



County of Monterey

Item No.4

Board Report

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Review of the 2025 Seawater Intrusion Contour Maps

Overview

The Monterey County Water Resources Agency (Agency) is responsible for the Groundwater Monitoring Program (GMP) which includes data collection and analysis of data throughout the Salinas Valley to support ongoing groundwater level contouring, seawater intrusion mapping, and other programs related to current groundwater conditions. Conditions are assessed throughout the year to better understand how aquifers are responding during different hydrologic conditions as well as the relative groundwater storage fluctuations that occur on an annual basis.

These activities align with Agency Strategic Plan Goal B, Strategy 2 (*Collaborate with local Groundwater Sustainability Agencies, define MCWRA's role, and implement at GSA integration plan*); Goal B, Strategy 7 (*Use of data and analysis to make informed decisions based on science*); and Goal E, Strategy 1 (*Improve public outreach to increase transparency, communication, education and information about Agency projects and programs*). Activities associated with the GMP are included in Fund 111 (1501) of the adopted Fiscal Year 2025/2026 budget.

Program Background

Seawater intrusion was first detected in the Salinas Valley Groundwater Basin in 1933. As seawater intrudes into an aquifer there is a transition zone where seawater and freshwater mix. In the Salinas Valley, the chloride concentrations in this transition zone are between 50 milligrams per liter (mg/L), which is the native water quality of the 180-Foot and 400-Foot Aquifers, and 19,000 mg/L, which is the concentration of chloride in Pacific Ocean water.

The Agency uses the 500 mg/L chloride isocontour as the threshold for determining seawater intrusion into the coastal aquifers. This definition of "seawater intruded" is described in Agency Ordinance No. 03790, Section 1.01.13. A chloride concentration of 500 mg/L is roughly ten times the native concentration of chloride in these aquifers, two times the regulatory limit set by the U.S. Environmental Protection Agency Drinking Water Secondary Maximum Contaminant Level (250 mg/L), and exceeds the U.S. Department of Agriculture concentration (350 mg/L) for water considered to be of "Class III - injurious or unsatisfactory" quality for agricultural irrigation.

Data Collection and Analysis

Each summer, Agency staff samples approximately 120 agricultural, urban purveyor, and small diameter monitoring wells in the coastal area of the northern Salinas Valley, both in and adjacent to

areas that have been impacted by seawater intrusion. Water quality samples are collected from the agricultural and urban wells twice, once in June and again in August. In 2025, the Agency's network of small diameter monitoring wells was sampled in September.

The water quality samples are analyzed by the County of Monterey's Consolidated Chemistry Lab (Environmental Laboratory Accreditation Program #1395). The data are then evaluated with several geochemical tools, resulting in 500 mg/L chloride isocontours that map the approximate location of the seawater intrusion front. Supporting data from the groundwater level and groundwater extraction monitoring programs are used to provide additional validation of the chloride isocontour locations. The new polygons depicting the areas that increased above the seawater intrusion threshold are then added to the Historical Seawater Intrusion maps, which illustrate the current seawater intrusion front while highlighting the changes observed over the period of record. As in prior years, the 250 mg/L isocontour is also included on both the 180-Foot Aquifer and 400-Foot Aquifer Historical Seawater Intrusion maps as an indicator of areas where chloride concentrations are approaching, but have not yet surpassed, the 500 mg/L threshold.

The result of an evaluation of the geochemical composition of each groundwater sample is also represented in an additional map showing each well's seawater intrusion phase - categorized as Not Intruded, Phase I or Phase II - alongside the associated chloride value for the current year. By depicting each well's seawater intrusion phase and chloride concentration, this version of the seawater intrusion map illustrates the variability of current conditions relative to where the 500 mg/L chloride isocontour has been delineated over time, acknowledging that conditions may change at well sites as well operation or groundwater conditions evolve.

In 2025, the Agency added four existing wells to the monitoring network in the 180-Foot Aquifer and three existing wells to the monitoring network in the 400-Foot Aquifer, with the goal of filling data gaps and refining the geographic distribution seawater intrusion monitoring data.

For the first time in 2025, the Agency also depicted the "intruded zone" defined by the Pajaro Valley Water Management Agency (PV Water), which is delineated using a 250 mg/L chloride isocontour. The PV Water data replaces what was previously shown as a "no data" area north of Elkhorn Slough on the Agency's maps. This information was added to reflect that seawater intrusion is being monitored in the area north of Elkhorn Slough. Details of PV Water's monitoring are available at <https://www.pvwater.org/basin-monitoring>.

2025 Seawater Intrusion Maps - 180-Foot Aquifer

In 2025, the 500 mg/L contour within the 180-Foot Aquifer advanced slightly in two areas: south of Blanco Road and on the northern edge of the main lobe, toward Rodgers Road. The 250 mg/L contour at the leading edge of the main lobe also advanced towards the western city limit of Salinas.

