Deep Aquifers Management Recommendations Memorandum

March 2026

Prepared by the Deep Aquifers Agencies Working Group:

Salinas Valley Basin Groundwater Sustainability Agency
Monterey County Water Resources Agency
County of Monterey
Marina Coast Water District Groundwater Sustainability Agency

Deep Aquifers Management Recommendations Memorandum

Table of Contents

Section 1. Overview

1.1 Purpose

The Deep Aquifers increasingly provide vital groundwater resources for domestic, industrial, and agricultural uses in the Salinas Valley within Monterey County. The Deep Aquifers Memorandum (DA Memo) supplements the Deep Aquifers Study (Study) prepared by Montgomery & Associates (M&A) for the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) and funding partners.

The Study defined the Deep Aquifers as water-bearing sediments lying beneath a relatively continuous clay-rich aquitard located about 500 to 900 feet below the land surface, extending below the 400-Foot Aquifer or its stratigraphic equivalent. Additionally, it offered twelve science-based guiding principles for groundwater users and agencies, focused on preventing further degradation of the Deep Aquifers and raising groundwater elevations to reduce risks of seawater intrusion and land subsidence. However, the Study did not recommend specific policies, projects, or management actions.

This DA Memo builds on recommendations in related earlier reports by the Monterey County Water Resources Agency (MCWRA), discussed below, as well as the Study's guidance. Its purpose is to create a recommended structure for managing the Deep Aquifers and to identify actions or projects that could be deployed to sustainably manage them.

Through collaboration among local agencies participating in the Deep Aquifers Working Group, this DA Memo refines interim local protective management actions, outlines potential long-term management approaches, strengthens monitoring coordination, and recommends pathways for operationalizing management actions within existing statutory authorities.

To adhere to the Sustainable Groundwater Management Act (SGMA), the recommended actions in this DA Memo may be necessary to ensure long-term sustainable groundwater supplies and retain groundwater management under local control.

The following sections summarize key findings from the Study to provide technical context for the management considerations presented later in this DA Memo. The background explains the hydrogeologic conditions that inform groundwater sustainability planning and preserves the technical work developed through the Study process. While detailed, the following information does not establish new regulatory requirements but provides the foundation for evaluating interim and long-term management options under existing authorities.

1.2 Background

In 2017, MCWRA issued a report titled "Recommendations to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin" (2017 report). This report was prepared in response to a 2015 analysis that found seawater advancing inland and creating "islands" of saline groundwater in the 400-Foot Aquifer through vertical migration from overlying aquifers. The 2017 report identified an Area of Impact from seawater intrusion as that

portion of the 180/400 Foot Aquifer Subbasin in which chloride concentrations in either the 180-Foot or 400-Foot Aquifer are 250 milligrams per liter (mg/L) or greater.

The 2017 report raised concerns about the Deep Aquifers in addition to recommendations for proactively managing seawater intrusion in the 180-Foot and 400-Foot Aquifers, noting risks related to shifting pumping to the Deep Aquifers without sufficient knowledge about their hydraulic properties and sustainable yield. Concerned that increasing Deep Aquifers pumping could compromise this critical reserve, the 2017 report called for further scientific investigations about them and recommended treating the Deep Aquifers cautiously as a remaining relatively fresh water source.

In May 2018, the Monterey County Board of Supervisors enacted Interim Urgency Ordinance No. 5302 pending further investigation of the Deep Aquifers, prohibiting new well applications in the Area of Impact with some exceptions. It required monitoring and reporting of groundwater usage and quality for new wells. The ordinance, initially effective for 45 days, was extended by Ordinance No. 5303 to May 21, 2020; it expired at that time. The lapse of the ordinance, together with new data on well construction and groundwater pumping that occurred during the term of the moratorium, underscored the continued need for a comprehensive study of the Deep Aquifers.

Also in May 2020, MCWRA updated the 2017 report with additional information on the conditions in the Salinas Valley Groundwater Basin and the persistent threat of seawater intrusion on the reliability of groundwater as the primary water source for agriculture and communities in some areas of the Salinas Valley. Inland movement of groundwater with elevated chloride levels continued to be detected and affect the 180-Foot and 400-Foot Aquifers. MCWRA's 2020 seawater intrusion report noted that several areas between Castroville and Salinas had worsening trends. Though the Deep Aquifers continued to be unaffected, the report noted the importance of expanding monitoring in the Deep Aquifers to ensure early detection of seawater intrusion, should it occur.

MCWRA's 2020 report recommended protective management measures to safeguard the Deep Aquifers, recognizing their critical role as a strategic reserve. It stated the concern that over-pumping could jeopardize a crucial but vulnerable water source and recognized the Deep Aquifers as one source within a broader portfolio of water supply strategies. Recommendations for long-term solutions in the 2020 report included reducing groundwater pumping in sensitive areas, expanding use of recycled and surface water for irrigation, exploring new recharge and conveyance projects, and developing long-term regional water management strategies to balance supply and demand.

The 2020 report called for a comprehensive Deep Aquifers investigation to better understand recharge mechanisms, available storage, hydrogeologic properties, and the spatial extent of the aquifers. It highlighted the need for coordinated scientific work with the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) and Marina Coast Water District Groundwater Sustainability Agency (MCWDGSA), recommended joint pursuit and funding of a Deep

Aquifers study, and integration of results into the relevant groundwater sustainability plans being prepared for compliance with the Sustainable Groundwater Management Act (SGMA).

In December 2020, County Ordinance No. 5339 established a 90-day moratorium on new well construction permits so the County could assess the impact of the *Protecting Our Water & Environmental Resources v. County of Stanislaus (Cal. Supreme Court, 2020)* decision, which held that well permits are not categorically ministerial. This ruling requires environmental review under the California Environmental Quality Act (CEQA) if permit approval involves discretionary authority. Since the expiration of the 90-day moratorium, pursuant to Monterey County Code Chapter 15.08 the Monterey County Health Department Environmental Health Bureau (EHB) has determined that CEQA is required for Deep Aquifers well applications.

1.3 Deep Aquifers Study

In 2021, the SVBGSA coordinated with funding partners to undertake the Study to answer key questions about the geology and hydrogeology of the aquifers and to provide a scientific foundation for sustainable management. Study funding partners included ALCO Water, California Water Service, Castroville Community Services District, City of Salinas, irrigated agriculture, MCWDGSA, County of Monterey, SVBGSA, and MCWRA.

The Study, completed by M&A April 2024, provides a comprehensive scientific overview and definition of the Deep Aquifers across several Salinas Valley subbasins. The Study provides a comprehensive scientific overview of the geology and hydrogeology of the Salinas Valley's Deep Aquifers, bringing together prior investigations with new data and analysis. The Study defines the Deep Aquifers, develops a hydrogeologic conceptual model, presents a water budget, and reviews both historical and recent groundwater conditions. Although the Study identifies where there are remaining areas of uncertainty and data gaps, its findings provide a technical foundation for developing a plan for managing the Deep Aquifers.

In the summer and fall of 2024, the Study was presented to the Boards of Directors of SVBGSA, MCWDGSA, and MCWRA, as well as to the Monterey County Board of Supervisors.

Definition of Deep Aquifers

The Study defines the Deep Aquifers as water-bearing sediments lying beneath a clay-rich aquitard at depths of approximately 500–900 feet, extending below the 400-Foot Aquifer. They consist of multiple geologic formations, including the Santa Margarita, Paso Robles, and Purisima Formations, each contributing to the complex subsurface system. It notes hydraulic connections both with adjacent aquifers (lateral) and overlying aquifers (vertical) based on documented groundwater gradients. The Hydrogeologic Conceptual Model (HCM) of the Deep Aquifers in the Study describes the geologic framework, groundwater occurrence and movement, aquifer extent, hydraulic properties, groundwater chemistry, and potential recharge and discharge pathways.

Water chemistry was found to be distinct from shallower aquifers and varies between north and south coastal areas, while isotopic data indicate no recharge from surface water since at least

1953. Limited aquifer tests showed typical confined aquifer properties, with relatively low storage and hydraulic conductivity (about 10 ft/day on average), meaning groundwater moves more slowly than in the overlying 180-Foot and 400-Foot Aquifers. Because the portions of the Deep Aquifers formations that occur below the 400/Deep Aquitard lack direct surface recharge, inflows and outflows occur through subsurface connections from areas where the Deep Aquifers formations outcrop beyond the defined Deep Aquifers extent and slow leakage with adjacent aquifers, including the 400-Foot Aquifer.

Groundwater Elevations

The Study found that groundwater elevations in the Deep Aquifers have generally declined over the past two decades (Figure 1). Three pumping depression areas exist: near Castroville, west of Salinas, and in Seaside.

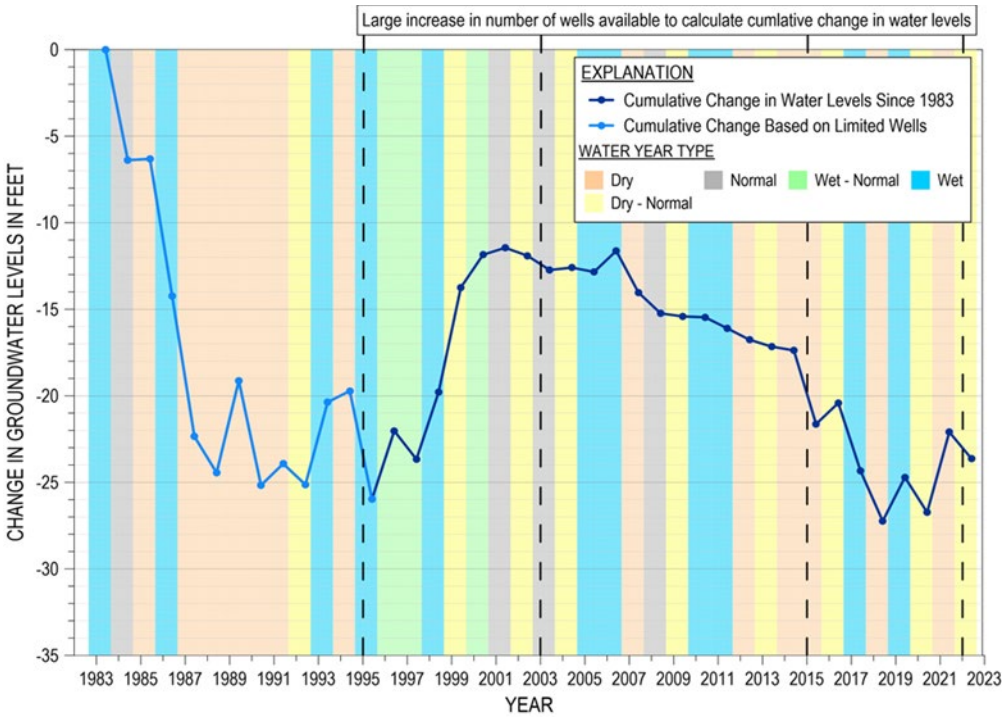

Figure 1: Cumulative Change in Groundwater Elevations in the Deep Aquifers

The Study confirmed that declining groundwater elevations due to increased pumping have reversed the natural vertical gradient between the Deep Aquifers and the overlying 400-Foot Aquifer. Historically, water moved upward from the Deep Aquifers toward the shallower zones. The aquitard separating these layers is not fully impermeable—it contains intermittent pockets of sands and silts with variable thickness, which act as conduits for vertical flow. With the reversed gradient, groundwater could currently flow downward through the aquitard or leaking wells.

The Study identified that lowering groundwater levels have created an inland hydraulic gradient from the coast, which increases the risk of lateral seawater movement from the ocean into the Deep Aquifers. One of the main Deep Aquifers formations, the Purisima Formation, outcrops in

the Monterey Bay Canyon and is in direct contact with seawater, establishing a plausible lateral intrusion route. Other formations are hydraulically connected to these marine sediments, meaning seawater could migrate inland through interconnected geologic pathways over time. The Study noted some risk of land subsidence due to dewatering of confining clays.

Water Budget and Trends

The Study's water budget section provides estimates of groundwater inflows, outflows, and changes in storage. Flows can occur between the Deep Aquifers and adjacent aquifers, including slow leakage with the overlying 400-Foot (or equivalent) Aquifer. The water budget was developed using the provisional Salinas Valley Integrated Hydrologic Model (SVIHM)[1] and the Salinas Valley Seawater Intrusion Model (SWIM).

The water budget analysis found average storage declines of ~9,000 acre-feet per year (AFY) historically (2004–2017) and ~9,600 AFY in the more recent period (2018–2020). Subsurface inflows occur across most boundaries, with outflows toward the Gabilan Range in the east.

Installation of wells partially or entirely completed in the Deep Aquifers has increased over time, especially since 2013. These new wells are primarily for irrigation and are concentrated west of the City of Salinas and northeast of Marina, in an area overlapping with where the 180-Foot and 400-Foot aquifers have been impacted by seawater intrusion. In Water Year 2022, there were 43 wells screened solely in the Deep Aquifers and 9 wells screened across both the Deep and 400-Foot Aquifers. Groundwater extraction from these wells ranged from 13,800 AFY from the true Deep Aquifers wells to 17,700 AFY when including wells screened in both the Deep Aquifers and 400-Foot Aquifer. This increased concentration of wells screened within the Deep Aquifers has intensified extraction rates, amplified further as wells are installed at deeper depths due to seawater intruded overlying aquifers.

The Study notes that water budget estimates will improve as new data and refined model calibrations become available. Since the Study was prepared, the SWIM and SVIHM have been further refined and calibrated. Additional model updates have since been completed with new data collected through the Study (see Attachment 1 of this report).

Deep Aquifers Regions

The Study identifies three regions of the Deep Aquifers based on geology, water chemistry, groundwater trends, and use (Figure 2). The regions are used to describe variability in conditions and available data throughout the Deep Aquifers, but any management actions for the Deep Aquifers would be administered on the basis of agency jurisdictional boundaries.

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

- **Northern region** –Includes the northern area of the Monterey Subbasin, 180/400-Foot Aquifer Subbasin from the coast down to south Salinas, and western edge of portions of the Eastside and Langley Subbasins. The northern region has the greatest amount of groundwater extraction from the Deep Aquifers and the most information available about them. This region shows the greatest storage decline.

- **Seaside region** – Includes portions of the Seaside Subbasin and adjacent southern area of the Monterey Subbasin. It is characterized by unique water chemistry and the presence of the Santa Margarita Sandstone. The boundary with the northern region is a groundwater divide that can shift with groundwater extraction or injection pumping rates. Storage decline has been partially offset by projects with injection for aquifer storage and recovery in the Seaside region of the Deep Aquifers from both the Carmel River Aquifer Storage and Recovery and Pure Water Monterey projects.

- **Southeastern region** – Includes areas inland/up-valley area south of Salinas. This area has fewer wells and less groundwater extraction. Deep Aquifers pumping in this area occurs mostly from wells screened across both the 400-Foot Aquifer and Deep Aquifers. The Study noted that additional data and refined models are needed to reduce uncertainty and support management decisions in the southeastern region.

