BRACKISH GROUNDWATER RESTORATION PROJECT

FEASIBILITY STUDY

PHASE 1 REPORT

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1. Introduction

Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) manages six of the nine subbasins in the Salinas Valley, including the critically overdrafted 180/400-Foot Aquifer Subbasin. In June 2023, SVBGSA initiated a feasibility study of two projects, the Seawater Intrusion Extraction Barrier and Regional Municipal Supply projects, included in the 180/400-Foot Aquifer Subbasin (180/400 Subbasin) Groundwater Sustainability Plan (GSP). These projects were identified to address critical overdraft conditions and seawater intrusion. The Regional Municipal Supply Project is also identified in the GSP for the Monterey Subbasin, the Eastside Aquifer Subbasin, and the Langley Area Subbasin as a project to address chronic declines in groundwater levels and loss of storage.

SVBGSA has evaluated a range of project scenarios for what is now referred to as the Brackish Groundwater Restoration Project (BGRP), which integrates the seawater intrusion extraction barrier and a regional municipal supply concept. With funding from the California Department of Water Resources (DWR) Round 1 and Round2 Sustainable Groundwater Management Implementation Grants, SVBGSA has engaged a consultant team including Carollo Engineers and Montgomery and Associates to prepare a scientifically rigorous evaluation of whether an extraction barrier—coupled with brackish water treatment—could serve as both a groundwater protection measure and a new water supply source.

The Phase 1 feasibility analysis, summarized here, focused on whether a project of this type could meet sustainability criteria for seawater intrusion. This report is accompanied by the BGRP Scenarios Analysis and Modeling Results Technical Memoranda that address the following:

- **Effectiveness Evaluation** – assessing how well the project could achieve sustainability goals and mitigate undesirable results.
- **Scenarios Analysis** – examining potential end-user mixes, infrastructure and treatment needs, and preliminary cost estimates

Following the Phase 1 analysis, SVBGSA will continue investigating the BGRP through preparation of a United States Bureau of Reclamation (USBR) Title XVI Feasibility Study Report (USBR Report) for large, recycled water or desalination projects.

1.1 Project Study Area

The project study area is generally on the Pacific coast in the northern subbasins of the Salinas Valley. Figure 1 shows SVBGSA's Salinas Valley Seawater Intrusion Model (SWI Model) area, which is also the project study area. The SWI Model extends up-valley far enough to minimize any potential boundary effects on groundwater modeling results.

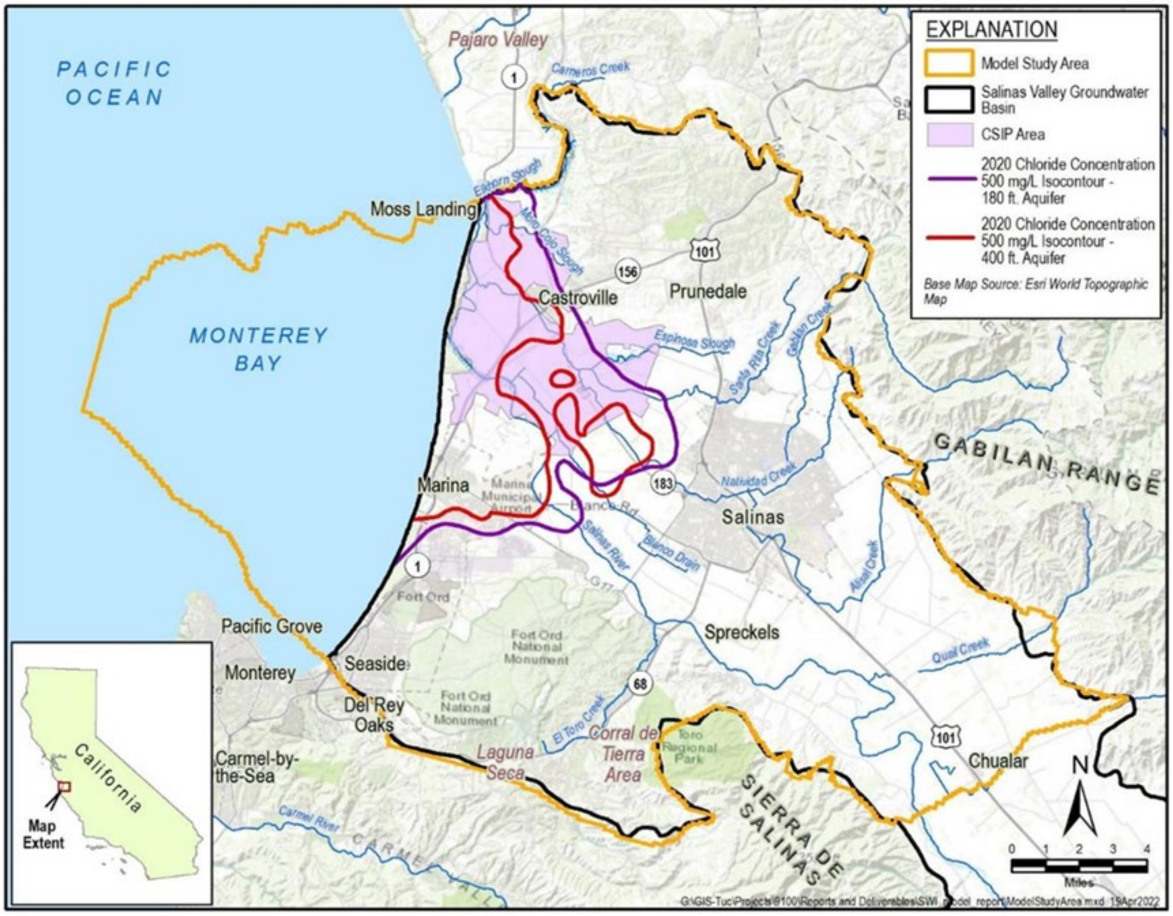

Figure.1 Seawater Intrusion Model Area

1.2 Summary of Problem and Need

Local groundwater is the primary water supply for the Salinas Valley communities, farms, and environment — but it is being used faster than being replenished. In parts of the valley, groundwater levels are declining, seawater is moving further inland, and more wells are at risk of failure. In the face of these warning signs, management efforts have historically been fragmented, infrastructure is aging, and opportunities to capture and store water are limited. Climate extremes, data uncertainty, and the high cost of new projects add to the challenge.

SVBGSA is working to protect and restore the region's groundwater by balancing use with recharge, considering supplemental supply projects, improving coordination, and guiding local solutions through inclusive, science-based planning.

Groundwater provides 95% of demand in the Salinas Valley and sustains a multi-billion dollar agricultural economy. However:

- Seawater intrusion has occurred in some areas for decades. Water levels in several subbasins are significantly below sea level, driving further seawater intrusion inland.
- Pumping exceeds recharge in many areas, leading to declining groundwater levels and loss of storage, with overdraft conditions and wells vulnerable to rising salinity.
- Deep Aquifers, increasingly tapped as seawater intrusion spreads, recharge slowly (beyond the human timescale for management), and face risks that need to be managed. Reliance on the Deep Aquifers is not a sustainable long-term replacement supply.
- Climate change, drought variability, and reduced wastewater recycling sources (due to urban conservation) further limit water supply reliability.