Groundwater samples collected from wells screened in the 180-Foot Aquifer did not indicate a significant change in the geochemical composition relative to 2024, so none of wells were advanced in their seawater intrusion phase designation (i.e., from Not Intruded to Phase 1, or from Phase 1 to Phase 2).

The Agency also reviewed and mapped the one-year percent change in chloride concentration at each of the sampled wells to evaluate variations in the groundwater mass both west (or behind) and east (or ahead) of the 500 mg/L chloride isocontour within the monitored area. There are 17 wells throughout the monitored area that showed one-year increases in chloride concentration ranging from 1% to 20%, and 15 wells that showed one-year decreases in chloride concentration ranging from 1% to 13%. Two wells showed no change from 2024, and four could not be evaluated because 2025 was the first year of data collection at the well. Percent changes in chloride concentration are not necessarily linear and can be the result of one or more factors including, but not limited to: amount pumped from a well, pumping from nearby wells, the depth of a well's screened interval(s), and local geology. It is also possible that, if pumping changes at or near a well, the percent change in chloride concentration could oscillate between an increase and a decrease from year-to-year. The one-year percent change in chloride concentration, whether a decrease or increase, does not solely determine the phase designation based on the geochemical signature of groundwater sampled from the well, meaning that a well that shows a one-year decrease in chloride concentration could still be considered to be experiencing Phase I or Phase II seawater intrusion.

2025 Seawater Intrusion Maps - 400-Foot Aquifer

In 2025, there was no advancement of the 500 mg/L chloride isocontour in the 400-Foot Aquifer. However, the Agency has identified an area extending approximately from Cooper Road, on the east, to the Salinas River, on the west, that warrants additional focus in the coming year. Labeled as a "seawater intrusion review area," the Agency has identified this as an approximate area where, based on verbal information from well owners and limited data obtained from the California State Water Resources Control Board, seawater intrusion could be occurring. There are not sufficient data to make such a determination at this time, but the Agency will be pursuing additional monitoring points in this area for 2026. There was a slight expansion of the 250 mg/L chloride line in 2025, specifically within the "seawater intrusion review area."

Within the 400-Foot Aquifer, one groundwater sample from a well located ahead of the eastern edge of the 250 mg/L contour, north of Espinosa Lake, progressed from Not Intruded in 2024 to Phase 1 in 2025.

The Agency mapped the one-year percent change in chloride concentration at each of the sampled wells within the monitored area that are constructed in the 400-Foot Aquifer. Based on this evaluation, there are 30 wells throughout the monitored area that showed one-year increases in chloride concentration ranging from 1% to 140%, and 20 wells that showed one-year decreases in chloride concentration ranging from 1% to 68%. Seventeen wells showed no change from 2024, and four wells could not be evaluated because there was not a 2024 chloride value to compare to. Attachment 7 designates the wells used to provide a supplemental groundwater supply for the Castroville Seawater Intrusion Project by using a purple border around the well symbol.

As stated previously, the one-year percent change in chloride is one way of looking at variability in water quality conditions between sites, but it is an indicator that can be influenced by multiple factors and is not necessarily suggestive of a long-term trend at the well or in the aquifer as a whole. The change in chloride metric is also not a substitute for a robust evaluation of geochemistry that captures the phase of seawater intrusion a well may be experiencing, which can be separate from the numerical

chloride concentration or one-year percent change thereof.

Summary

In conclusion, the Agency's analysis of seawater intrusion in the 180-Foot and 400-Foot Aquifers based on data collected in 2025 resulted in:

- Slight advancement of the 500 mg/L chloride contour in two areas within the 180-Foot Aquifer
- Advancement of the 250 mg/L chloride contour in the 180-Foot Aquifer toward the city of Salinas
- No advancement of the 500 mg/L chloride contour in the 400-Foot Aquifer and slight advancement of the 250 mg/L chloride contour
- Delineation of a "seawater intrusion review area" in the 400-Foot Aquifer where additional water quality data collection will be pursued in 2026 in order to clarify or confirm anecdotal information about elevated chloride levels in this geographic space.

Additionally, the Agency added seven new monitoring sites to the groundwater quality monitoring network for seawater intrusion and included a depiction on its maps of the extent of seawater intrusion (250 mg/L chloride) as defined by PV Water for areas within Monterey County north of Elkhorn Slough. Multiple map products were developed for both the 180-Foot and 400-Foot Aquifers to demonstrate the geochemical conditions at each monitored well and the variability of water quality conditions within the monitored area.

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Attachments:

1. Attachment 1: 2025 Seawater Intrusion Maps