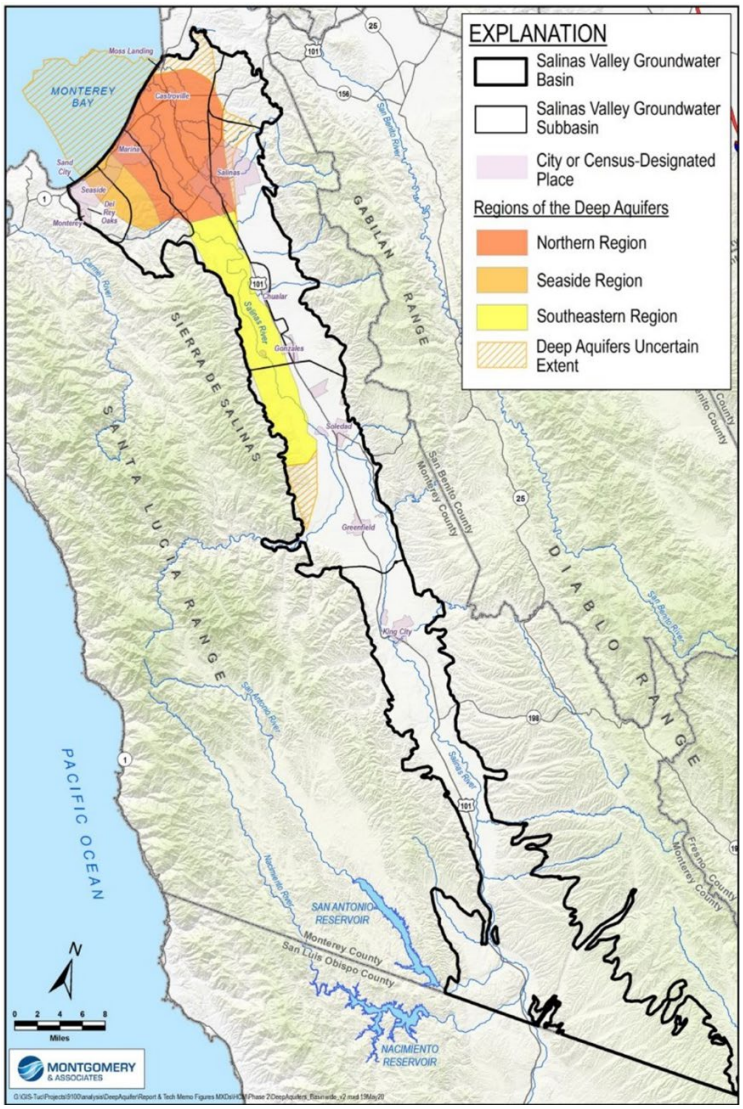

Figure 2. Deep Aquifers Extent and Regions

1.4 Groundwater Sustainability Plans

SGMA requires GSPs for all critically overdrafted, high, and medium priority basins and subbasins in California. GSPs intend to ensure that a basin or subbasin is operating within its sustainable yield and is taking action to avoid undesirable results related to six sustainability indicators:

- Chronic lowering of groundwater levels
- Reduction of groundwater in storage
- Seawater intrusion
- Degraded groundwater quality
- Land subsidence
- Depletion of interconnected surface water

Each GSP identifies Sustainable Management Criteria (SMC) for each indicator that consists of three factors, and which are set with some reasonable margin for operational flexibility.

- Minimum Thresholds (MT) – the lowest groundwater conditions a basin can reach before it is considered to have a significant problem.
- Measurable Objectives (MO) – the target conditions a basin aims to achieve over time.
- Undesirable Results (UR) – serious, unacceptable outcomes caused by groundwater conditions that must be avoided.

SGMA requires GSPs to identify projects and management actions (PMA) that will meet the sustainability criteria within 20 years of the initial plan.

GSPs for the 180/400-Foot Aquifer Subbasin (180/400) and Monterey Subbasin (Monterey) identify the Deep Aquifers as an important source of groundwater in these subbasins. These GSPs recommend coordinated, cautious management to preserve the Deep Aquifers as a long-term water resource for the Salinas Valley region within Monterey County. The GSPs were prepared prior to completion of the Study but provide additional context for this management framework. The Study recognized the Deep Aquifers extent going partially into the Langley Area, Eastside Aquifer and Forebay Subbasins, but they are not considered principal aquifers in the GSP for these Subbasins.

180/400-Foot Aquifer Subbasin GSP

The California Department of Water Resources (DWR) has identified the 180/400 as a critically overdrafted basin. The 180/400 GSP was first prepared in 2020 and the 180/400 GSP Amendment 1 was prepared by SVBGSA in 2022. DWR is currently reviewing 180/400 GSP Amendment 1, accompanied by the GSP 5-year Evaluation that SVBGSA submitted in January 2025. In 180/400 GSP Amendment 1, the Deep Aquifers are correlated to the lower Paso Robles, Purisima, and Santa Margarita formations. Also historically called the 900-Foot and 1500-Foot Aquifers, these water-bearing formations up to 900 feet thick consist of alternating sandy-gravel and clay layers that do not clearly separate into distinct aquifers or aquitards.

Together, the 180-Foot Aquifer, 400-Foot Aquifer, and Deep Aquifers form the major groundwater-producing zones in the 180/400, referred to in the 180/400 GSP as principal aquifers. While recognizing limited data on hydraulic connectivity between these aquifers, the Deep Aquifers play a critical role in the subbasin's overall storage and water balance. The 180/400 GSP recognizes that the Study needed to be completed and monitoring improved to determine sustainable yield and to ensure that Deep Aquifers resources will remain viable and un-intruded by seawater.

Both the 2020 180/400 GSP and Amendment 1 identify data gaps for the Deep Aquifers, particularly in the northern part of the Subbasin and along the Eastside Subbasin boundary. The Study itself addressed many data gaps. SVBGSA has continued to fill data gaps, collect information and improve model calibrations for the Deep Aquifers since completion of the Study.

These activities are summarized in Attachment 1 of this DA Memo. For example, in 2022 the monitoring network included 11 representative monitoring sites (RMS). The monitoring network has since been expanded to 23 RMS.

While data limitations are recognized, the 180/400 GSP identifies sustainable management criteria for Deep Aquifers. For example, the seawater-intrusion MT for the Deep Aquifers is set at State Route 1. In the groundwater level SMC, the MT is set at 1-foot above 2015 elevations, with the MO to restore groundwater levels to 2003 elevations. An undesirable result was defined as more than 15% of wells below the groundwater level MT. However, the 180/400 GSP does include SMC for groundwater storage, stating that the Deep Aquifers' contribution to the overall storage in the subbasin needs to be refined based on results from the Study.

The 180/400 GSP identifies the need for improvements to the groundwater models to further quantify the sustainable yield and recommended reevaluating minimum thresholds and measurable objectives based on the Study findings. SVBGSA is planning this work to be done in 2026 as part of the next GSP evaluations for SVBGSA's other 5 Subbasins as well as an updated evaluation of the 180/400 GSP.

The 180/400 GSP includes Management Action 5: Undertake and Operationalize Guidance from Deep Aquifers Study. This management action states that the GSAs will incorporate findings of the Deep Aquifers Study into future GSP updates to ensure that the study and that future regulations will be developed to promote groundwater sustainability of the Deep Aquifers. The management action is to operationalize guidance for management from the Deep Aquifers Study based on how recent and new data informs the Deep Aquifers' HCM and water budget, particularly with regards to recharge, risk of seawater intrusion, and sustainable management requirements under SGMA.

Monterey Subbasin GSP

The California Department of Water Resources (DWR) has identified the Monterey Subbasin (DWR Basin No. 3-004.10) as a high-priority basin under the Sustainable Groundwater Management Act (SGMA). The Monterey Subbasin Groundwater Sustainability Plan (GSP) was adopted in 2022. Within the Monterey Subbasin, the MCWDGSA serves as the Groundwater Sustainability Agency for the Marina-Ord Management Area and is responsible for implementation of Sustainable Management Criteria (SMC), monitoring, reporting, and development of projects and management actions within its jurisdiction. MCWDGSA is actively implementing the GSP and coordinating required annual reports and five-year evaluations consistent with SGMA requirements.

In the Monterey Subbasin GSP, the Deep Aquifers are identified as a significant component of the subbasin's principal aquifer system and are recognized by MCWDGSA as a strategic reserve requiring careful and deliberate management. At the time the Monterey Subbasin GSP was prepared, the Deep Aquifers Study was underway and intended to further define the hydrogeologic framework, groundwater conditions, and sustainable yield of these deeper

formations. MCWDGSA anticipated incorporation of Study findings into future GSP evaluations and project development to ensure management decisions are informed by the best available science.

The Monterey Subbasin GSP identifies the Deep Aquifers as primarily composed of the Paso Robles Formation, the Purisima Formation, and the Santa Margarita Formation, which all date from the Pliocene to Miocene epochs. It describes them kas separated from shallower aquifers by the 400-Foot/Deep Aquitard, a thick, relatively impermeable layer that limits vertical flow but may contain discontinuities allowing limited hydraulic communication. These formations extend across much of the Monterey Subbasin and are hydraulically connected to the equivalent Deep Aquifers in adjacent subbasins, including the 180/400 and Seaside Subbasins, suggesting that regional pumping and recharge projects in one area can influence conditions in another.

The Monterey Subbasin GSP refers to the Deep Aquifers as a strategic reserve—a limited, largely non-renewable groundwater source that must be managed cautiously. It notes that groundwater in the Deep Aquifers moves slowly, and recharge from surface water or rainfall is extremely limited due to confinement by the aquitard. The plan calls for continued monitoring and regional coordination between subbasins (Monterey, 180/400-Foot, and Seaside) to manage pumping and to evaluate hydraulic gradients. It identifies future management actions such as limiting new Deep Aquifers wells, reducing extraction, and enhancing recharge where possible.

The Monterey GSP sets SMC to address chronic lowering of groundwater levels for the Deep Aquifers along with other principal aquifers in the Monterey Subbasin. Undesirable results are defined as, over the course of any one year, exceedance of more than 20% of the RMS below the groundwater level MT in:

a) both the Dune Sand and upper 180-Foot Aquifers, or
b) both the lower 180-Foot and 400-Foot Aquifers, or
c) the Deep Aquifers, or
d) the El Toro Primary Aquifer System.

The MT 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, and 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 State Route 1 in the Monterey Subbasin and seaward of groundwater extraction wells in the Subbasin. The sustainability indicator for reductions in groundwater storage uses the SMC for groundwater levels and seawater intrusion. Undesirable results are defined as the same. Any exceedance of the seawater intrusion MT is an undesirable result.

1.5 Recent Groundwater Conditions

Since completion of the Study, MCWRA, SVBGSA, and MCWDGSA have continued to monitor and evaluate conditions in the Deep Aquifers as part of ongoing SGMA compliance. This section provides recent findings on Deep Aquifers conditions from the 180/400 GSP 5-Year

Evaluation, which covered Water Years (WY) 2019-2024. It also provides a summary of WY 2024 annual report findings related to the Deep Aquifers in both the 180/400 and Monterey Subbasins.

180/400-Foot Aquifer GSP 5-Year Evaluation

SVBGSA submitted the first 180/400 GSP 5-year Evaluation to DWR in January 2025. As illustrated in Figure 3, during the period from WY 2019-2023, the 180/400 had undesirable results for seawater intrusion and groundwater levels in all 5 years. Groundwater storage MT were not met in WY 2021 and 2022.

Water Year	Groundwater Levels	Seawater Intrusion	Groundwater Storage	Groundwater Quality	Land Subsidence	Depletion of ISW
WY 2019	X	X	✓	✓	✓	✓
WY 2020	X	X	✓	✓	✓	✓
WY 2021	X	X	X	✓	✓	✓
WY 2022	X	X	X	✓	✓	X
WY 2023	X	X	✓	✓	✓	✓

Figure 3. 180/400 GSP 5-year Evaluation Summary of Undesirable Results

Groundwater levels in the RMS wells for the Deep Aquifers fell below the MT in all 5 years. Between 45% and 100% of the RMS in the Deep Aquifers were below their thresholds—far exceeding the 15% limit that defines an undesirable result.

Aquifer	Less Than 15% of RMS Wells are Exceeding their Minimum Threshold		More Than 15% of RMS Wells are Exceeding their Minimum Threshold		
	Percent of RMS Wells Below Minimum Thresholds				
	2019	2020	2021	2022	2023
180-Foot Aquifer	0	9%	9%	37%	6%
400-Foot Aquifer	11%	0	13%	34%	7%
Deep Aquifers	45%	100%	82%	78%	55%
Subbasin Groundwater Level Undesirable Result	2019 Undesirable Result	2020 Undesirable Result	2021 Undesirable Result	2022 Undesirable Result	2023 Undesirable Result

Figure 4. Annual Summary of Groundwater Level Undesirable Results

Monitoring revealed that increased Deep Aquifers pumping contributes to storage loss and reduced pressure heads. The 180/400 GSP evaluation identifies downward trends in groundwater elevations and prolonged recovery times after the pumping season, suggesting that extraction exceeds the aquifers' ability to replenish. Hydrographs for key wells (such as 14S/02E-28H04 and 13S/02E-19Q03) demonstrate multi-year declines with seasonal drawdown and partial recovery each winter. Some localized temporary stabilization is noted in interior zones, likely due to reduced pumping or minor inflow from adjacent formations. Extraction volumes were not offset by recharge, given that Deep Aquifers recharge is limited.

The 180/400 GSP 5-year Evaluation incorporates the Study findings that groundwater elevations in parts of the Deep Aquifers are now below those of the overlying aquifers, reversing the historical downward gradient. This reversal increases vulnerability to vertical seawater migration if the current hydraulic conditions persist. High-frequency monitoring of Deep Aquifers groundwater levels and chloride concentrations to detect early intrusion signals is recommended.

SVBGSA and MCWDGSA have increased the number of representative monitoring sites in the Deep Aquifers from 11 to 23, installed 3 new dedicated Deep Aquifers wells, and began integrating them into the 2024 Annual Report network. The expanded network will enable development of groundwater elevation contours for the Deep Aquifers, support SMC updates specific to these deeper zones, and allow calculation of storage changes and tracking of hydraulic connectivity between subbasins.

The 180/400 GSP Evaluation recommends that, for management purposes, the Deep Aquifers should be recognized as a strategic reserve rather than a resource for ongoing expansion of pumping, until sustainable yield and inter-aquifer relationships are fully quantified. It states that the Deep Aquifers are at risk of groundwater quality degradation and reduced storage and recommends actions to reduce pumping and monitor saline encroachment.

180/400 Subbasin and Monterey Subbasin Annual Reports WY 2024

Water Year (WY) 2024 Annual Reports for the Monterey and 180/400 Subbasins show that groundwater levels in the Deep Aquifers continue to decline across most monitoring wells. Both Subbasins fell below their sustainability thresholds. WY 2024 and recent data show that the vertical flow direction between aquifers has changed — instead of water moving upward, as it once did, the hydraulic gradient is now downward into the Deep Aquifers. This reversal increases the risk of pulling seawater or other poor-quality water into deeper layers. Although a few wells show signs of stabilization or slight recovery, the overall trend in groundwater levels remains downward.

The reports warn that current conditions make the Deep Aquifers more vulnerable to seawater intrusion, due to falling groundwater levels caused by continued pumping and geologic

connections between the Purisima Formation and marine sediments along the coast. These risks are especially high near Castroville and Marina, where the Deep Aquifers are closest to the ocean and overlying aquifers are already intruded. Well data shows that groundwater pumping and water levels are seasonal. Levels typically drop in the summer irrigation season and rebound to some extent in the fall, when pumping decreases. In a few places, temporary increases in water levels were observed, possibly due to inflows from nearby aquifers or deeper layers, though more testing is needed to confirm whether this water is fresh or saline.

1.6 Deep Aquifers Memorandum

The DA Memo presented here has been developed based on discussions among a staff working group of local agencies with groundwater management authorities in the Salinas Valley, including MCWRA, Monterey County Health Department Environmental Health Bureau (EHB), MCWDGSA, and SVBGSA. This DA Memo is intended to serve as a guide for further development of management actions or projects related to the Deep Aquifers and to guide related policy considerations by agency decision-makers, beneficial users, and the interested public.

The following sections of this document identify interim and long-term management actions to be developed. Attachment 1 provides an overview of new data collection and efforts to fill data gaps since completion of the Study. Attachment 2 is an excerpt from the County of Monterey General Plan Public Services Element, with the goal and policies related to long-term water supply.Section 6 of the Deep Aquifer Study provides management guidance.

Section 2. Interim Local Management Options for Immediate Action

This section of the DA Memo identifies interim management actions that can be developed to address the issues in the Deep Aquifers that were described in Section 1. The options presented here build upon content from the Study, further identifying considerations for implementing each option, with a focus on tasks that can be completed while longer-term projects or management actions are contemplated.

2.1 Seawater Intrusion Response Planning

Beyond long-term groundwater elevation goals, low groundwater levels in the Deep Aquifers pose risks of seawater intrusion and land subsidence. While projects to achieve sustainability will take significant time to develop and implement, more immediate action may be necessary if these risks materialize.

A seawater intrusion response plan (SIRP) is a strategy for detecting, preventing, and mitigating the contamination of coastal freshwater aquifers by saltwater. Based on a monitoring plan, triggers are established and response measures are identified if seawater intrusion is detected. Triggers may include specific thresholds for water quality (e.g., chloride levels) and groundwater elevations that would result in activation of the response plan and groundwater management strategies or implementation of infrastructure solutions.

Examples of potential response measures include:

- **Water shortage response plan:** Establish a contingency plan that prescribes how water demands will be reduced if seawater intrusion impacts the water supply.
- **Pumping reductions:** Immediately decrease or halt pumping from contaminated wells. Implement mandatory water conservation measures during dry periods to reduce overall demand on the aquifer.
- **Relocation of wells:** In severe cases, discontinue the use of contaminated wells and drill new wells in areas less susceptible to intrusion. For existing wells, consider reducing pump depth or using smaller pumps to minimize drawdown.
- **Require well destruction**: If monitoring identifies elevated chloride levels, require well owners to conduct an assessment to determine if intrusion is due to downward vertical migration and require well destruction if the well increases risk of intrusion in the Deep Aquifers.
- **Pumping schedules:** For multiple wells in a system, operators may alternate pumping times to allow for aquifer recovery and minimize localized drawdown.
- **Development of alternative supplies:** Investigation and assessment of alternative supplies to provide water during emergencies.
- **Recharge augmentation:** Implement artificial recharge projects to raise the water table and create a freshwater barrier against saltwater. Sources can include stormwater capture, treated wastewater, or injection wells.