2. Project Concept

The BGRP concept includes extraction wells to intercept brackish water in the seawater intrusion zone near the Monterey Bay coastline, preventing further inland intrusion. Extracted water is treated with reverse osmosis (RO) to produce potable-quality water. The resulting potable or agricultural-quality water is distributed to regional end users to offset pumping or injected inland to raise groundwater levels and push back the seawater front. RO concentrate (brine) would be discharged through the Monterey One Water (M1W) ocean outfall.

Potential end users include urban water systems, agricultural irrigators, or hybrid arrangements. Each user group has different water quality standards—potable water must meet drinking water regulations, while agriculture depends on crop-specific sensitivities. Injection wells broaden the project benefits for other uses, including small water systems and the environment. The Phase 1 analysis included initial water quality sampling in the proposed extraction zone as an important input to defining treatment needs.

During Phase 1, SVBGSA also conducted an initial survey with the urban water suppliers to learn about their systems and demands to consider in the end user analysis. SVBGSA coordinated with Monterey County Water Resources Agency (MCWRA) to evaluate the Castroville Seawater Intrusion Project (CSIP) as a potential end user to replace current supplemental well pumping, which has declined in part from seawater intrusion. MCWRA has conducted hydraulic modeling to consider how a new source of supply from BGRP can be integrated into the existing distribution system.

The scenarios analysis includes a summary of water supplies and demands in the study area.

<u>Extraction Wells and Extraction Pipeline</u>

Through the scenario development process and iterative modeling, the number of wells, spacing needed between wells to create the extraction barrier, and pumping volumes to establish the barrier were estimated. Well locations were adjusted to be located outside of the 100-year and 500-year floodplain and located outside of know sensitive resources to the extent possible. Each scenario has a different number of wells and locations to fit the goals of that scenario. Pipelines connecting wells to a treatment facility are included and again vary depending on the scenario.

Reverse Osmosis Treatment Plant

The treatment process selected is reverse osmosis (RO), which is typical for brackish and ocean desalination. RO works to remove salt from water by applying pressure to move the water through a semi-permeable membrane, so that water ends up on one side of the membrane and the salty concentrate (waste product) ends up on the other side of the membrane. Preliminary water quality sampling was conducted to estimate treatment requirements and recovery rates. This information paired with modeling of projected chloride concentrations was used to assess treatment configuration needed to meet the water quality objectives. A two pass, multiple stage RO configuration is assumed to meet boron water quality objectives in the groundwater. Based on the predicted water quality and treatment configuration, it is expected that an RO system could achieve 70% recovery of treated water.

The treatment facility is anticipated to be located somewhere close to M1W's facilities for easy use of their outfall for the RO concentrate waste product (the remaining 30%). However, the Phase 1 analysis did not include a site assessment, and this would need to be done in future phases.

Discharge to M1W Outfall

The RO concentrate waste product would need to be disposed of and typically this means discharge to an ocean outfall. SVBGSA and the consultant team met with M1W and determined that there is capacity in the existing M1W outfall under most conditions, but that during extreme wet weather events, storage of the RO concentrate would be required. Working with M1W, a mixing analysis was conducted to assess the impacts of the BGRP RO concentrate on the M1W outfall and resulting permit compliance. Findings from this analysis were that the diffuser section of the outfall (final end piece that disperses discharge into the ocean) would need to be modified to promote better mixing. These modifications and the introduction of a new waste being discharged would trigger a new discharge permit.

Treated Water Delivery Pipelines and End Users

Potential end user demands were estimated through publicly available pumping records as well as through a survey and discussions with urban water providers. Based on the information available, each scenario includes a preliminary identification of connection to different end user systems, including CSIP. Once the end users were identified, preliminary distribution pipeline alignments in existing roads and right of ways were established for each scenario. Locations for delivery for each end user were determined through discussions with the user or based on known water supply tank locations. The estimated use for each end user accounts for the known seasonal variations in water use.

Injection Wells

Due to the seasonal variations in water use by both agriculture and urban water systems, the volume of water used differs significantly from peak summer to winter conditions. To operate most efficiently and to prevent seawater intrusion, both the extraction wells and the RO treatment need to be operated at a relatively constant volume. For these reasons, for scenarios with direct delivery to end users, there is excess water during the winter months. The volume that cannot be used by end users is injected into the groundwater basin on the inland side of the seawater intrusion zone to improve inland groundwater levels and promote restoration of the groundwater basin.

