.
- **Baseline Conditions** is an overview of baseline water use by sector and region in the Salinas Valley to provide context for the value of these industries, the importance of reliable water supplies, and future evaluation of the cost of demand management measures.
- **Global Implementation Elements** provides an overview of core requirements applicable to all measures, including administration, measurement and monitoring, water accounting, enforcement, and adaptive management. The Framework does not establish these elements; it describes the process for establishing each element.

- **Economic and Financial Considerations** is a preliminary assessment of relative costs and economic implications for agencies, water users, and the broader regional economy. This element of the Framework includes a qualitative overview of the cost of demand management measures. In coordination with the groundwater modeling of demand management, the analysis evaluates the cost and economic impact of demand management.
- **Process for Program Development** is a transparent pathway for refining measures through additional technical analysis, stakeholder engagement, policy development, and Board consideration before activation of any measure occurs.

The Demand Management Framework does not activate any demand management measures. Rather, it provides the foundation for the Board to evaluate and prioritize demand management measures, define program rules, establish funding mechanisms, and align demand management actions with groundwater conditions and SGMA compliance requirements.

8.2 Water Efficiency Pilot Program

In the Fall of 2024, SVBGSA staff designed the WEPP to assess what progress could be made increasing water use efficiency among rural residents. The WEPP was established to achieve the following objectives:

- Build awareness on water use efficiency among rural residential users.
- Leverage successful urban water efficiency strategies for rural application.
- Increase adoption of water-efficient practices.
- Empower rural residents to contribute to sustainable water management.

SVBGSA identified that while large water systems (3,000+ connections) are required to provide water efficiency resources to their users per the Urban Water Management Planning Act, these water systems do not have the same regulatory requirement: private (1-4 connections), small state (5-14 connections), small public (15-199 connections), and medium public (200-2,999 connections). This presents an opportunity to make gains in water efficiency that had previously been underexplored. SVBGSA identified the target audience for WEPP as households in rural residential areas such as the Corral de Tierra Management Area of the Monterey Subbasin, where many residents are served by either a private well or water systems with less than 3,000 connections. WEPP has a 3-pronged approach: a water use efficiency webpage, a water use survey, and home assessments.

8.2.1 Water Efficiency at Home Webpage

The water use efficiency webpage launched in February 2025 on the SVBGSA website. The page provides general information on water efficiency and its importance, ways to improve home water efficiency, links to water efficiency tools, and links to additional resources. The webpage serves as a central hub connecting WEPP participants and the broader public to water efficiency tools relevant to their household water systems. The general WEPP landing page, with information about the survey and the home assessments, had 1,500 views and 971 unique visitors.

8.2.2 Water Use Survey

The water use survey was launched in September 2025 and was designed to collect basic information from residents regarding their water usage and water efficiency concerns. It was purposely designed to be brief (about 5 minutes) to maximize participation. The survey was live on the SVBGSA website from September 2025 to February 2026 and was completed by 11 respondents. The survey's results include:

- Responses from 5 different Subbasins (180/400, Eastside, Forebay, Langley, and Monterey) with Langley being the most common.
- 83% of respondents identified as the property owner.
- For 46% of respondents, water came from wells and 53% from a water system.
- 99% of respondents try to be efficient with water at home, 99% are familiar with water efficiency, and 61% would like to learn more about ways to save water. However, only 31% of respondents track their water usage.
- In the open-ended responses the most requested resources were financial assistance, technical assistance, and educational materials.

8.2.3 Home Assessments

The third component of WEPP was a home assessment program that provided residents with free evaluations of their indoor and outdoor water use. SVBGSA partnered with WaterWise Consulting, Inc. to provide indoor and exterior water-use assessments. The indoor water-use assessment included inspection of water fixtures and checking for leaks. The exterior water-use assessment included inspections of irrigation systems, timers, and a general landscape review.

After assessments were completed, WaterWise staff provided and installed kitchen and bath aerators, shower heads, sprinkler nozzles, and irrigation controllers free of charge for the residents as needed. These free devices would help residents make immediate efficiency improvements in their home and were also highlighted in the advertisements to draw interest to the program. Over the course of 6 months, the home assessment program had 10 applicants, of which 8 qualified, and of which 5 have had assessments completed.

8.2.4 Lessons Learned

SVBGSA identified takeaways and lessons learned from the pilot project. First, participation was lower than anticipated. SVBGSA, with support from communications consultants Miller Maxfield Inc., extensively advertised the program through newsletters, social media, radio advertising, and mailed postcards. SVBGSA was not able to collect as much information as initially hoped for in the survey. The home assessments reports indicated that many residents are already water efficient.

Participants provided feedback that while receiving free sprinkler heads, irrigation timers, and aerators was appreciated, they noted that receiving assistance with more costly appliances would be more helpful. The devices that were installed were ones they could more easily purchase; the resident indicated that financial assistance with or installation of water efficient clothes washers, dishwashers, water softeners, reverse osmosis systems, and water heaters would be ideal since they have a higher financial barrier and a larger potential impact on their water usage. Of the large water systems in the Salinas Valley Basin, currently only California Water Service, Marina Coast Water District, and the City of Gonzales provide rebates. Providing rebates or large device installation could be a way to attract more residents for a potential future program. Another suggestion is to provide irrigation efficiency assessments to small farms and family farms.

9 FUTURE GROUNDWATER MODELING

SVBGSA and MCWDGSA plan to conduct groundwater modeling of combined projects and management actions using the updated SWIM v4 in late spring and summer 2026. The planned scenarios will address both seawater intrusion and groundwater level sustainability goals under SGMA across multiple subbasins. Modeling may also include portions of the Corral de Tierra Management Area along Reservation Road and River Road as part of the 180/400 Subbasin analysis, as these areas are immediately adjacent to, and share aquifers with, the 180/400 Subbasin.

Specific MCWDGSA PMAs to be modeled in 2026 include, but are not necessarily limited to: increasing indirect potable reuse (IPR) injection at the MCWD Sand Tank site to add water sources such as desal; expanding IPR to areas upgradient of FO-11S to specifically address seawater intrusion indicated at this site; and evaluating potential impacts to the sustainable yield within the Marina-Ord management area from implementing projects within the Monterey Subbasin such as aquifer storage and recovery (ASR), demand management, and an extraction barrier.

In addition, SVBGSA plans to conduct focused groundwater modeling in the Corral de Tierra Management Area. Updates to the hydrogeologic conceptual model indicate that the groundwater basin in the El Toro area, near Corral de Tierra Road and San Benancio Road, has a bowl-shaped geometry and is only minimally connected to adjacent aquifers. SVBGSA intends to use SWIM v4, which is better calibrated in this area, to model demand management scenarios in this area and better understand the effects of pumping reductions on groundwater levels. Because this rural residential area faces practical constraints on the extent of pumping reductions achievable without an alternative water supply, modeling results will be used to evaluate whether demand management alone can meet SGMA sustainability goals. If it proves insufficient, SVBGSA may need to consider additional projects or management actions.

Finally, MCWDGSA and SVBGSA intend to collaboratively update the SVIHM and SVOM in 2026 to reflect the latest round of improvements made to the SWIM v4. This will ensure both regional models maintain alignment to the greatest extent possible and may continue to be complementarily applied for coordinated, regional SGMA planning and implementation efforts across the Salinas Valley Basin moving forward.

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