This DA Memo supports establishing a SIRP for the Deep Aquifers to enable rapid assessment and response action if intrusion is detected. Implementation of any response measures will

require close coordination between SVBGSA, MCWDGSA, MCWRA, Deep Aquifers well owners, and other relevant agencies, consistent with existing statutory authorities and adopted GSPs. The Seaside Groundwater Basin Watermaster recently approved an updated SIRP for its adjudicated area, described further in Section 3.

2.2 Demand Management as an Interim Tool

Over the last several years, SVBGSA has been planning for demand management and engaging a broad audience in the process. Over the last year, SVBGSA has been evaluating a range of potential demand management measures, from efficiency improvements to groundwater allocation, with continued public involvement at the SVBGSA subbasin committees.

From this effort, SVBGSA developed a Demand Management Framework (Framework) that was accepted by the SVBGSA Board in November 2025. The Framework outlines ten demand management measures and provides a structured approach for further policy and program development. It recognizes that activation of specific measures will depend on localized groundwater conditions. It is designed to accommodate variability across subbasins. This flexible structure allows for implementation across the Salinas Valley while accounting for unique subbasin characteristics and conditions.

SVBGSA's Framework provides a structured approach for evaluating, prioritizing, and implementing demand management measures as part of the broader GSP implementation strategy. The Framework articulates key components including stages and triggers, global elements (such as water accounting and measurement systems), and a suite of potential agricultural and domestic measures. A variety of projects and management actions are being studied to assess which can achieve sustainable management criteria in the timeframe stipulated by SGMA.

Importantly, the Framework is a planning tool rather than a set of activated measures; it sets the foundation for developing rules, guidelines, and implementation activities for measures when and where they are needed to support SGMA compliance.

Based on the observed triggers, under the Framework the 180/400 is in Stage 4 due to having groundwater level SMC undesirable results in the Deep Aquifers every year since GSP implementation. Much of the Deep Aquifers pumping occurs in an area with seawater intrusion in the overlying aquifers, complicating efforts to reduce pumping without alternative supplies. This suggests that deploying demand management may be appropriate and necessary, at least as an interim measure until injection or in-lieu supply projects can be implemented, to reduce extraction from the Deep Aquifers.

SVBGSA FY 2027 workplan includes activities to develop the rules, program structures, and administrative systems for allocations and a Demand Management Fee, with emphasis on areas where seawater intrusion overlies the Deep Aquifers and sustainability concerns are acute. The 180/400 GSP 2025 Evaluation identified that the Deep Aquifers have had undesirable results for

groundwater levels every year since the 180/400 GSP was submitted. The Deep Aquifers Study and subsequent data emphasize that groundwater elevations in the Deep Aquifers are below sea level and groundwater elevations are below those in the overlying 400-Foot Aquifer. In the areas where the overlying 180-Foot and 400-Foot Aquifers are seawater intruded, these conditions increase the risk of both lateral and vertical seawater intrusion and jeopardize the long-term viability of the Deep Aquifers. Measures that directly influence net pumping, such as pumping limits (allocations), fees, and land repurposing, align with the Deep Aquifers Study's core guidance to prevent further degradation by limiting extraction to help stabilize and raise groundwater elevations. Prioritizing development of these tools in specific areas reflects the need to manage demand where the consequences of inaction are most severe.

Since the 1990's, MCWD has implemented several demand management measures within its District boundaries. The 1993 Annexation Agreement with MCWRA for the annexation of Fort Ord into Zones 2 and 2A established pumping limits for the Fort Ord area, restricting extraction from the Salinas Basin to 6,600 AFY for use within the Fort Ord Area until implementation of a project to provide a substitute supply. Additionally, the 1996 Annexation Agreement and Groundwater Mitigation Framework for Marina Area Lands established a groundwater pumping limit of 4,440 AFY in the Marina Area. These pumping limits were established to address concerns of seawater intrusion and limit extractions from the aquifers to ensure groundwater pumping remained at historical sustainable levels.

In 1993, MCWD enacted an ordinance within section 3.36.030 of the District Code of Ordinances, addressing water waste by establishing limitations of how water can be used on landscapes and outside. This ordinance has since been updated throughout the years to remain consistent with the Model Water Efficient Landscape Ordinance.

Since the early 2000's, MCWD has been installing meters at previously unmetered locations and has been 100% metered since 2019. Now fully metered, MCWD can account for all water demand within its service area and more efficiently address water loss throughout the system. Additionally, MCWD encourages conservation through a pricing system where residential high-water users are charged at a higher rate. By utilizing conservation pricing, MCWD provides a financial incentive for customers to reduce their water consumption and therefore reduce water demand.

MCWD's conservation program currently consists of residential water audits, rebates for drought-tolerant landscaping, water efficient landscaping devices, high-efficient toilets and washers, and hot water circulation pumps. Annually, the program saves about 1,600 AFY and has contributed to the consistent decline in water production and water demand over the past few years.

Currently, there are seven active extraction wells through MCWD's service area, supplying water to about 40,000 customers. These wells are screened throughout the lower 180/400 Ft., 400 ft., and deep aquifers. Because MCWD's production wells are screened across multiple aquifers, the

District has operational flexibility to shift pumping among sources, helping to avoid concentrated impacts on any single aquifer.

MCWDGSA will continue to implement and refine demand management measures while evaluating the effectiveness and potential benefits of additional strategies.

2.3 Well Permitting

In California, construction, alteration, or destruction permits for water wells are issued and enforced by local jurisdictions that have adopted ordinances meeting or exceeding the state's standards, referred to as the Local Enforcing Agency (LEA). DWR issues well construction and destruction standards[2] applicable to water wells, monitoring wells, geothermal wells, and cathodic protection wells—addressing key aspects like:

- Well siting (avoiding pollution sources),
- Casing and annular seal specifications,
- Surface features (e.g., pads, locks),
- Well development, repair, decommissioning, etc.

Additionally, the Division of Drinking Water (SWRCB-DDW) enforces added standards for public water supply wells (i.e., those serving 15 or more connections) and the Regional Water Quality Control Board and DWR oversee monitoring wells, hazardous sites, and related cases.

County of Monterey Well Ordinance Amendments

As noted above, in *Protecting Our Water & Environmental Resources v. County of Stanislaus* (Cal. Supreme Court, 2020), the Court held that well permits are not categorically ministerial and if a county's ordinance requires staff to exercise judgment/discretion (e.g., apply protective standards based on site-specific conditions), the approvals can be discretionary and CEQA applies. If, on the other hand, the permit is issued by rote when fixed standards are met, it is ministerial and CEQA does not apply.

EHB is preparing proposed amendments to the Monterey County Code Chapter 15.08 to update the County's regulations for consistency with current State well regulations. These amendments are planned to be considered by the Board of Supervisors in 2026. The amendments will include adding definitions for ministerial and discretionary well applications. Ministerial well applications will involve review to determine whether basic technical standards are satisfied. Most other changes will be non-substantive language changes designed to improve the Chapter's clarity, as it was originally drafted decades ago. The County will also be preparing an Administrative Manual to offer more specific detail as to Chapter provisions.

[2] California Department of Water Resources Well Standards can be found here: https://water.ca.gov/Programs/Groundwater-Management/Wells/Well-Standards

Well Ordinance Policy Considerations

The purpose of the County's regulations of water wells, as stated in Section 15.08.010 of the Monterey County Code, is:

> "to provide for the construction, repair, and reconstruction of all wells, including cathodic protection wells, test wells, observation wells, and monitoring wells, to the end that the groundwater of this County will not be polluted or contaminated and that water obtained from such wells will be suitable for the purpose for which used and will not jeopardize the health, safety or welfare of the people of this County. It is also the purpose of this Chapter to provide for the destruction of abandoned wells, monitoring wells, observation wells, test wells, and cathodic protection wells found to be public nuisances, or when otherwise appropriate, to the end that all such wells will not cause pollution or contamination of groundwater."

Well permitting is an important groundwater management activity conducted by the County. As EHB planned amendments to County Code Chapter 15.08 are to update the technical standards, the Study guidance and the DA Memo may inform evaluations related to discretionary permits for new Deep Aquifers wells.

Permit review may require analyses of the effects of pumping from new wells, including factors such as both the total volume and seasonal timing of extraction, how the new wells may affect nearby wells and regional groundwater levels, and whether the wells are located in area with overdraft conditions, seawater intrusion, or as already noted in County Code Section 15.08.140, in an area with known groundwater contamination. Generally, SGMA and GSPs have established Sustainable Management Criteria (SMC) that provide quantifiable minimum thresholds that can be used in these evaluations.

County of Monterey General Plan Long Term Water Supply Policy Considerations

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

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

techniques (PS-3.7). Attachment 2 provides the complete set of policies under Goal 3: Long Term Water Supply in the Monterey County General Plan Public Services Element.

As part of a General Plan-related settlement agreement made prior to the statewide adoption of SGMA, the County conducted a Salinas Valley Basin Investigation pursuant to Policy PS-3.1. The DA Memo recommends the County further review these General Plan policies and assess potential amendments to bring them into consistency with SGMA and the GSPs applicable in Monterey County, and for the Deep Aquifers, the findings of the Study.

The County's prior moratoriums under Government Code section 65858 on Deep Aquifers wells were put in place temporarily until further study could be completed and the County could develop appropriate regulations. The 2018 moratorium included exemptions for replacement wells and public water systems, which had policy tradeoffs that are still relevant:

- Too many exemptions could accelerate overuse of the Deep Aquifers and jeopardize sustainability.
- Too few exemptions could limit essential water access for communities or farmers with no alternatives.

These well permitting policy and regulatory issues should be prioritized for review and update to ensure consistency with SGMA, the GSPs, as well as the findings of the Study.

Marina Coast Water District Well Authority

Marina Coast Water District (MCWD) exercises independent authority within its jurisdictional boundaries under District Code Chapter 3.32 (Water well Permits and Standards). Pursuant to Section 3.32.010, MCWD has adopted Monterey County Code Chapter 15.08 while retaining additional regulatory authority specific to wells located within District boundaries.

Under section 3.32.020, construction or reconstruction of non-District wells within MCWD boundaries is generally prohibited, except for limited shallow non-potable wells authorized under District permit. All such permits are issued and administered by the District's General Manager and are subject to District review, environmental evaluation, and public hearing requirements as applicable. The District may deny or condition permits where proposed wells present potential environmental, groundwater quality, or public welfare concerns.

2.4 Well Destruction and Protective Measures

MCWRA's 2017 Report recommended initiating and diligently proceeding with destruction of wells in Agency Zone 2B, in accordance with Agency Ordinance No. 3790, to protect the Salinas Valley Groundwater Basin against further seawater intrusion.

In 2020, MCWRA secured funding for the Protection of Domestic Drinking Water Supplies in the Lower Salinas Valley project, provided in part by Proposition 1- the Water Quality, Supply, and Infrastructure Improvement Act of 2014 through an agreement with the State Water Resources Control Board. The purpose of the project is to destroy a minimum of 59 abandoned or inactive wells to prevent conduits that may allow for vertical migration of seawater- or nitrate-

impaired groundwater into drinking water aquifers. The project area generally covers an area that includes Castroville, Marina, and Salinas with a southern boundary of Reservation Road and an eastern boundary of Harris Road, though wells must be within a specified proximity of either known high chloride or nitrate to be eligible for destruction using the grant funds.

As of November 2025, MCWRA has completed 37 well destructions and has received an extension of the term to complete work using the grant funds through January 31, 2028.

In the 2017 Report, MCWRA documented the presence of wells constructed in a manner that could facilitate vertical movement of seawater intruded groundwater between the 180-Foot and 400-Foot Aquifers. This mechanism, combined with the downward hydraulic gradient between the Deep Aquifers and overlying aquifers, also results in a potential pathway for movement of seawater intrusion into the Deep Aquifers. Thus, the DA Memo recommends continued financial support of a well destruction program in the seawater intruded area as one means of protecting the Deep Aquifers, in addition to agency support for EHB to fully exercise its authority under County Code Chapter 15.08 to require destruction of wells that are not consistent with the purposes of the chapter.

Section 3. Long-Term Management Actions

This section of the DA Memo is focused on long-term management actions that could be considered to address identified concerns and groundwater conditions in the Deep Aquifers.

3.1 Proposed Projects

The Study emphasized the need to raise groundwater elevations in the Deep Aquifers through reducing groundwater extraction and recharging through injection, a technique sometimes referred to as Aquifer Storage and Recovery (ASR). Projects that provide in-lieu source of supply offset groundwater demands and reduce extractions. Projects that inject water can raise groundwater levels while also providing a method for storage of new supplies that may be extracted for use without increasing net extraction.

Groundwater replenishment through injection into an aquifer is a project approach that has been implemented in the Seaside region, Carmel River ASR and the Pure Water Monterey Project.

SVBGSA, MCWRA, and MCWDGSA are investigating the feasibility of in-lieu supply and injection projects within the area of both observed and modeled expansion of areas at risk of seawater intrusion. Projects under consideration are listed below.

Castroville Seawater Intrusion Project (CSIP) Enhancements/Optimization

MCWRA's 2017 Report first recommended enhancements to the (CSIP) System followed by reductions in pumping within the seawater intrusion Area of Impact identified at that time. The report called for enhancements to the CSIP distribution system including the Booster Pumps, additional storage, and optimizing operational timing.

MCWRA has been working on these recommendations for the existing CSIP distribution system. MCWRA recently completed enhancements to the booster stations to reduce the use of CSIP groundwater wells to address distribution system hydraulic deficiencies by optimizing the effectiveness of the three booster station sites. All eight booster pumps at the three booster station sites (Espinosa, Molera, and Lapis) have been fully rebuilt. SVBGSA has supported some of this effort with SGMA grant funds.

MCWRA has also developed a new hydraulic computer model for the CSIP distribution system, replacing the previous hydraulic model, to evaluate existing CSIP distribution system capacity and performance under peak irrigation demands. The modeling has resulted in additional recommendations to guide MCWRA's capital improvement planning and long-term operational strategies, with the goal of optimizing existing operations and minimizing reliance on supplemental groundwater wells.

Several Capital Improvement Projects (CIP) have been identified to address current needs, with capital costs over $60M. MCWRA is developing a master plan for the Monterey County Water Recycling Projects and further effort will be needed to fund additional improvements.

New Seawater Intrusion Project/CSIP Expansion

MCWRA's 2017 Report recommended expansion of the Castroville Seawater Intrusion Project (CSIP) Service Area and suggested that expansion should include, at a minimum, lands served by wells currently extracting groundwater within the Area of Impact. CSIP Expansion is a project identified in the 180/400 GSP.

At this time, MCWRA and SVBGSA are preparing an initial feasibility study for a New Seawater Intrusion Project (NSIP), with a modified description of CSIP expansion to provide a new agricultural water supply project that would be complementary to CSIP. The study will compare potential source waters and delivery area options with a focus on the areas experiencing or at risk of seawater intrusion beyond the existing CSIP distribution system. This study will consider inclusion of the NSIP in other potential water supply projects being evaluated, specifically the Brackish Groundwater Restoration Project and the Castroville and Eastside Canals and Alternatives.

Aquifer Storage and Recovery of Salinas River Diversions

SVBGSA has prepared a Preliminary Feasibility Study of Aquifer Storage and Recovery (ASR) Project Concepts to Address Seawater Intrusion (January 2025). This study examines a project concept identified in the 180/400-Foot Aquifer Subbasin and Monterey Subbasin Groundwater Sustainability Plans, known as the Seasonal Release with ASR project concept, as a mechanism to halt seawater intrusion in these subbasins. The study led to the development of an alternative called the New Diversion of Winter High Flows for ASR (Alternatives 1 and 1A).

These ASR project concepts aim to reduce seawater intrusion in the 180-Foot, and 400-Foot Aquifers while ensuring a sustainable water supply for the CSIP area by:

- Increasing surface water diversions for recharge during the wet season
- Injecting diverted surface water inland of the seawater-intruded area to raise groundwater elevations
- Partially recovering injected water during the growing season to supplement CSIP supplies and reduce reliance on native groundwater

The Preliminary ASR Feasibility Study can be found here: https://svbgsa.org/aquifer-storage-and-recovery-2/

Brackish Groundwater Restoration Project

SVBGSA completed the first phase of a feasibility study for the Brackish Groundwater Restoration Project (BGRP) in October 2025 and will finalize a U.S. Bureau of Reclamation Title XVI Large-Scale Water Recycling Program Feasibility Study of this project in March 2026. The BGRP concept includes extraction wells to intercept brackish water in the seawater intruded 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 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 MCWRA to evaluate the 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.