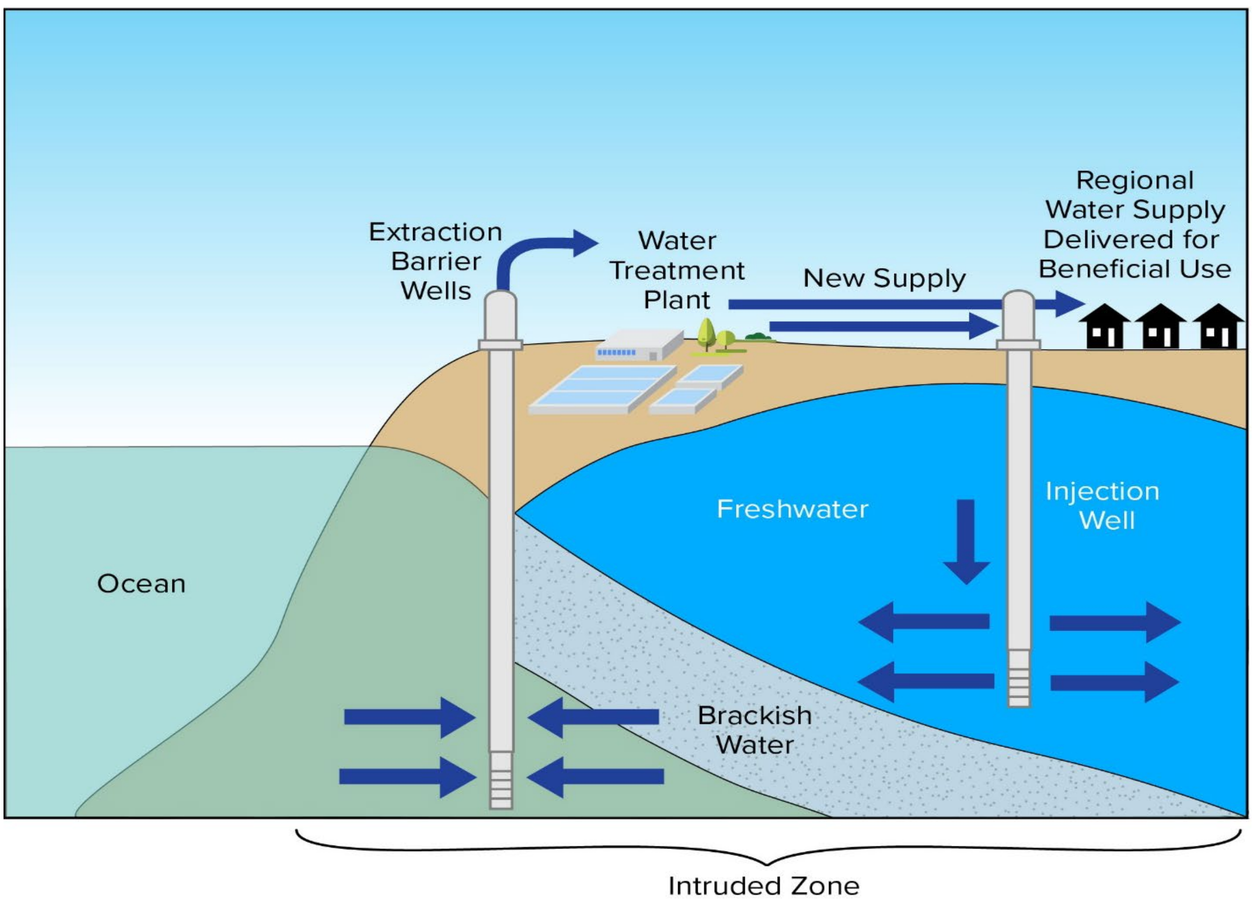

Figure 2 Brackish Groundwater Restoration Project Concept

2.1 Seawater Intrusion Barrier

A seawater intrusion barrier is a line of groundwater wells—usually along the coast—used to keep salty ocean water from migrating inland into freshwater aquifers. Seawater intrusion barriers can either inject water to form a ridge (pressure mound) that reverses the groundwater gradients causing intrusion, or extract water to form a trough (low pressure area) that captures seawater and prevents further intrusion. SVBGSA's project scenarios include both an extraction barrier along the coast and injection wells inland of the seawater intrusion front as a secondary barrier. Injection barriers require a reliable source of high-quality injectate (often advanced-treated recycled water). Because of the relatively low population density in the project area, there are not sufficient recycled water supplies to create an injection barrier to address seawater intrusion. All existing recycled water supplies are directly delivered through the Castroville Seawater Intrusion Project or provided to the Pure Water Monterey project, which provides groundwater replenishment in the Seaside Basin.

Large seawater intrusion barriers have been built in several Southern California locations, including the Talbert Gap in Orange County, the Alamitos Barriers in Los Angeles and Orange Counties, and the planned Oxnard Plain Barrier in Ventura County. The Talbert Gap and Alamitos barriers are injection barriers that inject fresh or advanced-treated recycled water into closely spaced wells near the shoreline. Alameda County Water District (ACWD) has a Aquifer Reclamation Program that pumps out saline or brackish water from degraded portions of the Niles Cone aquifer to increase usable subsurface storage, improve groundwater quality, and prevent further migration of salinity toward production wells. ACWD also treats brackish groundwater via reverse osmosis to produce potable water. United Water District is implementing the Oxnard Plan Barrier, which is designed to control seawater intrusion using an extraction barrier, like the planned Salinas Valley barrier.

Variants of a seawater intrusion barrier could include extraction wells (to pump and capture brackish water) or a combined inject-and-extract setup. Both have been evaluated during the BRGP Feasibility Study Phase 1. During this phase, SVBGSA has met several times with other coastal California communities involved with similar projects, including United Water District in Ventura County and Alameda County Water District. During Phase 1, these agencies provided presentations about their projects to the SVBGSA Advisory Committee.

While it is difficult to compare seawater intrusion barrier projects directly because of the variable project sizes, project operations, hydrogeology, and benefits from surrounding recharge projects, Table 1 attempts provide an order-of magnitude comparison by estimating comparable project's acre-foot of injection or extraction per mile of intruded coastline. The BGRP Medium Scenario, with an intruded coastline length of 11 miles, is included for comparison. The Oxnard Plain project is shown as a minimum of 5,150 acre-feet per mile because a project fact sheet[1] identifies this as the minimum rate needed to stop seawater intrusion, although, “larger projects are likely feasible.” This table establishes that the proposed BGRP is of comparable size to other large seawater intrusion barriers in California.

Table 1. Comparison of seawater intrusion barrier projects

Project	**Acre-Feet/mile of coastline (or barrier)**
Talbert Gap, Orange County	8,540
Oxnard Plain (in development)	5,150 (minimum)
Alamitos Barrier, Orange County and Los Angeles County	3,710
SVBGSA Medium Project	6,090

2.2 Brackish Water Desalination

Brackish water desalination through reverse osmosis (RO) is an established treatment technology and is used by all the projects discussed above. RO is also the technology used by ocean desalination projects and inland brackish water projects, often called groundwater desalters. Groundwater desalters are used by many communities in California to improve the quality of their drinking water.

The California Water Plan (CWP) is the state’s long-term strategic blueprint for managing water resources. Updated every five years by the California Department of Water Resources (DWR), the plan guides policy, planning, and investments to ensure a reliable water supply, environmental stewardship, and resilient communities. Brackish desalination is a supplemental water supply strategy within the Water Plan’s broader portfolio.

In DWR’s December 2024 Desalination (Brackish and Seawater) Resource Management Strategy, coastal brackish desalination is noted to be most relevant where saltwater intrusion has degraded local groundwater basins and it has the potential to both provide new supplies and improve basin conditions. Coastal brackish desalination is thus positioned as a dual-benefit tool—both a water supply solution and a groundwater management measure. Brackish groundwater desalination is a drought-resilient supply that could diversify the Salinas Valley’s water portfolio and reduce reliance on over-drafted aquifers.

There are several examples of major brackish desalination projects now operating in California:

[1] https://www.unitedwater.org/coastal-brackish-water-treatment-project/

- ACWD Newark Desalination Facility (Alameda County): Brackish groundwater, 12.5 million gallons per day (MGD) of blended treated water.
- Antioch (Contra Costa County) – Brackish surface water (San Joaquin River): 6 MGD**.** Plant activated Sept. 2025
- Chino Basin Desalter Authority (Inland Empire) – Brackish groundwater: ~31–36 MGD systemwide**.** Chino I is 14 MGD; combined production target about 35,200 AFY (~31.4 MGD) after expansions
- Eastern Municipal Water District (Menifee/Perris, Riverside County) – Brackish groundwater: ~13.4 MGD total across three co-located plants **(**Menifee 3.0**,** Perris I 5.0**,** Perris II 5.4 MGD**)**
- Sweetwater Authority (Chula Vista/National City) – Brackish groundwater: 10 MGD after expansion (originally 4–5 MGD; doubled by 2017)
- Camarillo (Ventura County) – North Pleasant Valley Desalter– Brackish groundwater: Up to 3,800 AFY (~3.4 MGD)
- Torrance (Los Angeles County) – Robert W. Goldsworthy Desalter– Brackish groundwater: 5 MGD currently; expansion to add ~9 MGD (targeting full-scale operation around 2027)
- San Juan Capistrano (Orange County) - Santa Margarita Water District, Mineralized/brackish groundwater: ~6.2–6.8 MGD following upgrades (RO expansion)
- Fort Bragg (Mendocino Co.) – Brackish Noyo River during high tides: ~0.144 MGD (144,000 gpd) emergency RO unit (portable) used as needed

2.3 Scenario Development

The development of BGRP scenarios has been an iterative process using the Salinas Valley Seawater Intrusion (SWI) model to test how different BGRP scenarios perform against GSP minimum threshold for seawater intrusion (defined as holding the 500 mg/L chloride contour at its 2017 extent) under future scenarios through 2040 and 2070. The modeling was coupled with the identification of associated facilities and infrastructure required for each scenario.