SVBGSA evaluated seven BGRP scenarios in Phase 1. The feasibility study will focus on the Injection Only Scenario as the recommended approach. The BGRP Feasibility Study reports can be found here: https://svbgsa.org/brackish-groundwater-restoration-project/

Decentralized Stormwater Recharge Projects

MCWDGSA is evaluating decentralized stormwater recharge projects that focus on enhancing groundwater recharge through medium scale bioswales and recharge basins located on non-agricultural land within the Monterey Subbasin. These facilities are primarily situated over the Dune Sand Aquifer and are intended to capture, infiltrate, and store stormwater locally, increasing groundwater replenishment while also reducing surface runoff and associated impacts.

MCWDGSA has identified and inventoried most stormwater basins within the Monterey Subbasin and is investigating which existing basins provide the greatest potential for direct recharge. This evaluation includes assessing opportunities to retrofit existing bioswales and basins to enhance infiltration capacity, as well as identifying locations where new decentralized recharge basins could be established. The anticipated recharge benefit from converting select existing bioswales to direct recharge facilities is approximately 182 acre-feet per year.

By increasing storage within the Dune Sand Aquifer, these decentralized recharge projects are intended to support conjunctive use and overall system resilience. Enhanced shallow groundwater storage may provide additional operational flexibility and indirectly reduce reliance on deeper groundwater sources over time by improving the balance between recharge and extraction across the broader groundwater system. Any future evaluation of how recharged water may be managed or utilized would occur through existing groundwater sustainability planning and agency processes.

Armstrong Ranch Aquifer Storage and Recovery (ASR) Project

MCWDGSA is advancing the Armstrong Ranch ASR Project as a project-specific feasibility effort to evaluate seasonal groundwater storage and recovery using recycled water within the Monterey Subbasin. The project is located at the Armstrong Ranch property adjacent to the

Monterey One Water Regional Treatment Plant and focuses on storing water in a shallow aquifer system underlying the site, rather than directly within the Deep Aquifers.

The Armstrong Ranch ASR Project is designed to capture surplus recycled water during periods of lower demand and store it underground for later recovery during periods of higher demand, particularly during the irrigation season. Recycled water would be conveyed to the site and recharged through engineered infiltration facilities into the shallow aquifer system, which is hydraulically separated from deeper potable aquifers by a regionally extensive low-permeability unit. Stored water would then be recovered through dedicated recovery wells for beneficial use.

Recovered water from the Armstrong Ranch ASR Project could support agricultural irrigation demands, urban water supplies, or a combination of both, depending on operational needs and future planning decisions. By providing an additional seasonal supply that can be accessed during periods of high demand, the project has the potential to offset groundwater pumping that would otherwise occur from deeper aquifer systems. In this way, the project provides an indirect benefit to the Deep Aquifers by reducing reliance on Deep Aquifers extraction during critical periods, rather than by directly recharging the Deep Aquifers.

The feasibility analysis is being conducted in phases to support progressive refinement of the project concept, including evaluation of storage capacity, groundwater response, and recovery potential under a range of conditions. This phased approach allows MCWDGSA to reduce uncertainty over time while coordinating with ongoing environmental review and groundwater sustainability planning efforts. Consideration of project implementation and operational use would occur through established agency planning, permitting, and SGMA.

Seawater Desalination Project (Reservation Road)

Marina Coast Water District (MCWD) is retrofitting an existing seawater desalination project located on MCWD property near Marina State Beach to provide an additional, drought-resilient water supply for MCWD's service area. The project is currently in Phase 1 and utilizes previously constructed desalination infrastructure. The desalination facility is designed to treat up to 300 AFY of seawater to produce potable water that can be integrated into MCWD's water supply portfolio.

The desalination project is intended to convert seawater into a reliable source of treated water that is independent of groundwater availability and hydrologic conditions. The facility is expected to provide a supplemental supply that can be utilized during periods of elevated demand, reduced groundwater availability, or operational constraints affecting other water sources.

Although the desalination project does not directly recharge groundwater aquifers, it provides an indirect benefit to the Deep Aquifers by supplying potable water that can offset groundwater pumping. By increasing the availability of surface-independent water supplies, desalinated water can reduce reliance on Deep Aquifer extraction in areas where Deep Aquifer wells currently contribute to municipal or regional demand. This supply substitution approach supports overall

groundwater sustainability by reducing pressure on deeper aquifer systems during critical periods.

The desalination project complements other MCWDGSA projects focused on groundwater recharge, storage, and conjunctive use by diversifying the District's water supply sources. Together with Indirect Potable Reuse (IPR), ASR, stormwater recharge, and operational optimization projects, desalination contributes to a broader strategy of improving water supply reliability while minimizing dependence on groundwater extraction.

Indirect Potable Reuse (IPR) Project

MCWDGSA has completed an IPR Feasibility Study to evaluate the direct injection of advanced-treated recycled water into groundwater aquifers within the Monterey Subbasin as a long-term water supply augmentation and groundwater replenishment strategy. The IPR project consists of direct recharge of advanced-treated recycled water at a District-owned site along California Avenue known as the Sand Tank site, with subsequent recovery through existing MCWD Deep Aquifers production wells. The project is intended to supplement MCWD's potable water supplies while addressing groundwater level declines and reducing the risk of seawater intrusion, including impacts to the Deep Aquifers.

Advanced-treated recycled water produced by Monterey One Water would be conveyed from Pure Water Monterey (PWM) to the Sand Tank site and injected through a dedicated injection well. Recovered water would be extracted through MCWD Deep Aquifers production wells 10 and 11. A feasibility study for the project was completed in 2022, and facilities planning is underway with project completion anticipated within the next few years.

The 2022 feasibility study evaluated multiple project alternatives, including injection into the 180/400-Foot Aquifer, injection into the Deep Aquifers, and hybrid configurations. Screening criteria included technical feasibility, groundwater management benefits, implementation ability, flexibility under future basin conditions, and cost. Based on these factors, injection into the Deep Aquifers was identified as the preferred alternative. Under the selected configuration (Alternative #2), approximately 400 linear feet of pipeline would be constructed to convey advanced-treated recycled water from the existing recycled water pipeline to the injection well.

The preferred alternative includes construction of a single injection well to a depth of approximately 1,300 feet below ground surface, with an approximate well diameter of 18 inches and a maximum injection capacity of up to 1.0 MGD. Ancillary facilities would include a well pad, onsite piping, a hydropneumatics tank, and associated electrical, instrumentation, and control systems to support injection operations.

Unlike projects that indirectly reduce Deep Aquifers pumping through alternative supplies or demand management alone, the IPR project provides a direct mechanism for replenishing the Deep Aquifers. By increasing groundwater elevations near MCWD's Deep Aquifers production wells, the project is expected to stabilize groundwater levels, reduce downward vertical hydraulic gradients from overlying aquifers, and decrease the potential for both vertical and lateral

seawater intrusion. This approach also provides additional resilience against future basin-wide pumping constraints by augmenting supplies.

Overall, the IPR project represents a cornerstone groundwater replenishment strategy that directly addresses Deep Aquifers conditions while supporting long-term water supply reliability for municipal and regional uses. By pairing advanced water treatment with controlled injection and recovery at a defined site, the project demonstrates how engineered recharge can play a central role in sustaining the Deep Aquifers and reducing reliance on unmanaged groundwater extraction over time.

Municipal Well Reoperations

MCWDGSA is advancing a Municipal Well Reoperations project to optimize operation of its existing groundwater production wells through enhanced use of its Supervisory Control and Data Acquisition (SCADA) system. MCWD currently operates seven active extraction wells located throughout the City of Marina and unincorporated areas of Monterey County. The District's Operations and Maintenance (O&M) Department uses SCADA to manage the distribution system and schedule well operations in response to customer demand.

This project seeks to expand the functionality of the existing SCADA system by leveraging the spatial distribution of MCWD wells to better coordinate groundwater extraction across the Monterey Subbasin. Enhanced SCADA capabilities would allow MCWD to avoid concentrating pumping in limited areas and instead activate the wells strategically based on observed groundwater conditions, customer demand, and system performance. This operational approach is intended to improve system efficiency while supporting more balanced groundwater extraction.

The project will utilize real-time data from SCADA-integrated transducers installed in extraction wells and nearby monitoring wells to track groundwater levels and respond dynamically to changing aquifer conditions. By monitoring groundwater elevations and trends in near real time, MCWD can adjust pumping operations to help maintain stable groundwater levels and reduce extraction during conditions that may negatively affect aquifer performance.

MCWD's O&M Department is currently implementing upgrades to the SCADA system to support these enhanced operational capabilities. Additional technical studies and operational testing will be conducted to evaluate system performance, refine operational protocols, and determine the most effective strategies for integrating real-time groundwater data into day-to-day well operations.

Seaside Groundwater Basin Management

The portion of the Deep Aquifers underlying the Seaside Subbasin is subject to the jurisdiction of the Seaside Groundwater Basin Watermaster (SGBW). The Seaside Watermaster participated in the development of the Monitoring Plan for the Deep Aquifers and is a party to the memorandum of understanding to collect and share monitoring data for the Seaside region identified in the Study in coordination with Monterey Peninsula Water Management District (MPWMD).

SVBGSA is supporting the Seaside Watermaster's groundwater modeling technical consultants to work with SVBGSA and MCWDGSA to further improve the calibration of the SWIM and SVIHM in the Seaside region by March 2026. These model improvements will allow for further assessment and monitoring of boundary conditions with the Monterey Subbasin in both the Marina-Ord and the Corral de Tierra Management Areas.

As previously noted, the Carmel River ASR and Pure Water Monterey projects have been implemented in this Subbasin and are closely monitored by MPWMD. These projects inject and store water in the Deep Aquifers in Seaside, with benefits to groundwater levels.

The Seaside Watermaster Board approved an update to the Seaside Groundwater Basin SIRP in the fall of 2025. Long-term groundwater level declines caused by pumping in the Seaside Groundwater Basin have raised concerns that seawater could eventually intrude into the coastal parts of the basin. Earlier studies, including several Seawater Intrusion Analysis Reports (SIARs from 2007, 2008, and later years), examined how seawater intrusion could occur and reviewed historical water quality data for any warning signs. These reports, through Water Year 2024, found no evidence of seawater intrusion in the basin, including in its two main aquifers—the shallow Paso Robles Formation and the deeper Santa Margarita Sandstone. However, even though intrusion has not yet been detected, groundwater level and pumping trends show that the risk of intrusion does exist.

The Seaside Watermaster's Seawater Intrusion Response Plan (SIRP) fulfills requirements of the court's Amended Decision governing basin management. It is the plan for how to respond if seawater intrusion is detected in the Seaside Basin. The first version was completed in 2009 as part of the Basin's Monitoring and Management Program. Because 15 years had passed and new data was available, the Seaside Watermaster Technical Advisory Committee recommended in February 2024 that the SIRP be updated to reassess intrusion indicators, response triggers, and actions. The updated plan was approved by the Seaside Watermaster Board in October 2025.

The updated SIRP explains how seawater intrusion will be identified and what steps should be taken if it occurs. Section 2 reviews consistency with other relevant planning documents. Section 3 defines the warning signs and action levels that will trigger a response. Section 4 outlines proactive pumping management (Part 1 of the Pumping Distribution Plan), and Section 5 describes specific actions to take if intrusion is confirmed in the basin.

The plan notes that these actions could be costly for Watermaster agencies and local communities. Financial impacts may include lost economic activity from reduced water availability, costs for extra monitoring and public notification, expenses for new monitoring wells or changes in pumping patterns, and reduced water sales for suppliers.

This document does not identify new replacement water sources. Instead, it refers to the 2019 Basin Management Action Plan (BMAP), which outlines potential supplemental supplies and management strategies that could help prevent seawater intrusion by raising groundwater levels.

Section 4. Study-Based Management Considerations

4.1 Guiding Principles from the Deep Aquifers Study

Section 6 of the Study provides management guidance in the form of 12 science-based guiding principles to help prevent seawater intrusion, subsidence, and further groundwater level declines in the Deep Aquifers. The Study did not address policy choices or specific management actions. The guidance it provided was intended to support local agencies and stakeholders in decision-making for groundwater sustainability planning. The full text of Section 6 (Management Guidance) and Section 7 (Monitoring Recommendations) is provided in the Deep Aquifer Study.

For purposes of this DA Memo, the Study's guiding principles are presented as informational considerations to be evaluated within existing subbasin GSPs and adopted governance frameworks. This document does not adopt a separate management structure for the Deep Aquifers.

Based on the Study findings and subsequent technical review, the following principles may inform future evaluation by responsible agencies:

- Maintain protective groundwater elevation. Where groundwater levels decline below overlying aquifers, reversed vertical gradients may increase the potential for downward migration of saline water.
- Evaluate risk of lateral seawater intrusion. Declining coastal groundwater elevations may increase the inland hydraulic gradient from Monterey Bay, particularly in formations with marine connectivity.
- Avoid long-term storage declines. Continued groundwater level reductions and net storage losses may increase vulnerability to seawater intrusion and subsidence.
- Consider hydraulic connectivity. The Deep Aquifers interact with overlying and adjacent aquifers and should be evaluated as part of the broader groundwater system.
- Improve monitoring and model refinement. Continued data collection and model calibration are necessary to reduce uncertainty regarding sustainable yield and aquifer response.

These principles are intended to inform ongoing GSP implementation, annual reporting, and future plan updates. Any management actions would occur through established statutory authorities and public processes.

4.2 Adaptive Management Approach

Management of the Deep Aquifers must occur under conditions of ongoing data collection, model refinement, and evolving hydrogeologic understanding. The Deep Aquifers Study identified data gaps, uncertainties in sustainable yield estimates, and the need for continued evaluation of hydraulic connectivity, recharge mechanisms, and seawater intrusion risk. As monitoring networks expand and groundwater models are further calibrated, understanding of system behavior will continue to improve.

Consistent with SGMA, an adaptive management approach allows groundwater conditions, extraction patterns, and project performance to be periodically evaluated using updated data. Under this framework, groundwater elevations, storage trends, hydraulic gradients, and water quality indicators are reviewed through annual reports and five-year GSP evaluations. Where monitoring indicates that Sustainable Management Criteria are not being met, agencies may consider adjustments to projects, pumping patterns, recharge efforts, or other management tools within their existing authorities.

Adaptive management does not establish automatic triggers or new regulatory requirements outside of adopted GSP processes. Rather, it provides a structured process for reassessing groundwater conditions over time and making informed adjustments as warranted through formal governing body consideration and public processes.

Given the confined nature of the Deep Aquifers and limited direct recharge, adaptive management may include periodic review of groundwater extraction and injection activities in relation to observed groundwater elevations and aquifer response. This review may consider:

- Net changes in Deep Aquifers extraction,
- Effectiveness of recharge or injection projects,
- Seasonal and long-term groundwater elevation trends,
- Vertical and lateral hydraulic gradients, and
- Interactions with overlying and adjacent aquifer systems.

Adjustments to pumping patterns, replenishment efforts, or project operations, if warranted, would occur through established GSP processes and GSA Board direction. Other adaptive management actions (i.e., project operations, changes to land use regulations, or revised well standards) could be enacted under the authority of existing agencies at the County level, with approval of the respective governing body.

4.3 Monitoring Coordination and Data Integration

The Deep Aquifers extend across multiple subbasins and jurisdictions. Effective evaluation of groundwater elevations, hydraulic gradients, storage trends, and seawater intrusion risk therefore requires coordinated monitoring and data sharing among responsible agencies.

MCWRA, SVBGSA, the Seaside Groundwater Basin Watermaster, and Monterey Peninsula Water Management District have entered into a Memorandum of Understanding (MOU) to implement a coordinated Deep Aquifers Monitoring Program. As of March 2026, the MOU remains under consideration by MCWDGSA.

The MOU establishes a collaborative framework for collecting, sharing, and compiling monitoring data across jurisdictions. Each agency remains responsible for monitoring activities within its own area of authority and for covering its own monitoring costs. Monitoring data are compiled and made available for use in annual reporting, Groundwater Sustainability Plan (GSP) implementation, and related groundwater management activities.

The MOU does not create new regulatory authority, alter governance structures, or establish management requirements. Its purpose is limited to coordination of monitoring and data integration to support informed decision-making under existing SGMA processes and adjudicated basin requirements.

The agreement also provides for periodic review and refinement of monitoring methodologies to ensure that monitoring efforts remain responsive to updated hydrogeologic understanding and GSP evaluation needs.

Coordinated monitoring and model refinement under this framework support continued evaluation of Deep Aquifers conditions while preserving each agency's independent authority under adopted GSPs and governing statutes.

Section 5. Operationalizing Local and Regional Actions

5.1 Existing Agency Authorities

As noted in the Study, several local agencies have groundwater management authorities within the Deep Aquifers extent.

County of Monterey

All counties in California, including the County of Monterey, have powers that allow groundwater regulation. SGMA legislation specifically states that it is the intent of the legislature "to recognize and preserve the authority of cities and counties to manage groundwater pursuant to their police powers."

The Monterey County Health Department, Environmental Health Bureau (EHB) is the primary well-reporting agency for the County. Chapter 15.08 of the Monterey County Code sets forth the application and decision-making process for the County in considering permit applications for well construction, repair, reconstruction, and destruction. The chapter sets forth certain technical requirements that appear to be ministerial in their application; however, the chapter also gives the Health Officer discretion to impose unspecified conditions on a permit, grant variances, and deny an application if in his/her judgment it would defeat the purposes of the chapter.

The California Supreme Court's decision in *Protecting Our Water and Environmental Resources v. County of Stanislaus* (2020) held that Stanislaus County could not categorically classify its issuance of groundwater well construction permits as ministerial decisions exempt from environmental review under the CEQA. Under CEQA, ministerial approvals are those that involve little or no discretion, merely apply a checklist to the facts as presented, and are often issued by county staff. In contrast, discretionary approvals are those that involve judgment or deliberation and allow a county to use discretion to decide whether to issue the approvals and how best to shape or condition those approvals to avoid or mitigate environmental impacts. CEQA environmental review applies only to discretionary approvals, not ministerial approvals. Monterey County Code Chapter 15.08 has not been amended since the *Protecting Our Water* decision, so the County performs environmental review on each well permit application.

MCWRA provides technical assistance on well permit applications through a memorandum of understanding with the County. MCWRA provides technical information to the EHB, and the EHB through its delegation from the Health Officer makes the final decision on whether to issue a well permit. Along with that decision, the EHB performs environmental review under CEQA. Some cities within the Salinas Valley also retain well permitting authority.

Monterey County Water Resources Agency

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

Marina Coast Water District

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

Unlike agencies whose authority is limited solely to groundwater regulation under SGMA, MCWD operates as a full-service public water supplier. The District owns and operates production wells, treatment facilities, storage tanks, transmission pipelines, distribution systems, recycled water infrastructure, and related facilities necessary to provide safe and reliable water service to its customers. As a retail water utility, MCWD is directly accountable to state drinking water regulators and must ensure compliance with all applicable water quality standards, operational requirements, and public health protections.

Under Division 12 of the California Water Code, MCWD has authority to:

- Acquire, develop, store, treat, and distribute groundwater, surface water, recycled water, and desalinated water supplies;
- Construct, operate, and maintain wells, pumping plants, aquifer recharge facilities, injection wells, and treatment systems;
- Implement conjunctive use programs and aquifer storage and recovery (ASR) projects;
- Develop recycled water and indirect potable reuse (IPR) systems;
- Enter into contracts and regional agreements for water supply, infrastructure, and joint powers arrangements;
- Acquire property, easements, and water rights necessary to carry out its functions;
- Finance infrastructure through rates, fees, bonds, grants, and other lawful funding mechanisms; and
- Exercise the power of eminent domain where necessary for water supply development.

This statutory authority provides MCWD with substantial operational flexibility to respond to changing hydrologic conditions, infrastructure needs, and long-term supply challenges.
In addition to supply development authority, MCWD has independent well permitting authority within its jurisdiction pursuant to District Code Chapter 3.32 (Water well Permits and Standards). Construction or reconstruction of non-District wells within MCWD boundaries is generally prohibited except under limited circumstances authorized by the District. MCWD may condition, restrict, or deny proposed wells if they present risks to aquifer integrity, water quality, hydraulic gradients, or public welfare. This independent well authority provides an additional layer of groundwater protection beyond county-level permitting processes.

MCWD's authority also includes responsibility for long-term water supply reliability planning. As a public water supplier, MCWD must prepare Urban Water Management Plans (UWMPs) and Water Shortage Contingency Plans (WSCPs) under California law. These planning requirements require MCWD to evaluate supply reliability under normal, single-dry-year, and multiple-dry-year scenarios, as well as climate variability projections. As a result, MCWD's water resource decisions incorporate drought resilience, emergency preparedness, and infrastructure redundancy considerations.

MCWD also maintains capital improvement planning authority and bonding capacity. The District may issue revenue bonds and incur indebtedness to finance large-scale infrastructure projects, including desalination, injection, treatment upgrades, and distribution system improvements. This financial authority enables MCWD to implement physical solutions to groundwater stress rather than relying solely on regulatory measures.

Operationally, MCWD manages multiple active production wells screened in different aquifer units and has the technical capacity to shift pumping among wells to reduce localized drawdown and balance aquifer stress. Through Supervisory Control and Data Acquisition (SCADA) systems and groundwater monitoring integration, MCWD can dynamically adjust pumping schedules to respond to aquifer conditions. This operational flexibility is a significant tool in managing confined aquifer systems such as the Deep Aquifers.

MCWD also participates in regional water supply coordination efforts and maintains working relationships with adjacent agencies, including MCWRA, Monterey Peninsula Water Management District, the Seaside Groundwater Basin Watermaster, and neighboring GSAs. While each agency retains independent authority, MCWD's infrastructure, supply portfolio, and operational footprint give it a direct and measurable influence on groundwater conditions within the Monterey Subbasin and surrounding areas.

Through its Division 12 authority, MCWD possesses both the legal framework and operational capacity to implement groundwater replenishment projects, desalination, recycled water programs, conjunctive use strategies, and supply substitution approaches that reduce reliance on Deep Aquifers extraction over time.

Groundwater Sustainability Agencies

SGMA established a new structure for managing California's groundwater resources at the local level by local agencies. SGMA required Groundwater Sustainability Agencies (GSAs) to form in the State's high- and medium-priority basins and subbasins by June 30, 2017.

Under SGMA, subbasins must be managed to achieve and maintain groundwater sustainability by 2040 for the 180/400-Foot Aquifer Subbasin or 2042 for the other Salinas Valley Subbasins. Progress to reach sustainability must be demonstrated leading up to those years in GSP annual reports and periodic evaluations. Subbasins must avoid undesirable results, which are a combination of quantitative minimum thresholds for each indicator. If sustainability is not reached or progress is not made within a subbasin, DWR can refer the subbasin to the State Water Resources Control Board (SWRCB) and if it decides to do so, the SWRCB can step in to manage the subbasin.

Among other SGMA provisions, California Water Code section 10726.4 (a)(2) provides GSAs the authority to control groundwater extractions by regulating, limiting, or suspending extractions from individual groundwater wells or extractions from groundwater wells in the aggregate.

Salinas Valley Basin GSA

The SVBGSA is a Joint Powers Authority established in 2017 by local agencies under California Water Code § 10721 with water or land use authority that are independently eligible to serve as GSAs. Its members include the County of Monterey, Monterey County Water Resources Agency (MCWRA), City of Salinas, City of Soledad, City of Gonzales, City of King (King City), the Castroville Community Services District (CSD), and Monterey One Water (formerly the Monterey Regional Water Pollution Control Agency). SVBGSA was formed in accordance with the requirements of California Water Code §10723 et seq, which lists its specific authorities for GSA formation and groundwater management.

SVBGSA is governed and administered by an 11-member Board of Directors, representing public and private groundwater interests throughout the Salinas Valley (see Box 1). The Board of Directors is supported by a robust set of committees that prepare and vet policies, programs, plans, and projects for the SVBGSA and provide multiple avenues for stakeholder engagement.

Upon establishing itself as a GSA, the SVBGSA retains all the rights and authorities provided to GSAs under California Water Code § 10725 *et seq*. as well as the powers held in common by the members. GSAs have and may use the powers in this Section to provide the maximum degree of local control and flexibility consistent with its sustainability goals. SVBGSA is both a management agency and a regulatory agency responsible for complying with SGMA by developing adequate GSPs and reaching sustainability across 6 sustainability indicators, as described in the GSPs. To do so, it has the authority to undertake a variety of actions, including:

- Adopting rules, regulations, ordinances, and resolutions for the purpose of groundwater sustainability or related to GSP development and implementation
- Conducting investigations related to groundwater management
- Requiring registration of groundwater extraction facilities
- Regulating groundwater extractions or undertaking other regulatory actions related to groundwater management
- Taking revenue raising actions related to groundwater management or SVBGSA activities, such as passing regulatory fees and extraction fees
- Implementing projects and management actions
- Submitting to the electorate or property owners (as required by law) decisions to impose fees or taxes

Where SVBGSA does not have authority, such as land use, it will work with the responsible agencies.

SVBGSA manages groundwater in the 6 non-adjudicated subbasins in the Monterey County portion of the Salinas Valley:

- 180/400 Subbasin (3-004.01)
- Eastside Aquifer (Eastside) Subbasin (3-004.02)
- Forebay Aquifer (Forebay) Subbasin (3-004.04)
- Upper Valley Aquifer (Upper Valley) Subbasin (3-004.05)
- Langley Area (Langley) Subbasin (3-004.09)
- Monterey Subbasin (3-004.10)

SVBGSA shares jurisdiction over portions of the 180/400 Subbasin with MCWDGSA and the County of Monterey Groundwater Sustainability Agency. In 2019, the County of Monterey established itself as the GSA for a small portion of land near the coast in the 180/400 Subbasin.

SVBGSA and MCWDGSA co-manage the Monterey Subbasin under a single co-authored GSP. The Monterey Subbasin GSP identifies two management areas, with MCWDGSA authority over the Marina-Ord Management Area and SVBGSA authority over the Corral de Tierra

Management Area. SVBGSA and Arroyo Seco GSA co-manage the Forebay Subbasin under a single GSP, with the Arroyo Seco Cone Management Area under ASGSA.

Marina Coast Water District GSA

Marina Coast Water District Groundwater Sustainability Agency (MCWDGSA) is a duly formed Groundwater Sustainability Agency under SGMA. MCWDGSA exercises groundwater management authority within defined portions of both the Monterey Subbasin (DWR Basin No. 3-004.10) and the 180/400-Foot Aquifer Subbasin (DWR Basin No. 3-004.01).

Within the Monterey Subbasin, MCWDGSA serves as the GSA for the Marina-Ord Management Area and co-manages the subbasin pursuant to a jointly adopted GSP with SVBGSA. Under this structure, MCWDGSA retains authority over groundwater management within its designated management area, including responsibility for implementation of applicable SMC, project development, monitoring, and reporting consistent with SGMA.

Within the 180/400, MCWDGSA shares jurisdiction with SVBGSA, and the County of Monterey GSA over defined areas near the coast. MCWDGSA participates in implementation of the 180/400 GSP and retains authority within its jurisdictional boundaries consistent with California Water Code section 10726.4 and related statutory provisions.
As a public water supplier and groundwater sustainability agency, MCWDGSA has dual responsibilities:

1. Ensuring reliable municipal water service to its customers, including emergency and public health considerations; and
2. Achieving and maintaining groundwater sustainability consistent with SGMA requirements and adopted GSPs.

MCWDGSA's authority includes the ability to regulate, limit, or suspend groundwater extraction within its jurisdiction as authorized under SGMA; to develop and implement groundwater replenishment and supply augmentation projects; and to collect and evaluate monitoring data necessary to assess basin conditions. All such actions occur through formal Board direction, public process, and compliance with applicable state law.
Through its role in both the Monterey and 180/400 Subbasins, MCWDGSA participates in coordinated groundwater management while retaining independent governance authority within its legally defined boundaries.

Arroyo Seco GSA

The City of Greenfield formed the Arroyo Seco GSA to manage groundwater around Greenfield in the Arroyo Seco Cone Management Area of the Forebay Subbasin.

Seaside Groundwater Basin Watermaster (Adjudicated Authority)

The Seaside Subbasin is adjudicated and not subject to most SGMA requirements. It is instead governed by a 2007 court order by the Superior Court of the State of California in and for the County of Monterey (California American Water v. City of Seaside, Monterey County Superior Court, Case Number M66343). While termed Seaside Basin within the adjudication, it is referred

to as the Seaside Subbasin here because it is a subbasin of the Salinas Valley Groundwater Basin, as defined by DWR for the purposes of SGMA.

With an amendment to the adjudication, the Court approved the Basin Monitoring and Management Plan (MMP) for the Seaside Groundwater Basin Watermaster (SGBW). Groundwater elevations, quality, and extractions are collected by SGBW, who reports conditions to the Court overseeing the adjudication. The Seaside Watermaster also coordinates with the entities that extract groundwater within the Seaside Subbasin, as well as with the Monterey Peninsula Water Management District (MPWMD). The Seaside Watermaster governs the western portion of the Seaside region of the Deep Aquifers extent.

Monterey Peninsula Water Management District (Special District Authority)

The Monterey Peninsula Water Management District (MPWMD) is a special district formed under state legislation to manage and protect water resources within the Monterey Peninsula region.

Within the Seaside Subbasin, MPWMD plays an active role in water resource management, conservation, and project implementation. Although the Seaside Subbasin is governed under court adjudication and managed by the Seaside Groundwater Basin Watermaster, MPWMD participates in monitoring, supply planning, and project coordination that affects groundwater conditions in the Deep Aquifers within the Seaside region.

MPWMD is closely involved in implementation and oversight of Aquifer Storage and Recovery (ASR) and recycled water projects, including the Carmel River ASR and Pure Water Monterey programs, which inject water into aquifer systems within the Seaside region. These projects contribute to groundwater level stabilization and support long-term water supply reliability. Through technical coordination, monitoring participation, and project implementation, MPWMD's activities influence groundwater conditions within the Deep Aquifers in the Seaside region while operating within the framework of the Seaside adjudication and existing statutory authorities.

Coordination among MPWMD, the Seaside Watermaster, MCWDGSA, and SVBGSA supports data sharing and evaluation of groundwater conditions across jurisdictional boundaries, consistent with adopted management plans and court-ordered requirements.

5.2 Integration with Groundwater Sustainability Plans

Management of the Deep Aquifers must occur within the framework of adopted GSPs and applicable statutory authorities. Because the Deep Aquifers span multiple subbasins—each governed by its own GSP or, in the case of the Seaside Subbasin, by court adjudication—any considerations related to these aquifers must be integrated through the existing subbasin planning and management processes. This approach aligns with the guidance provided in Bulletin 118 and overseen by the Department of Water Resources.

The 180/400 GSP and the Monterey Subbasin GSP identify the Deep Aquifers as an important component of the groundwater system and establish SMC applicable to groundwater levels, seawater intrusion, and related sustainability indicators. These criteria provide the regulatory and planning framework through which Deep Aquifers conditions are evaluated.

Consistent with SGMA, projects and management actions that affect the Deep Aquifers—including demand management measures, alternative supply development, recharge and injection projects, or operational adjustments—are evaluated through each subbasin's adopted GSP processes. This includes incorporation into annual reports, five-year evaluations, and formal GSP updates as required.

Where monitoring or model refinement indicates that SMC are not being achieved, each GSA retains authority to consider and implement management actions within its jurisdiction pursuant to California Water Code section 10726.4 and related statutory authorities. Coordination among GSAs may occur where hydraulic connectivity or shared basin conditions warrant collaborative evaluation; however, implementation authority remains with the respective governing agencies.

For the adjudicated Seaside Subbasin, groundwater management continues under the authority of the Seaside Groundwater Basin Watermaster and the Court-approved Basin Monitoring and Management Plan. Coordination related to Deep Aquifers monitoring and evaluation occurs consistent with that framework.

Integration of Deep Aquifers considerations into existing GSPs ensures that management actions remain aligned with SGMA requirements, public process obligations, and established governance structures. This approach preserves local control while allowing technical findings from the Study and subsequent evaluations to inform subbasin-level sustainability planning over time.

5.3 Considerations and Implementation Pathways

The Deep Aquifers Study and subsequent evaluations provide technical context to inform future deliberation by the respective governing Boards. This DA Memo does not establish new policies, mandates, or implementation requirements. Rather, it summarizes considerations that may be evaluated by each Board within its existing statutory authority and adopted planning framework.