Preliminary modeling was conducted in early 2024, and several initial extraction barrier alignments and configurations were tested. Preliminary findings indicated that all barrier scenarios were more effective than doing nothing, reducing the inland spread of seawater. The initial scenarios were further refined in 2025, using lessons learned from the initial modeling and incorporating feedback from existing groundwater users.

The Phase 1 BGRP Scenarios Analysis modeled each scenario's effectiveness at pushing seawater intrusion back beyond the GSP minimum threshold towards the measurable objective. Each scenario's production capacity (groundwater offset), hydrogeologic characteristics, conveyance and treatment infrastructure components, overall cost, and implementation strategies are developed and used to compare scenarios for effectiveness in meeting the GSP requirements. Seven scenarios are included in the technical memorandum. These are summarized in Table 2.

2.4 Costs

BGRP planning-level cost estimates range from approximately $632 million (North of River) to $1.48 billion (Large Project). These costs include construction costs, engineering and design costs, planning and permitting costs, and a 30% contingency. Operations and maintenance costs range from $69 million (Small Project) to $148 million (Large Project) a year. Annualized unit costs fall between $1,760–$2,950 per AF depending on the scenario.

The use of $/AF per year is a useful metric when comparing cost of different water supplies and is commonly used in U.S. Bureau of Reclamation feasibility studies. However, this metric of $/AF per year should not be construed to be the cost of water to any individual user as grant funding and financial planning to spread costs to all beneficiaries has not been completed. Cost estimates will be refined in the feasibility study. While all projects require significant investment, the Medium and Injection-Only Scenarios show the most promise for meeting the minimum threshold.

Table 2 includes information for comparison of the scenarios.

Table 2. BGRP Scenarios Comparison Table

Project Component	Small	Medium	Large	Injection Only	Eastside Only Injection	North of River	Extract 180/Inject 400
Number of Extraction Wells	12	20	24	20	20	10	10
Total Volume Extracted (AFY)	39,700	67,000	96,800	67,000	67,000	29,800	41,400
Length of Extraction Pipe (ft)	41,400	66,000	128,770	66,000	66,000	50,700	66,000
Total Volume Treated (AFY)	28,000	46,900	67,800	46,900	46,900	20,900	29,000
End Users	Alco Water Service Cal-Water Salinas CCSD MCWD CSIP	Alco Water Service Cal-Water Salinas CCSD MCWD CSIP	Alco Water Service CW-Salinas CCSD MCWD CSIP CW-Salinas Hills Ag Wells in SWI Ag Wells w/in 1,000ft Normco Toro Oak Hills Ambler Park	Injection Only	Injection Only	CCSD CSIP	Injection Only
Total Volume Delivered to End Users (AFY)	19,400	27,800	41,700	0	0	6,000	0
Number of Injection Wells	9	12	12	20	12	14	12
Total Volume Injected (AFY)	8,600	19,200	26,300	44,800	44,800	14,900	29,000
Total Length of Treated Water Piping (ft)	204,400	204,400	331,700	139,800	92,462	132,521	85,600
Total Cost ($Million)	$720	$1,013	$1,482	$955	$949	$632	$933
Annualized Cost ($/AF/year)	$2,930	$2,635	$2,668	$2,712	$2,707	$1,763	$2,945

Modeling results comparing the 2040 line of the seawater intrusion fronts for all scenarios are shown in Figures 2 through 5 for both the 180-Foot Aquifer and the 400-Foot Aquifer. The black line on each figure is the minimum threshold to be achieved by 2040.

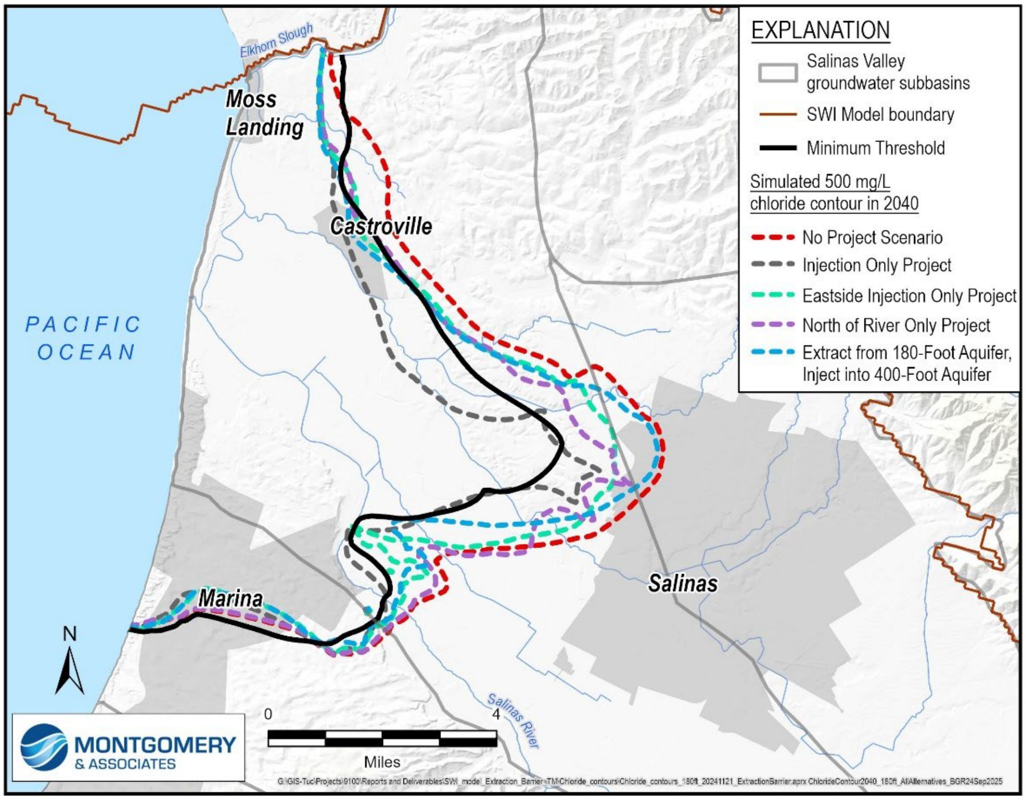

Figure 3. Chloride Contour in 180-Foot Aquifer for Injection Only, Eastside, North of River and Extract from 180, Inject in 400 Scenarios

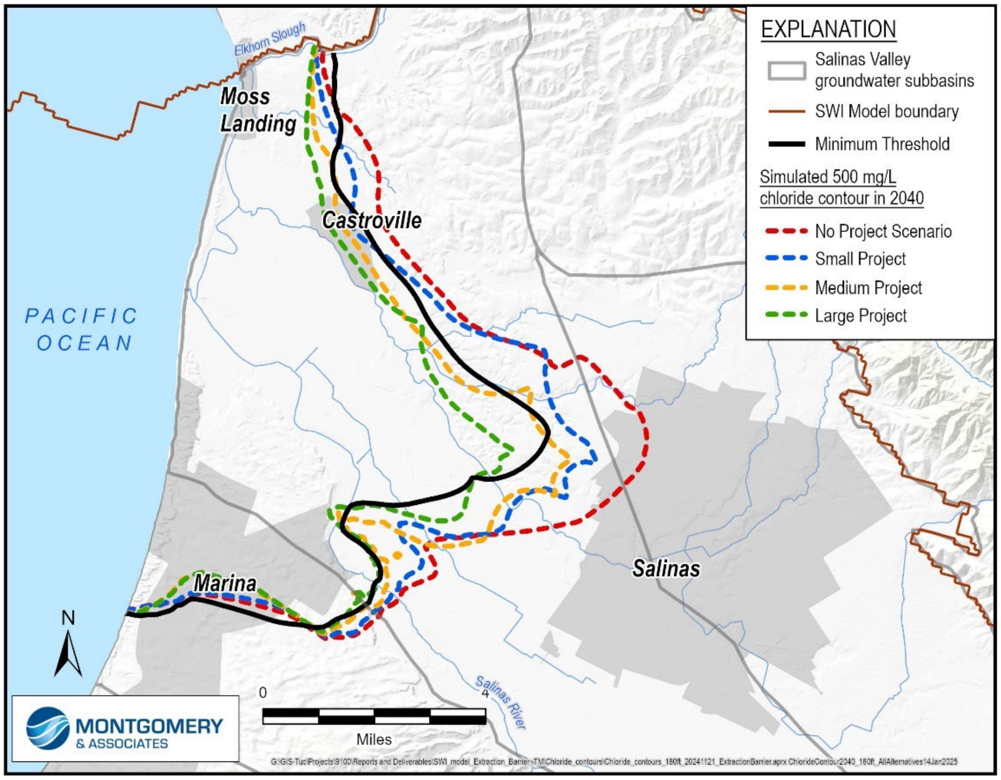

Figure 4. Chloride Contour in 180-Foot Aquifer for Small/Medium/Large BGRP

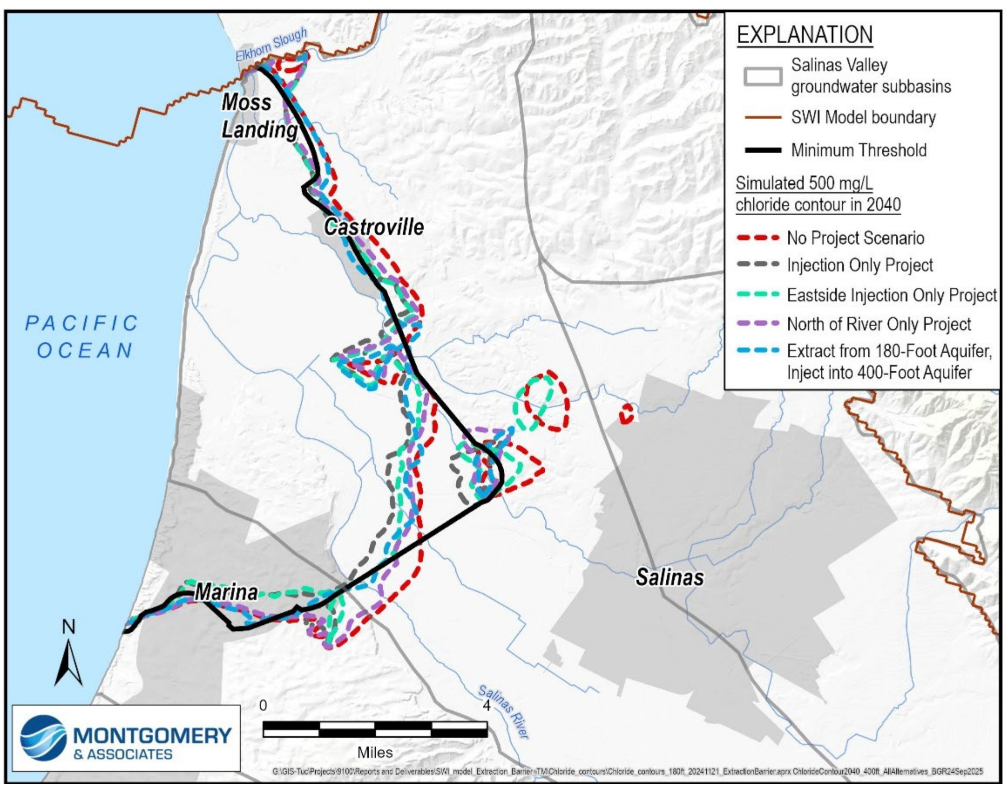

Figure 5. Chloride Contour in 400-foot Aquifer for Injection Only, Eastside, North of River and Extract from 180, Inject in 400 Scenarios

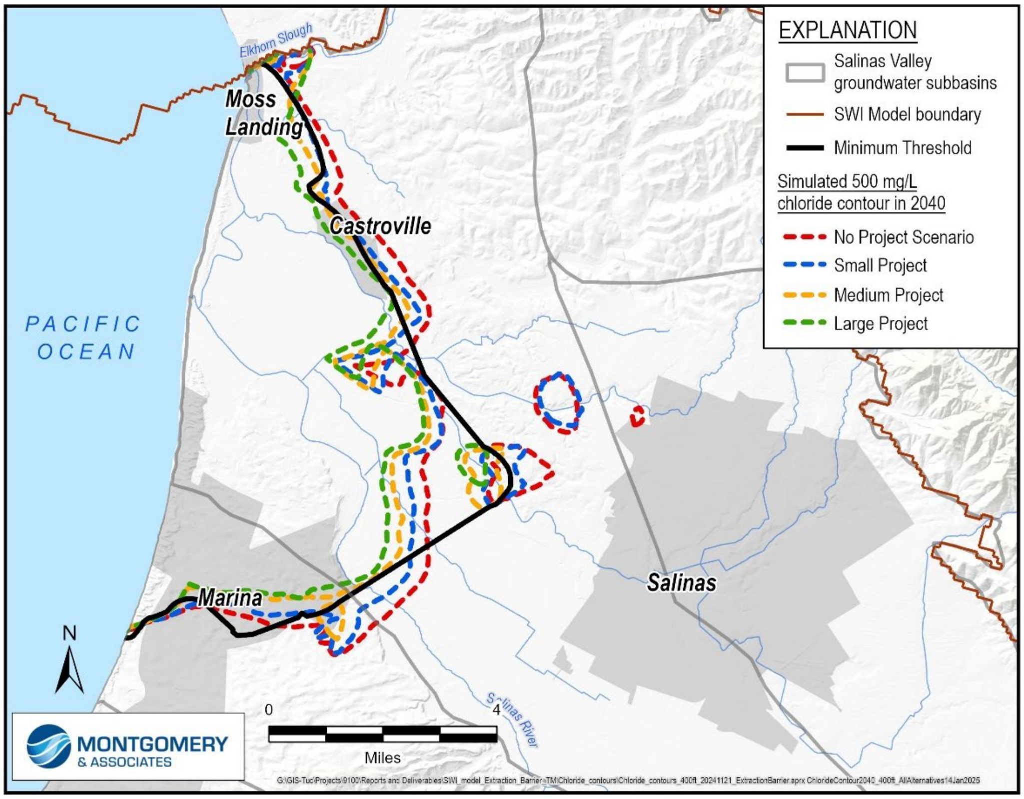

Figure 6. Chloride Contour in 400-Foot Aquifer for Small/Medium/Large Scenarios

2.3 Key Findings

Without intervention, seawater intrusion in the 180/400 Subbasin will continue to degrade, risking being out of compliance with SGMA. Modeling shows that the Medium, Large and Injection-Only Scenarios could likely achieve minimum thresholds by 2040, though none fully meet the long-term measurable objective. BGRP costs are substantial, but a project to address seawater intrusion is critical to the region's water security. Other findings include:

- No Project leads to worsening seawater intrusion and lack of compliance with SGMA.
- All projects can slow or reverse seawater intrusion.
- Brackish desalination can provide a treated water supply to urban and agricultural end users.
- Medium Scenario offers a solution for creating an effective barrier and providing a new source of supply coming close to meeting the seawater intrusion minimum threshold.
- Large Scenario provides the most protection and supplemental supply, but with the highest cost.

- Injection-Only Scenario is more effective than the Medium Scenario at reaching seawater intrusion minimum threshold within 10 years of being activated. It is a strong alternative, offering cost-effective intrusion control.
- Eastside and North of River Scenarios provide partial or local benefits but fall short basin-wide protection from future seawater intrusion.
- Extract in 180, inject in 400 Scenario also provides partial benefits but falls short of meeting goals.
- None of the scenarios reach the measurable objective of retreating seawater intrusion to Highway 1 by 2040, though there is a potential for long-term benefits.

2.4 Preferred BGRP Scenario

SVBGSA staff recommend the Injection Only Scenario, with refinements, to be carried forward as the preferred BGRP scenario in the feasibility study. Advantages of the Injection Only Scenario include:

- Preliminary modeling shows that Injection Only generally meet the 180/400 Subbasin and the Monterey Subbasin seawater intrusion minimum thresholds within 10 years of project being activated.
- Preliminary modeling shows it is more effective than the Medium Scenario or the Inject 180/Extract 400 Scenario at reaching seawater intrusion minimum threshold within 10 years of being activated.
- It does not require existing groundwater users to receive treated water in lieu of pumping. It allows existing groundwater users to continue using their wells and distribution systems.
- Although the initial cost estimates of the Inject 180/Extract 400 Scenario are slightly less than the Injection Only Scenario, the costs of the Inject 180/Extract 400 Scenario will likely rise after addressing the need for cleanup wells, the need to provide water in lieu of pumping for areas that will be impacted by future seawater intrusion in the 400 foot aquifer, and the additional extraction and treatment needed to provide this water in lieu of pumping.

Through completion of the feasibility study, the consultant team will explore and implement important refinements to the Injection Only Scenario. These refinements are designed to lower project costs, reduce impacts on existing groundwater users, and offer groundwater management flexibility to the Monterey and Seaside Subbasins. Potential refinements include:

- Reducing extraction barrier pumping in the 400-Foot aquifer to limit drawdown impacts on existing groundwater users.
- Providing water for injection to the Monterey or Seaside subbasins. This may include coastal injection that acts as seawater intrusion barrier. Integrating a coastal injection barrier with the proposed coastal extraction barrier, however, may be difficult.
- Providing water in lieu of pumping for lands lying between the extraction barrier and the coastline
- Making minor modifications to injection and extraction rates at individual wells to ensure seawater intrusion minimum thresholds are met within 10 years of it being activated