Because the Deep Aquifers extend across multiple subbasins and governance structures, implementation pathways differ by jurisdiction. Any action affecting groundwater extraction, recharge, injection, or project development must occur through the formal processes established under SGMA, applicable enabling legislation, or adjudicated basin requirements.

Considerations may include:

- Review of updated monitoring results and groundwater elevation trends.
- Evaluation of SMC performance in annual and five-year GSP reporting.
- Assessment of whether project implementation timelines remain adequate to achieve sustainability objectives.
- Consideration of whether additional demand management, supply augmentation, recharge, or operational strategies warrant further technical evaluation.

- Direction to staff regarding coordination with neighboring agencies where hydraulic connectivity or regional conditions merit collaborative analysis.

Implementation pathways may include:

- Incorporation of new or refined projects and management actions into GSP updates.
- Adjustment of SMC through formal amendment processes.
- Development of technical studies to evaluate feasibility of specific projects.
- Use of existing permitting and regulatory authorities, where applicable.
- Coordination through existing interagency agreements and monitoring frameworks.

All implementation actions would require Board direction, public notice, and compliance with applicable legal requirements, including CEQA where discretionary approvals are involved.

This structured approach ensures that Deep Aquifer considerations are integrated into formal governance processes rather than implemented through informal or extra-jurisdictional mechanisms. It preserves local control while allowing Boards to respond to updated scientific information, monitoring results, and sustainability evaluations in a transparent and deliberative manner.

References

Carollo Engineers. 2025. Brackish Groundwater Restoration Project Scenarios Analysis Technical Memorandum. Retrieved from: https://svbgsa.org/wp-content/uploads/2025/10/BGRP-Scenarios-Analysis-TM-2025-10.pdf.

County of Monterey. 1988. Monterey County Code of Ordinances Chapter 15.08 – Water Wells. Retrieved from: https://library.municode.com/ca/monterey_county/codes/code_of_ordinances?nodeId=TIT15PUSE_CH15.08WAWE

_____. 2010. Monterey County General Plan. Retrieved from: https://www.countyofmonterey.gov/government/departments-a-h/housing-community-development/planning-services/current-planning/general-info/2010-monterey-county-general-plan-adopted-october-26-2010

Littleworth and Garner. 2019. California Water Third Edition.

MCWDGSA and SVBGSA. 2022. Groundwater Sustainability Plan, Monterey Subbasin. Retrieved from: https://sgma.water.ca.gov/portal/gsp/preview/128

MCWRA. 2017. Recommendations to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin, Monterey County Water Resources Agency Special Reports Series 17-01. Retrieved from: https://www.countyofmonterey.gov/home/showdocument?id=57432

_____. 2020. Recommendations To Address the Expansion Of Seawater Intrusion in the Salinas Valley Groundwater Basin: 2020 Update, Monterey County Water Resources Agency Special Reports Series 20-01. Retrieved from: https://www.countyofmonterey.gov/home/showpublisheddocument/90578/637255787124030000

Montgomery & Associates. 2023. Salinas Valley Seawater Intrusion Model Development. Retrieved from: https://svbgsa.org/wp-content/uploads/2024/11/SWIModelReport_combined_Final_withAppendices.pdf ;

_____2023. Technical Memorandum: 2023 Model Updates to Address Groundwater Technical Advisory Comments. https://svbgsa.org/wp-content/uploads/2024/11/Addendum1_SWI-Model_2023-Update_TM_and-2070NoProjectAlternative_20231215.pdf

_____2024. Technical Memorandum 2: 2024 Seawater Intrusion Model Updates (Addendum 2 to the Salinas Valley Seawater Intrusion Model Report). Retrieved from:

https://svbgsa.org/wp-content/uploads/2024/11/Technical-Memorandum-Seawater-Intrusion-Model-Update-Addendum-2.pdf

_____2024. Salinas Valley Deep Aquifers Study. Prepared for the Salinas Valley Basin Groundwater Sustainability Agency and Collaborative Funding Partners. Retrieved from: https://svbgsa.org/wp-content/uploads/2024/05/Deep-Aquifers-Study-Report_no-appendices_compressed.pdf.

_____. 2025. Brackish Groundwater Restoration Project Modeling Technical Memorandum. Retrieved from: svbgsa.org/wp-content/uploads/2025/10/BGR-Project-Scenarios_Modeling-TM_20251002-1.pdf.

_____. 2025. Update to the Salinas Valley Integrated Hydrologic and Operational Models. Retrieved from: https://svbgsa.org/wp-content/uploads/2025/11/SVIHM-2025-Update-Report.pdf

_____. 2025. Technical Memorandum 3: 2025 Seawater Intrusion Model Updates (Addendum 3 to the Salinas Valley Seawater Intrusion Model Report). Retrieved from: https://svbgsa.org/wp-content/uploads/2025/10/SWI-Model_2025_Update_TM_20251016.pdf

SVBGSA (Salinas Valley Basin Groundwater Sustainability Agency). 2025a. Salinas Valley Groundwater Basin 180/400-Foot Aquifer Subbasin: Groundwater Sustainability Plan Amendment 1. Retrieved from: https://svbgsa.org/180-400-ft-aquifer/.

_____. 2025b. BGRP Feasibility Study Phase 1 Report. Retrieved from: https://svbgsa.org/wp-content/uploads/2025/10/BGRP-FS-Phase-1-Report-2025-10.pdf.

SVBGSA, ERA Economics, Montgomery & Associates, and David M. Ceppos Public Policy Mediation and Facilitation. 2025. Demand Management Framework (draft). Retrieved from: https://legistarweb-production.s3.amazonaws.com/uploads/attachment/pdf/3650690/6.2_DM_Framework_Draft.pdf.

SVBGSA and Montgomery & Associates. 2025. Preliminary Feasibility Study: Aquifer Storage and Recovery Projects Concepts to Address Seawater Intrusion. Retrieved from: https://svbgsa.org/wp-content/uploads/2025/01/ASR-FS-Report-compressed.pdf.

Attachment 1. Progress Towards Filling Data Gaps and Addressing Uncertainties

The Study addressed critical data gaps and sought alignment and overlap in best available data to support the current interpretation of the Deep Aquifers' extent, conditions, and sustainable yield. While enhancing the understanding of the Deep Aquifers, the Study also identified additional data gaps and acknowledged areas of remaining uncertainty. These uncertainties pertain to the understanding the Deep Aquifers' extent and hydraulic connection and groundwater conditions. The following discussion summarizes uncertainties identified by the Study and progress made towards filling data gaps and establishing a monitoring network and plan.

A. Understanding of the Deep Aquifers' Extent and Hydraulic Connection: Remaining Uncertainties in Hydrogeologic Conceptual Model

The Study developed a detailed conceptual model of the Deep Aquifers, integrating existing and new data to map their extent and describe their characteristics. Multiple data sources were used to corroborate findings whenever possible. While strong enough to guide groundwater management, the Study notes that some findings are less certain because of issues like inconsistent well records, limited testing with isotopes, and missing data on aquifer properties. The Study highlights three areas where further research could refine the understanding of the extent and connection of the Deep Aquifers:

- **Areas of Uncertain Extent:** The extent of the Deep Aquifers is defined by the presence of the 400/Deep Aquitard separating it from the overlying 400-Foot Aquifer or its equivalent. However, in two areas, data suggests the 400/Deep Aquitard exists, but there is not enough evidence to confirm it. These areas are not currently used for groundwater pumping at the depth of the Deep Aquifers; however, may be important to delineate prior to installation of new wells.
- **Flow between Deep Aquifers and the overlying 400-Foot Aquifer:** The 400/Deep Aquitard is a clay layer with pockets of sand and gravel that may allow water to move vertically. Groundwater models show water flows between the Deep Aquifers and the aquifer above. Because water tends to move downward in areas where the Deep Aquifers are pumped—and because the aquifer above has seawater intrusion—there is a higher risk that salty water could move down into the Deep Aquifers.
- **Flow from Adjacent Aquifers:** The Deep Aquifers are separated by the 400/Deep Aquitard but likely still connect to aquifers at similar depths just outside the extent. These adjacent aquifers may be confined or may have limited recharge, which limits how much fresh water can replenish the Deep Aquifers. More testing, such as carbon-14 dating, could show whether pumping is drawing very old water or if any new water is entering within a useful timeframe.
- **Flow within the Deep Aquifers:** The Deep Aquifers are made up of multiple geologic formations that are interspersed with small layers of clay. There isn't enough data to fully

understand how water moves between the productive zones within the Deep Aquifers. Water levels vary depending on which formation or depth a well taps into.

Overall, the Study concluded that while uncertainties remain, the conceptual model provides a significantly improved basis for groundwater flow modeling and sufficient information for management.

B. Refinement of Groundwater Models Based on Study

Groundwater models are critical for planning projects and management actions in an integrated manner across the Deep Aquifers. The Salinas Valley Deep Aquifers Study used the best numerical groundwater flow models available at the time:

- A provisional version of the Salinas Valley Integrated Hydrologic Model (SVIHM), developed by the United States Geological Survey (USGS) for the County of Monterey and Monterey County Water Resources Agency (MCWRA); and
- The Seawater Intrusion Model (SWIM), developed by M&A for SVBGSA to assess groundwater levels and seawater intrusion.

However, these models were developed before the Study and did not include the more accurate aquifer and aquitard depths and extents identified through this work. As a result, the Study recommended updating the models to reflect the improved understanding of the Deep Aquifers before relying on them for groundwater management.

The USGS published the final SVIHM in April 2025 (Henson et al, 2025), after the conclusion of the Deep Aquifers Study. On behalf of SVBGSA, M&A has completed a review of SVIHM and SVOM. The review assessed the models with respect to the most current understanding of the groundwater basin, including information from the Deep Aquifers Study, and identified improvements needed for SVBGSA's SGMA groundwater sustainability efforts. In 2025, M&A updated and recalibrated the SVIHM and the SWIM together with similar parameters to improve their complementary use for Salinas Valley groundwater management. The updated SVIHM and SWIM were published in the fall of 2025 and made public.

Salinas Valley Integrated Hydrologic Model Update

The released version of the SVIHM was improved over the provisional versions used for GSP development and the Deep Aquifers Study; however, based on model review, M&A recommended that certain model components be updated to improve these tools for managing groundwater resources in the Salinas Valley. Subsequently, with DWR Round 2 SGM Implementation Grant funding, SVBGSA contracted M&A to update and recalibrate the SVIHM. M&A worked closely with MCWD's technical consultant, EKI Environmental, as well as MCWRA and Seaside Watermaster's modeler from M&A.

Based on model review, the SVIHM was then updated by M&A to improve the model's accuracy and applicability for SGMA-related simulations. Model updates relevant to the Deep Aquifers are described below.

Model layering and Hydrostratigraphic Zones

M&A updated the geologic framework and hydrostratigraphic units based on recent AEM surveys and borehole data obtained and analyzed for the Deep Aquifers Study, along with other refinements to the Salinas Valley hydrogeologic conceptual model. Using these updates, M&A revised the SVIHM model layering. The principal change with respect to the Deep Aquifers involved deepening the base of the model to better represent bedrock elevations, which resulted in a thickening of the Deep Aquifers layers along the central axis of the Salinas Valley.

Model Grid

The USGS-released SVIHM grid was non-rectangular, leading to spatial mismatches between input data and model outputs, especially at the northern end of the model domain. M&A updated the SVIHM to replace the skewed, non-orthogonal grid with a rectangular, orthogonal grid to improve spatial alignment and model accuracy. While this change was not directly related to the Deep Aquifers, the grid update was an important improvement to the SVIHM as a whole.

Wells and Pumping

Some wells were missing or were miscategorized in the USGS-released SVIHM . Well locations and historical pumping volumes were updated using data obtained from MCWRA's groundwater extraction reporting program, MCWDGSA, and the Seaside Watermaster. Simulated pumping before 1995 was also updated to more accurately reflect available estimates. Improved accuracy of well locations and pumping volumes in the model improved the accuracy of groundwater conditions in Valley, including in the Deep Aquifers.

Calibration Data

Updated layering required recalibration using verified well data from MCWRA, MCWD, and Seaside Watermaster. This ensures calibration reflects the revised hydrogeologic framework. M&A also replaced measured groundwater elevation datasets with updated monitoring well data and layer assignments, including for the Deep Aquifers. The Monterey and Seaside Subbasins were not well-calibrated in the USGS-released SVIHM, leading to generally poor characterization of groundwater conditions in those areas. M&A, working together with MCWD and Seaside Watermaster consultants, updated and recalibrated the SVIHM. Better calibration in these areas, which includes portions of the Deep Aquifers, will improve model reliability and consistency with other regional models.

Seawater Intrusion Model Update

After the initial development of the Seawater Intrusion Model (SWIM) in 2023 to support seawater intrusion project planning efforts, M&A made updates in late 2023 and 2024 to improve the groundwater level calibration and incorporate new hydrogeological data, working closely with MCWD's consultant EKI Environmental. In 2025, M&A made additional updates to the model to remain consistent with the previously described updates to the SVIHM. These

updates, funded by the Monterey Round 2 SGM Implementation Grant, included revising hydrostratigraphic zones and recalibration of groundwater elevations and seawater intrusion extents. The SWIM is designed to be generally consistent with the SVIHM, including aquifer layering and parameters, groundwater pumping and recharge, and calibration datasets.

Predictive Models

In addition to the SVIHM, the USGS developed a predictive version of the SVIHM known as the Salinas Valley Operational Model (SVOM), and M&A developed a predictive version of the SWIM. These predictive models retain the same model layering, aquifer parameters, and general model setup as their respective historical models, ensuring consistency across simulations and supporting robust future simulations. Predictive versions of the models have been developed based on the updated SVOM and SWIM.

Future Groundwater Modeling of the Deep Aquifers

The Deep Aquifers Study created a water budget using the SVIHM and SWIM. These models will be used to reassess the water budget and sustainable yield of the Deep Aquifers, and analyze the extraction that can be sustained while not allowing groundwater levels to decline.

The updated SVOM and SWIM groundwater flow models will also be used for future planning and management of the Deep Aquifers. In fall 2025, water budgets for each subbasin were re-evaluated to be incorporated as part of the GSP 2027 Evaluations. These revised models will also be used to update the water budget and assess change in storage within the Deep Aquifers, providing a foundation for evaluating future management strategies. Predictive modeling will inform the review of SMC and assessment of projects and actions aimed at achieving SMC goals for the Deep Aquifers.

C. Groundwater Conditions

New Monitoring Wells

During preparation of the Study, SVBGSA installed three monitoring wells in the Deep Aquifers to fill monitoring network gaps identified in the GSP. The Study identified seven additional areas where groundwater level data were lacking and recommended adding monitoring wells that could also be used to test water quality. Since then, progress has been made:

- SVBGSA has installed three wells in two of the identified areas using the Salinas Valley Round 2 Sustainable Groundwater Management (SGM) Implementation Grant.
- MCWD has installed one well and plans to fill another seven wells with funding from the Monterey Round 2 SGM Implementation Grant.
- The Department of Water Resources is expected to install an additional well through Technical Support Services program in late 2025 that will serve as a sentinel well near the coast of the 180/400 Subbasin to provide early warning of seawater intrusion.

Figure 1 shows the Deep Aquifers monitoring wells, highlights the two gaps that remain, and marks the five new wells that have been or will be installed. In addition, it shows the three wells

added during the development of the Study. Early data from these wells is already helping improve the understanding of groundwater conditions in the Deep Aquifers, as described below.