Injection-Only Scenario Modeling Results 180-Foot Aquifer

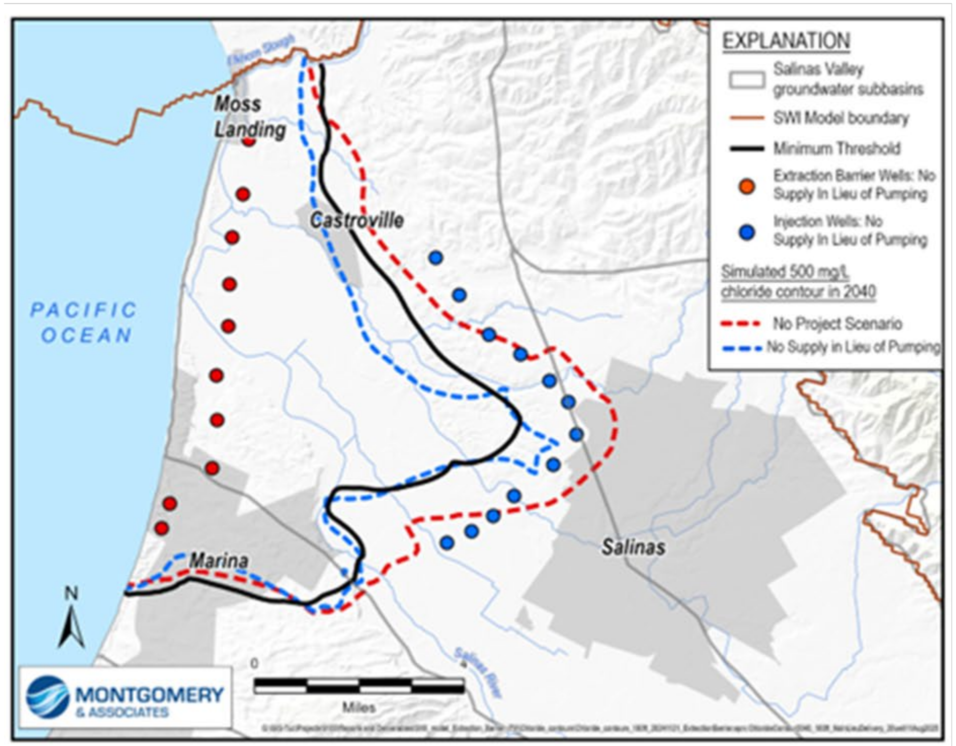

Figure 7.Injection Only Project Scenario Compared to Miniumum Threshold

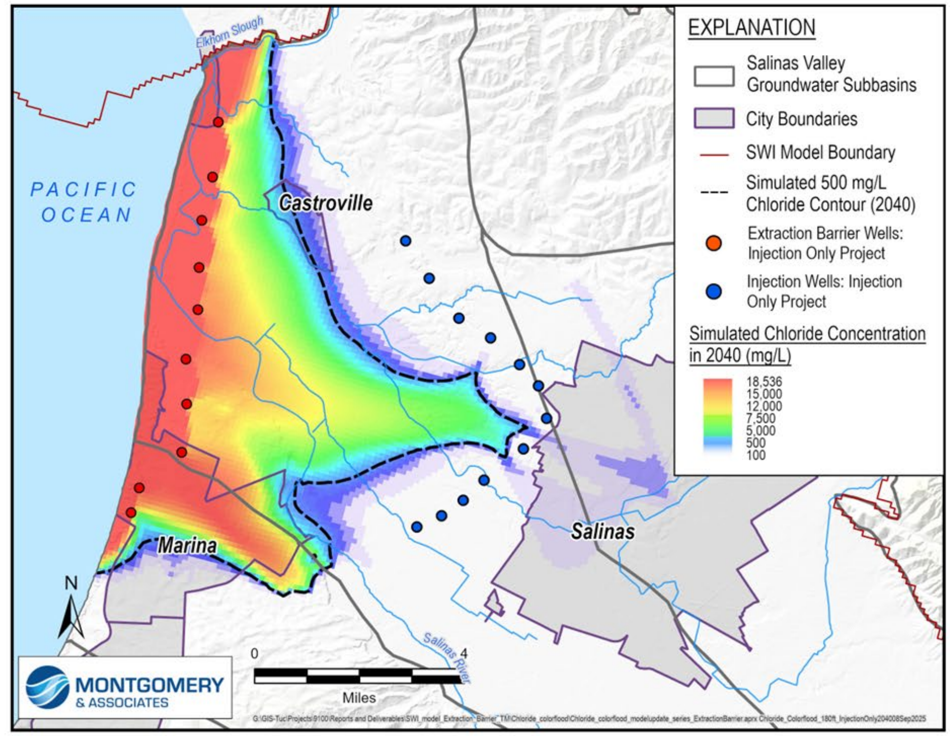

Figure 8. Injection Only Scenario Chloride Concentrations

Injection-Only Scenario Modeling Results - 400-Foot Aquifer

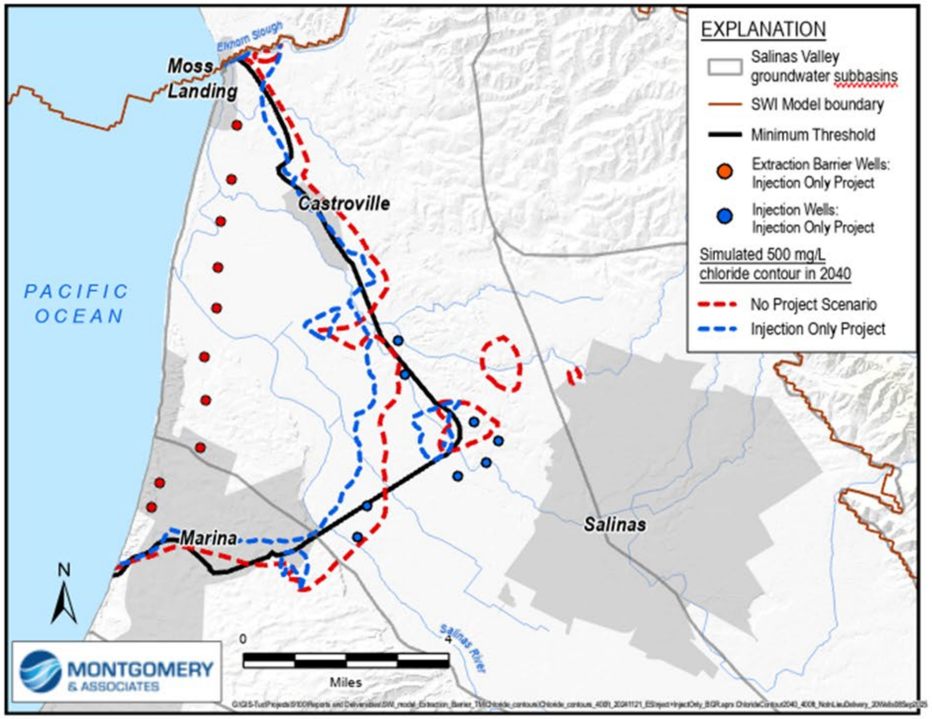

Figure 9.Injection Only Project Scenario Compared to Miniumum Threshold

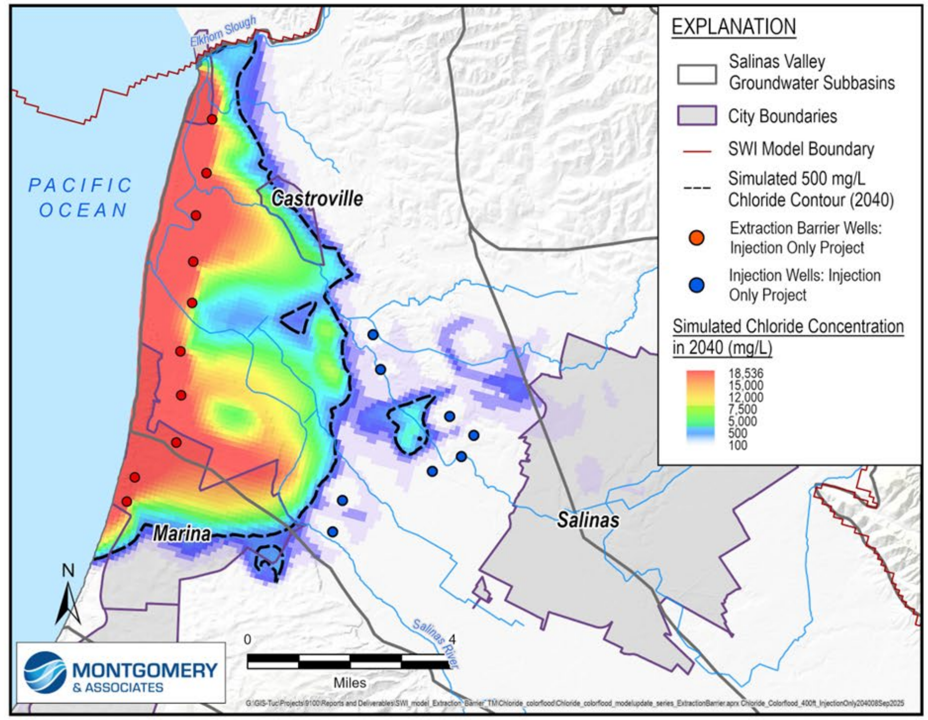

Figure 10. Injection Only Scenario Chloride Concentrations

3. Next Steps

SVBGSA has several activities underway to complete the analysis of potential solutions to seawater intrusion with additional funding from the DWR Round 2 Sustainable Groundwater Management Implementation Grant (SGM R2). Next steps are summarized below.

3.1 USBR Title XVI Feasibility Study

U.S. Bureau of Reclamation (USBR) Title XVI (Title XVI) was identified as a potential funding source for the BGRP. Under Title XVI, the Large-Scale Water Recycling Program (WRP) is appropriate for projects with total costs greater than $500,000,000. The Large-Scale WRP provides a 25% federal cost share with no per-project maximum. The BGRP would be eligible for funding under the Large-Scale WRP[2] once USBR has informed Congress that the project meets USBR guidelines WTR TRMR-128[3], *Large-Scale Water Recycling Program Feasibility Study Review Process* and WTR 11-01[4], *Title XVI Water Reclamation and Reuse Program and Desalination Construction Program Feasibility Study Review Process.*

Although the BGRP is still in the feasibility study phase, and has not yet been selected to move forward with the next phase of design, environmental review and permitting, SVBGSA has determined that completion of the USBR requirements will provide decision-makers and the public with important information to consider in the process of determining which projects to move forward into the next 5-year cycle of GSP implementation. If selected, completion of this type of feasibility study will position SVBGSA to be able to seek federal funding for the next planning phase, as well as into construction and project completion.