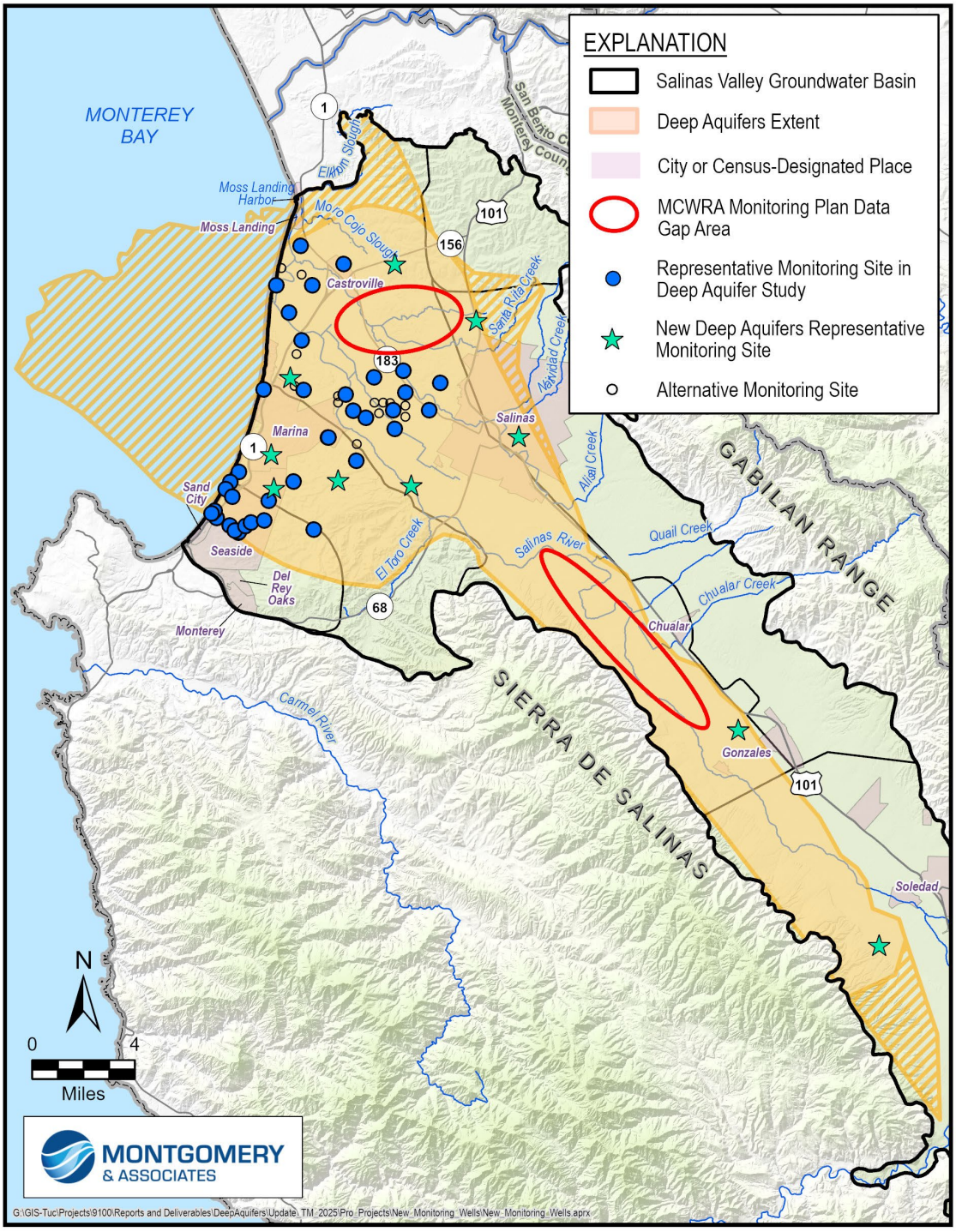

Figure 1. New Deep Aquifers Groundwater Level Monitoring Wells and Remaining Data Gaps

Table 2 shows the depth of each new monitoring well and the depth at which the 400/Deep Aquitard was encountered. Identification of the aquitard at these sites confirms the presence of the Deep Aquifers and contributed to the refinement of the hydrogeologic conceptual model.

Table 1. New Deep Aquifers Monitoring Wells

Well Name	Top Depth of Screen	Bottom Depth of Screen
180/400-DA-1	950	1,000
180/400-DA-2	1,020	1,080
180/400-DA-3	1,150	1,200
ES-1-A	850	900
ES-DA-2	1,230	1,280
F-DA-1	1,200	1,250

Note: Depths in feet below ground surface

As recommended by the Study, each newly installed monitoring well was sampled to establish baseline data for groundwater elevation, water chemistry, and isotopic composition, thereby enhancing the overall dataset.

Groundwater Level Data

Figure 5 shows groundwater elevations from fall 2024 at the newly installed Deep Aquifers monitoring wells, alongside data from other Deep Aquifers wells and wells in the Gabilan Range Bajada alluvial fans. The new wells show groundwater elevations that are generally consistent with nearby wells.

At all new sites, groundwater levels in the Deep Aquifers were lower than in overlying 400-Foot Aquifer, based on groundwater levels in nearby 400-Foot wells, resulting in a downward hydraulic gradient. This pattern—also seen across most of the Deep Aquifers—reinforces the current conceptual understanding of vertical groundwater flow.

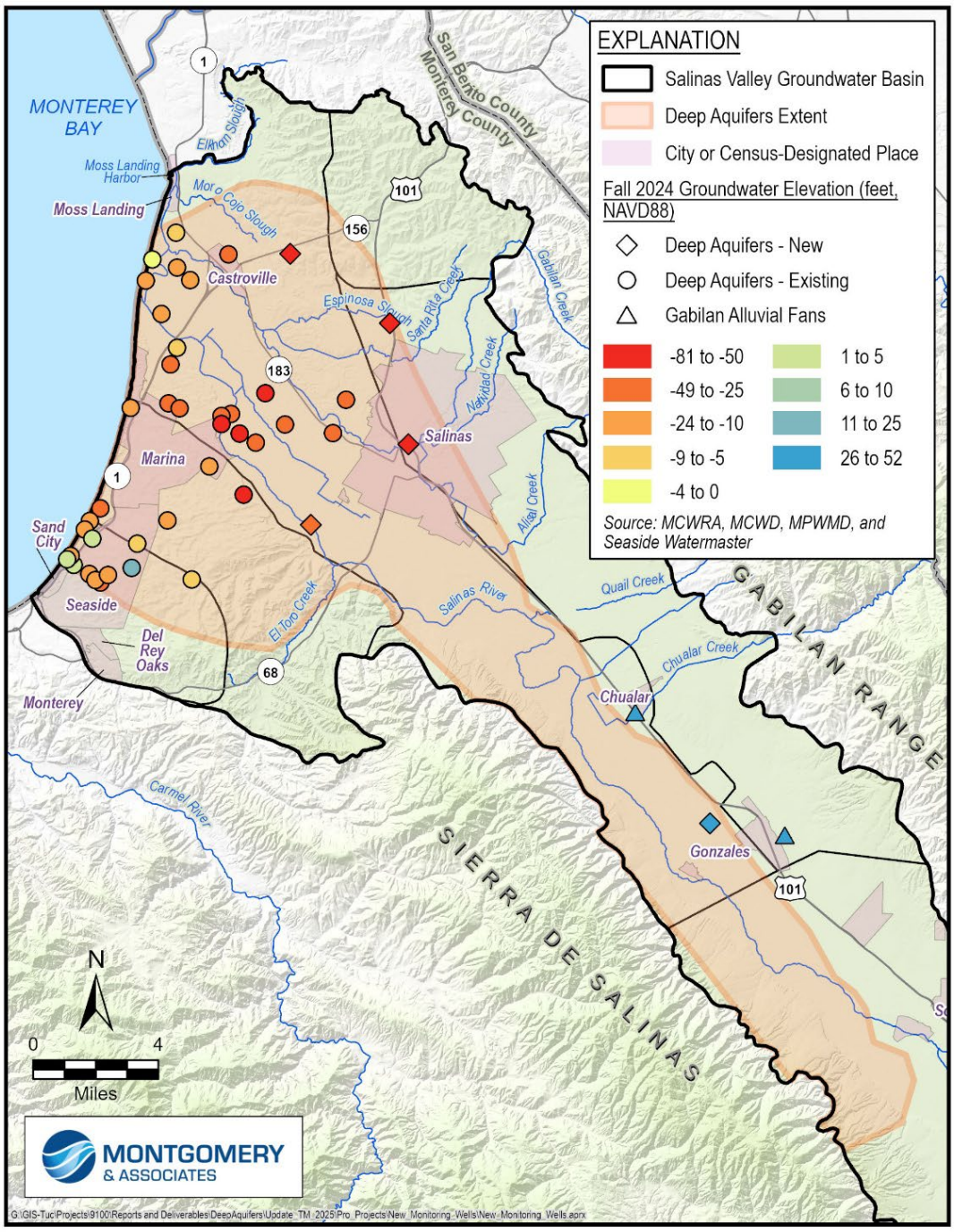

Figure 2. Groundwater Elevations for the New and Existing Deep Aquifers Monitoring Wells

Groundwater Quality and Geochemical Characterization

To establish baseline water chemistry, samples were collected from each newly installed Deep Aquifers monitoring well and analyzed for major cations and anions. Stiff diagrams were then used to visualize and compare these geochemical signatures with those from other Deep Aquifers wells (Figure 2).

The Study found clear differences between the Northern and Seaside Regions of the Deep Aquifers, shown by distinct stiff diagram shapes. In the Northern Region, groundwater typically has higher sodium and lower sulfate and magnesium, producing a top-left leaning stiff diagram. Wells 180/400-DA-1, 180/400-DA-3, and ES-DA-2 match this pattern, with 180/400-DA-3 and ES-DA-2 resembling well 13S/02E-19Q03, and 180/400-DA-1 resembling well 14S/02E-28H04. A sample from ES-1A has not yet been collected, as the well was only installed in July 2025.

One well, 14S/02E-25A03, was initially considered anomalous because its chemistry more closely resembled water from the 400-Foot Aquifer and the Gabilan Alluvial Fans. However, since this well is screened below the 400/Deep Aquitard and few Deep Aquifers samples exist to the south and east, its classification was re-examined. The new well 180/400-DA-2 in the Southeastern Region showed chemistry similar to 14S/02E-25A03 and to well 16S/04E-03G52 in the Gabilan Alluvial Fans, which border the Deep Aquifers. This finding indicates that 14S/02E-25A03 is not anomalous but instead represents a distinct water type typical of the Southeastern Region of the Deep Aquifers.

Because some areas of the Deep Aquifers—especially near Castroville—have shown high arsenic levels, all new monitoring wells were tested for arsenic. Wells 180/400-DA-3 and ES-DA-2 had arsenic about 2.5 times above California's safety limit of 10 µg/L. The high levels seem limited to the northeastern part of the Deep Aquifers, as all other new wells were below the limit. The exact source of the arsenic is still unknown but may come from the surrounding geologic formation.

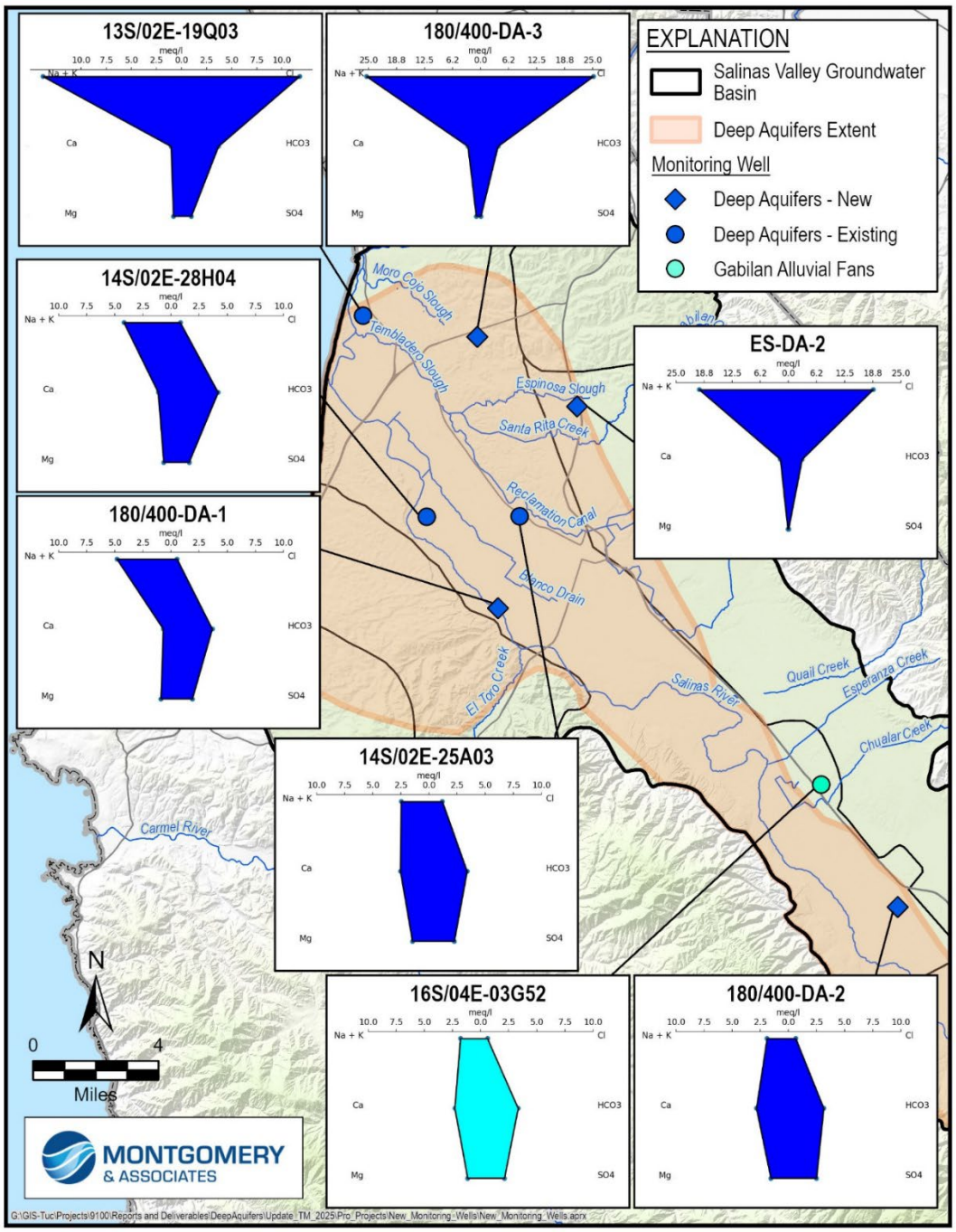

Figure 2. Water Chemistry for New Deep Aquifers and Nearby Existing Monitoring Wells

Isotope Data

Isotope data help reveal groundwater age and recharge sources in the Deep Aquifers. Although isotope sampling has not been routinely conducted in the Salinas Valley, the Deep Aquifers Study recommended sampling at newly installed monitoring wells to establish baseline signatures and track future changes.

Stable isotopes of oxygen-18 and hydrogen-2 in water (∂18O and ∂2H) can be used in hydrologic studies to identify potential water sources. Different water sources often have unique isotopic signatures due to fractionation of these isotopes during processes such as evaporation and precipitation (Clark and Fritz, 2000). Figure 4 adds the stable isotope samples from the new wells to the samples included in the Deep Aquifers Study. In general, lighter (more negative) stable isotope values are associated with cooler, wetter climate conditions such as winter precipitation, high elevation precipitation, or even an entirely different climate regime such as the late Pleistocene when conditions were generally colder and wetter. Heavier (less negative) stable isotope compositions are typical of warmer conditions such as summer precipitation or precipitation at lower elevations. The global meteoric water line, based on the stable isotope composition of global precipitation, is commonly plotted on stable isotope figures as a reference line (Craig, 1961). Samples that trend to the right of the reference line can be interpreted as having undergone evaporation, which can occur in the atmosphere and terrestrially (Clark and Fritz, 2000). The isotopic composition is measured as a ratio between isotopes: oxygen-16 to oxygen-18, and hydrogen-1 to hydrogen-2. ∂ (delta) represents the relative difference between the ratio of the sample and the ratio of a standard. The normal reference standard for stable isotopes is the Vienna Standard Mean Ocean Water (VSMOW), which is an industry-standard used to calibrate the sample value to a standard scale for comparison with other data. The units used to report isotopic composition are parts per thousand, or per mil (‰), between the sample and the VSMOW standard.

Results from the new wells show that groundwater in the Deep Aquifers is isotopically lighter than in overlying aquifers, indicating longer residence times and different recharge sources. These findings from the new wells match results from existing Deep Aquifers wells (Figure 4), supporting and validating the hydrogeologic conceptual model.

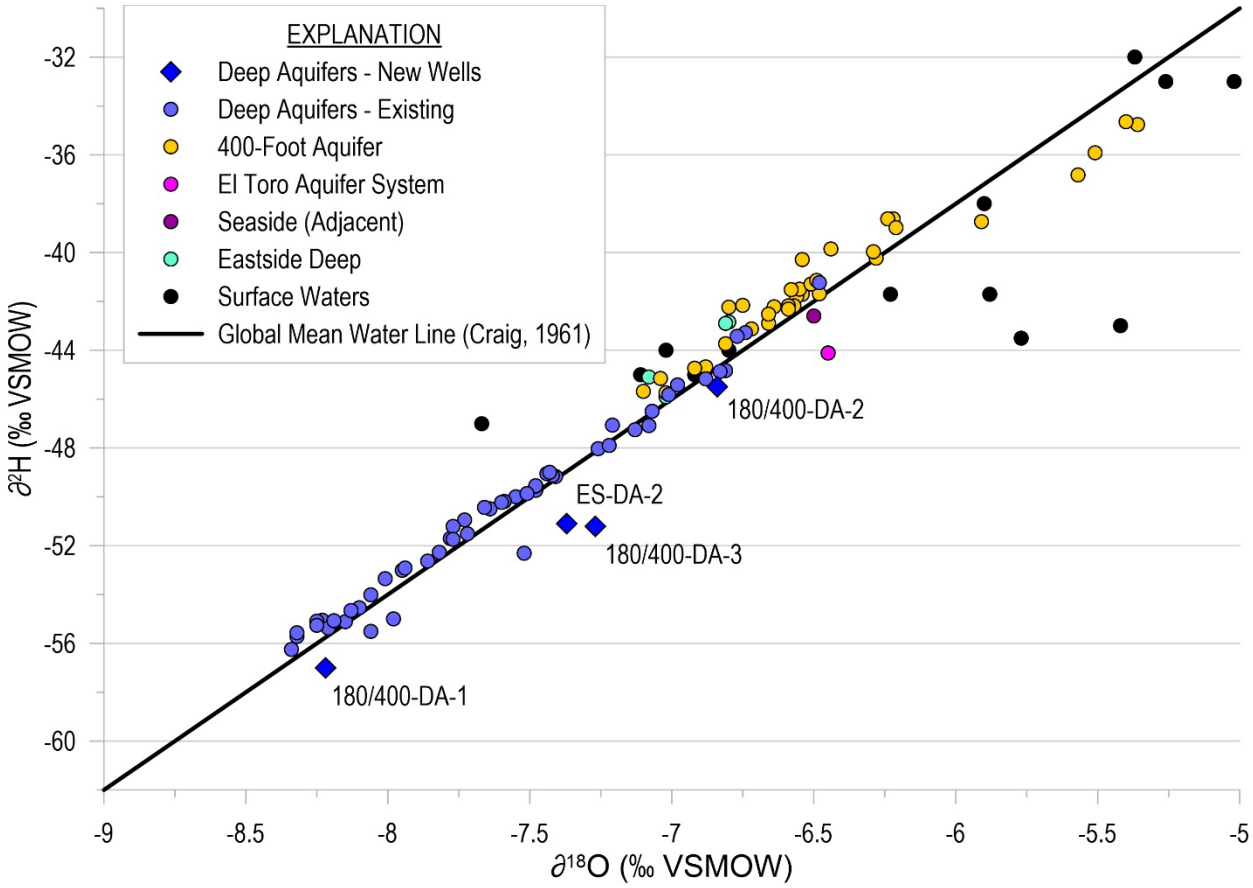

Figure 3. Stable Isotope Ratios in Deep Aquifers, 400-Foot Aquifers, and Equivalent Adjacent Aquifers

Tritium sampling in the Deep Aquifers Study was used to estimate groundwater age. Water with less than 1 tritium unit (TU) is considered "pre-modern," meaning it is older than about 70 years and contains no detectable tritium.

The Study included tritium data from four existing Deep Aquifers wells, all showing concentrations below 1 TU, indicating older groundwater. Tritium results from the newly installed monitoring wells are consistent with these findings, with all samples also showing concentrations below 1 TU, further confirming that the Deep Aquifers primarily contain pre-modern water and have experienced limited recent recharge.

D. Monitoring Plan and Memorandum of Understanding

The Study recommended improving monitoring networks to better track groundwater trends and conditions. MCWRA has prepared the Monitoring Plan for the Deep Aquifers (Monitoring Plan) with cooperation from MCWDGSA, MPWMD, Seaside Watermaster, and the SVBGSA. The Monitoring Plan captures, in a single document, the current type and frequency of existing monitoring of groundwater conditions in the Deep Aquifers within the extent defined in the Study. The Monitoring Plan presents an approach for establishing consistent timing and methods for monitoring of groundwater levels, groundwater quality, and groundwater extraction in the Deep Aquifers, and identifies data gaps, for the purpose of improving a collective regional

understanding of groundwater conditions in the Deep Aquifers. While each of the five groundwater management agencies spanning the Deep Aquifers has its own governance and monitoring responsibilities, the Monitoring Plan outlines a mechanism for annual data sharing and reevaluation of the Monitoring Plan to made adjustments, as appropriate, as new information emerges.

To facilitate annual data sharing and review of the Monitoring Plan, MCWDGSA, MCWRA, MPWMD, Seaside Watermaster, and the SVBGSA developed a Memorandum of Understanding (MOU). The purpose of the MOU is to generally describe each agency's respective activities and commitments to cooperate toward implementation of the Monitoring Plan. The MOU also provides each participating agency's governing body and the public at large with a non-technical explanation of the roles of each agency and the cooperation necessary to better implement the Monitoring Plan.

Monitoring, data collection, reporting, and sharing of information among agencies are essential activities that support sound and sustainable groundwater management decisions. Each agency party to the MOU relies upon the monitoring activities of other agencies to help inform groundwater management decisions within each agency's jurisdiction that affects the shared Deep Aquifers resource.

Attachment 2: Excerpt from 2010 Monterey County General Plan Chapter 5.0 - Public Services Element

LONG-TERM WATER SUPPLY

GOAL PS-3

ENSURE THAT NEW DEVELOPMENT IS ASSURED A LONG-TERM SUSTAINABLE WATER SUPPLY.

Policies

PS-3.1 Except as specifically set forth below, new development for which a discretionary permit is required, and that will use or require the use of water, shall be prohibited without proof, based on specific findings and supported by evidence, that there is a long-term, sustainable water supply, both in quality and quantity to serve the development.

This requirement shall not apply to:

a. the first single family dwelling and non-habitable accessory uses on an existing lot of record; or

b. specified development (a list to be developed by ordinance) designed to provide: a) public infrastructure or b) private infrastructure that provides critical or necessary services to the public, and that will have a minor or insubstantial net use of water (e.g. water facilities, wastewater treatment facilities, road construction projects, recycling or solid waste transfer facilities); or

c. development within Zone 2C of the Salinas Valley groundwater basin, provided the County prepares or causes to be prepared a study for the Board of Supervisors regarding Zone 2C, to be completed no earlier than October 31, 2017 and no later than March 31, 2018 that does the following:

    1) evaluates existing data for seawater intrusion and groundwater levels collected by Monterey County Water Resources Agency as of the date the study is commenced;

    2) evaluates the total water demand for all existing uses and future uses designated in the General Plan EIR for the year 2030;

    3) assesses and provides conclusions regarding the degree to which the total water demand for all uses designated in the General Plan for the year 2030 are likely to be reached or exceeded;

    4) evaluates on an annual basis during the study period groundwater elevations and the seawater intrusion boundary;

    5) based on historical data and the data produced by the study, evaluates and provides conclusions regarding future trends and any expected movement of groundwater elevations and the seawater intrusion boundary;

6) should the study conclude that i) total water demand for all uses designated in the General Plan for the year 2030 is likely to be exceeded; or ii) groundwater elevations are likely to decline by the year 2030 and iii) the seawater intrusion boundary is likely to advance inland by the year 2030, the study shall make recommendations on measures the County could take to address any or all of those conditions; and
7) addresses such other matters as the Board of Supervisors determines are appropriate.

Within two months following the completion of the study, the Board of Supervisors shall hold an open and noticed public hearing on the results of the study. If the study reaches the conclusions for Zone 2C identified in subsection 6) i or 6) ii and 6) iii, the Board of Supervisors shall adopt one or more measures identified in the study, or other appropriate measures, to address the identified conditions. This exception for Zone 2C shall be a rebuttable presumption that a Long Term Sustainable Water Supply exists within Zone 2C, and the presumption shall remain in effect until and unless the study reaches the conclusion for Zone 2C identified in subsection 6) i or 6) ii and 6) iii. Development in Zone 2C shall be subject to all other policies of the General Plan and applicable Area Plan.

Following completion of the study described herein, and the adoption of measures as may be recommended in the study, if any, the County shall prepare a report to the Board of Supervisors every five (5) years for Zone 2C that examines the degree to which a) total water demand for all uses predicted in the General Plan EIR for year 2030 will be reached; or b) groundwater elevations, the seawater intrusion boundary have changed since the prior reporting period; and c) other sources of water supply are available.

(Amended by Board Resolution 13-028)

PS-3.2 Specific criteria for proof of a Long Term Sustainable Water Supply and an Adequate Water Supply System for new development requiring a discretionary permit, including but not limited to residential or commercial subdivisions, shall be developed by ordinance with the advice of the General Manager of the Water Resources Agency and the Director of the Environmental Health Bureau. A determination of a Long Term Sustainable Water Supply shall be made upon the advice of the General Manager of the Water Resources Agency. The following factors shall be used in developing the criteria for proof of a long term sustainable water supply and an adequate water supply system:

a. Water quality;
b. Authorized production capacity of a facility operating pursuant to a permit from a regulatory agency, production capability, and any adverse effect on the economic extraction of water or other effect on wells in the immediate vicinity, including recovery rates;

c. Technical, managerial, and financial capability of the water purveyor or water system operator;
d. The source of the water supply and the nature of the right(s) to water from the source;
e. Cumulative impacts of existing and projected future demand for water from the source, and the ability to reverse trends contributing to an overdraft condition or otherwise affecting supply; and
f. Effects of additional extraction or diversion of water on the environment including on in-stream flows necessary to support riparian vegetation, wetlands, fish or other aquatic life, and the migration potential for steelhead, for the purpose of minimizing impacts on the environment and to those resources and species.
g. Completion and operation of new projects, or implementation of best practices, to renew or sustain aquifer or basin functions.

The hauling of water shall not be a factor nor a criterion for the proof of a long-term sustainable water supply.

PS-3.3 Specific criteria shall be developed by ordinance for use in the evaluation and approval of adequacy of all domestic wells. The following factors shall be used in developing criteria for both water quality and quantity including, but not limited to:

a. Water quality.
b. Production capability.
c. Recovery rates.
d. Effect on wells in the immediate vicinity as required by the Monterey County Water Resources Agency or Environmental Health Bureau.
e. Existing groundwater conditions.
f. Technical, managerial, and financial capability of the water purveyor of a water system.
g. Effects of additional extractions or diversion of water on in-stream flows necessary to support riparian vegetation, wetlands, fish, and other aquatic life including migration potential for steelhead, for the purpose of minimizing impacts to those resources and species.

This policy is not intended to apply to replacement wells.

(Amended by Board Resolution 13-028)

PS-3.4 The County shall request an assessment of impacts on adjacent wells and in-stream flows for new high-capacity wells, including high-capacity urban and agricultural production wells, where there may be a potential to affect existing adjacent domestic or water system wells adversely or in-stream flows, as determined by the Monterey County Water Resources Agency. In the case of new high-capacity wells for which an assessment shows the potential for significant adverse well interference, the County shall require that the proposed well site be

relocated or otherwise mitigated to avoid significant interference. The following factors shall be used in developing criteria by ordinance for use in the evaluation and approval of adequacy of all such high-capacity wells, including but not limited to:

a. Effect on wells in the immediate vicinity as required by the Monterey County Water Resources Agency or Environmental Health Bureau.
b. Effects of additional extractions or diversion of water on in-stream flows necessary to support riparian vegetation, wetlands, fish, and other aquatic life including migration potential for steelhead, for the purpose of minimizing impacts to those resources and species.

This policy is not intended to apply to replacement wells.

(Amended by Board Resolution 13-028)

PS-3.5 The Monterey County Health Department shall not allow construction of any new wells in known areas of saltwater intrusion as identified by Monterey County Water Resources Agency or other applicable water management agencies:

a. Until such time as a program has been approved and funded that will minimize or avoid expansion of salt water intrusion into useable groundwater supplies in that area; or
b. Unless approved by the applicable water resource agency.

This policy shall not apply to deepening or replacement of existing wells, or wells used in conjunction with a desalination project.

PS-3.6 The County shall coordinate and collaborate with all agencies responsible for the management of existing and new water resources.

PS-3.7 A program to eliminate overdraft of water basins shall be developed as part of the Capital Improvement and Financing Plan (CIFP) for this Plan using a variety of strategies, which may include but are not limited to:

a. Water banking;
b. Groundwater and aquifer recharge and recovery;
c. Desalination;
d. Pipelines to new supplies; and/or
e. A variety of conjunctive use techniques.

The CIFP shall be reviewed every five (5) years in order to evaluate the effectiveness of meeting the strategies noted in this policy. Areas identified to be at or near overdraft shall be a high priority for funding.

PS-3.8 Developments that use gray water and cisterns for multi-family residential and commercial landscaping shall be encouraged, subject to a discretionary permit.

PS-3.9 A tentative subdivision map and/or vesting tentative subdivision map application for either a standard or minor subdivision shall not be approved until the applicant

provides evidence of a long-term sustainable water supply in terms of yield and quality for all lots that are to be created through subdivision.

PS-3.10 In order to maximize agricultural water conservation measures to improve water use efficiency and reduce overall water demand, the County shall establish an ordinance identifying conservation measures that reduce agricultural water demand.

PS-3.11 In order to maximize urban water conservation measures to improve water use efficiency and reduce overall water demand, the County shall establish an ordinance identifying conservation measures that reduce potable water demand.

PS-3.12 The County shall maximize the use of recycled water as a potable water offset to manage water demands and meet regulatory requirements for wastewater discharge, by employing strategies including, but not limited to, the following:

a. Increase the use of treated water where the quality of recycled water is maintained, meets all applicable regulatory standards, is appropriate for the intended use, and re-use will not significantly impact beneficial uses of other water resources.

b. Work with the agricultural community to develop new uses for tertiary recycled water and increase the use of tertiary recycled water for irrigation of lands currently being irrigated by groundwater pumping.

c. Work with urban water providers to emphasize use of tertiary recycled water for irrigation of parks, playfields, schools, golf courses, and other landscape areas to reduce potable water demand.

d. Work with urban water providers to convert existing potable water customers to tertiary recycled water as infrastructure and water supply become available.

PS-3.13 To ensure accuracy and consistency in the evaluation of water supply availability, the Monterey County Health Department, in coordination with the MCWRA, shall develop guidelines and procedures for conducting water supply assessments and determining water availability. Adequate availability and provision of water supply, treatment, and conveyance facilities shall be assured to the satisfaction of the County prior to approval of final subdivision maps or any changes in the General Plan Land Use or Zoning designations.

PS-3.14 The County will participate in regional coalitions for the purpose of identifying and supporting a variety of new water supply projects, water management programs, and multiple agency agreements that will provide additional domestic water supplies for the Monterey Peninsula and Seaside basin, while continuing to protect the Salinas and Pajaro River groundwater basins from saltwater intrusion. The County will also participate in regional groups including representatives of the Pajaro Valley Water Management Agency and the County of Santa Cruz to identify and support a variety of new water supply, water management and multiple agency

agreement that will provide additional domestic water supplies for the Pajaro Groundwater Basin. The County's general objective, while recognizing that timeframes will be dependent on the dynamics of each of the regional groups, will be to complete the cooperative planning of these water supply alternatives within five years of the adoption of the General Plan and to implement the selected alternatives within five (5) years after that time.

PS-3.15 The County will pursue expansion of the Salinas Valley Water Project (SVWP) by investigating expansion of the capacity for the Salinas River water storage and distribution system. This shall also include, but not be limited to, investigations of expanded conjunctive use, use of recycled water for groundwater recharge and seawater intrusion barrier, and changes in operations of the reservoirs. The County's overall objective is to have an expansion planned and in service by the date that the extractions from the Salinas Valley groundwater basin are predicted to reach the levels estimated for 2030 in the EIR for the Salinas Valley Water Project. The County shall review these extraction data trends at five year intervals. The County shall also assess the degree to which the Salinas Valley Groundwater Basin (Zone 2C) has responded with respect to water supply and the reversal of seawater intrusion based upon the modeling protocol utilized in the Salinas Valley Water Project EIR. If the examination indicates that the growth in extractions predicted for 2030 are likely to be attained within ten years of the date of the review, or the groundwater basin has not responded with respect to water supply and reversal of seawater intrusion as predicted by the model, then the County shall convene and coordinate a working group made up of the Salinas Valley cities, the MCWRA, and other affected entities. The purpose will be to identify new water supply projects, water management programs, and multiple agency agreements that will provide additional domestic water supplies for the Salinas Valley. These may include, but not be limited to, expanded conjunctive use programs, further improvements to the upriver reservoirs, additional pipelines to provide more efficient distribution, and expanded use of recycled water to reinforce the hydraulic barrier against seawater intrusion. The county's objective will be to complete the cooperative planning of these water supply alternatives within five years and to have the projects online five years following identification of water supply alternatives.