The following USBR feasibility study sections are still in preparation and will be completed by February 2026.

<u>Alternatives to the BGRP</u>

No Action Alternative

Assessing the economic and financial feasibility of a single project and management action, or a portfolio of projects and management actions, requires defining a baseline—called a no action alternative (NAA) in project feasibility studies. The No Action Alternative (NAA) is the baseline against which projects and (in this case the BGRP, or a portfolio of other projects and management actions as an alternative to the BGRP) are compared. The NAA is critical for how project benefits (including economic benefits) are measured, assessing whether the project or an alternative to it is a reasonable investment, and can help determine how PMA costs may be allocated in an equitable manner.

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[2] https://usbr.gov/watersmart/title/largescale.html
[3] https://www.usbr.gov/recman/temporary_releases/wtrtrmr-128.pdf
[4] https://www.usbr.gov/recman/wtr/wtr11-01.pdf

The NAA acts as a baseline to show the economic, environmental, and regulatory impacts of doing nothing. The NAA describes what would most likely happen in the future without a project, including changes in law or policy. It can include new water supplies already approved or under construction, and nonstructural measures like conservation or watershed management. For SGMA compliance and comparison with the BGRP and other projects and management actions, the NAA highlights the risks of not addressing seawater intrusion.

The 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan (GSP) establishes 2017 seawater intrusion levels as the minimum threshold, with exceedances considered undesirable results (URs) under SGMA. Persistent URs could trigger State Water Board intervention, including pumping restrictions or costly engineered solutions paid for by groundwater users. For SVBGSA feasibility studies, the NAA assumes the State Water Board would limit pumping rather than implement infrastructure. This is consistent with the NAA requirement to not include infrastructure alternatives that are not already planned and under development.

While seawater intrusion is an important sustainability indicator in the 180/400 subbasin, groundwater modelling shows that the six Salinas Valley subbasins are interconnected. Additional modelling is required to better understand each subbasin's interaction with the area of seawater intrusion. The proposed NAA assumes that the State Water Board may also limit groundwater pumping outside of the 180/400 subbasin to address seawater intrusion. The NAA will apply a set of assumptions for the interconnected subbasins, to be refined as groundwater modeling improves the understanding of inter-basin flows.

Alternative Project(s)

Based on findings from SVBGSA's other projects and management actions feasibility studies, as well as considering other potential projects by other agencies or parties, SVBGSA and Montgomery and Associates are developing a project scenario, or a scenario with a portfolio of projects and management actions, that meets the minimum threshold for seawater intrusion. With other work in progress, this scenario is still under development and has not been identified for this Phase 1 Report.

Economic Analysis and Financial Planning

SVBGSA engaged ERA Economics to prepare an economic feasibility analysis for the BGRP in accordance with Title XVI requirements. The economic analysis follows standard economic practice for benefit-cost analyses and applies additional USBR guidelines. The NAA, discussed above, is the baseline against which project economic benefits are evaluated. Economic benefits, in addition to standardized project costs, are then applied to calculate the benefit-cost ratios for each alternative in the BGRP Feasibility Study. This analysis will calculate a preliminary benefit-cost ratio for the project and at least two alternatives, the NAA and Alternative Project(s) Scenario. ERA is also supporting SVBGSA with a funding strategy that applies to all projects and management actions that may inform other required financial capability requirements for the BGRP feasibility study.

Legal and Institutional Requirements

The Carollo Engineers team includes environmental and permitting consultants to identify regulatory requirements that apply to the BGRP. The Title XVI feasibility study also includes a water rights analysis. Minasian Law is supporting SVBGSA related to legal considerations for the BGRP and will prepare the water rights portion of the feasibility study.

Research Needs and Pilot Plans

Looking toward future implementation, there are three areas that would benefit from additional research: 1) a reverse osmosis pilot to determine treatment effectiveness and required configuration, 2) additional groundwater quality data, and 3) an injection well pilot. The feasibility study will develop pilot plans and recommendations for additional data collection and monitoring.

CEQA Initial Study

A CEQA Initial Study is prepared to decide the right level of environmental review and lets agencies refine a project early to avoid or reduce impacts. It helps to focus an EIR on potentially significant impacts. With funding from SVBGSA’s Round 2 SGMA Implementation Grant, SVBGSA is preparing a CEQA Initial Study to conduct preliminary environmental assessments and identify what additional studies will be required in an EIR to advance the BGRP. This will be completed concurrently with the feasibility study.

3.2 Other Feasibility Studies

SVBGSA is evaluating the feasibility of several other projects and management actions (PMA) identified in the GSPs. These PMA studies explore projects that may be an alternative to the BGRP to address seawater intrusion and may be included in the feasibility study. They include:

Demand Management

SVBGSA has developed a Demand Management Framework that will be considered by the SVBGSA Board in fall 2025. Further development of demand management measures is planned to be included in upcoming work plans.

CSIP Optimization

MCWRA has prepared an analysis of the CSIP system and operations and identified several improvements to optimize this important existing project implemented to address seawater intrusion. This work has been funded by the SGM R1 grant and will be available in the fall of 2025.

Aquifer Storage and Recovery (ASR)

In January 2025, SVBGSA completed a preliminary feasibility study evaluating ASR project concepts, including shifting reservoir releases with ASR to use re-diverted stored reservoir water for injection into the aquifers as well as an alternative concept to use a new diversion structure and diversion of Salinas River winter flows instead of stored reservoir water. Both project concepts use ASR as the mechanism to address seawater intrusion.

Somavia Road Recharge

SVBGSA is assessing potential for recharge near Somavia Road where a potential gap in the Salinas Valley Aquitard could allow water to move between the Salinas River and the principal aquifers.

Castroville and Eastside Canals and Alternatives

SVBGSA and MCWRA are coordinating a feasibility study to better understand project options for utilizing or modifying MCWRA's Permit 11043 water right or obtain a new water right. This study aims to identify a realistic project concept using additional supply from the Salinas River for mitigating seawater intrusion and/or addressing lowered groundwater levels in the Eastside, Langley, and 180/400 Subbasins. This study will be completed by February 2026.

New Seawater Intrusion Project

SVBGSA and MCWRA are coordinating a feasibility study to provide additional in-lieu supply to areas experiencing or at risk of seawater intrusion. It will include source water investigations, identification of delivery areas and irrigation demands, infrastructure needs and sizing paired with source water options, and costs. The BGRP is one of the potential sources of supply that will be included. This study will be completed by February 2026.

4. Conclusion

The BGRP may be a cornerstone project for the Salinas Valley, designed to both protect groundwater from seawater intrusion and provide new treated water supplies. Modeling shows that several BRGP scenarios could achieve minimum thresholds by 2040, though none fully meet the long-term measurable objective. Costs are substantial, but addressing seawater intrusion is critical to the region's water security. Through completion of the feasibility study, the preferred Injection Only Scenario will be further refined.

As noted in the 180/400 Subbasin GSP 5-Year Evaluation, work to date shows that at least one project can meet the seawater intrusion minimum threshold: the BGRP.