MONTGOMERY & ASSOCIATES

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Attachment 1 to the 2026 Seawater Intrusion Model Updates (Addendum 4 to the Salinas Valley Seawater Intrusion Model Report)

Projected Baseline Simulation

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CONTENTS

TABLES

FIGURES

1 INTRODUCTION

To help evaluate and design projects and management actions that address seawater intrusion, Mongomery & Associates (M&A) developed a predictive version of the updated Salinas Valley Seawater Intrusion Model (SWIM) that projects future groundwater conditions if no new projects and management actions are implemented. This simulation is referred to as the Baseline Scenario, and it simulates projected seawater intrusion and groundwater levels from Water Year (WY) 2023 through WY 2072. Results from modeling various projects and management actions will be compared to the Baseline Scenario model results.

The Baseline Scenario—initially developed in 2023 and updated in 2025—is referred to as the SWIM version 3 Baseline Scenario (M&A 2023, 2024, 2025a; 2026b). The Baseline Scenario presented here is based on the most recent SWIM version 4 (SWIM v4). SWIM v4 improved model calibration in the Seaside and Monterey Subbasins, as well as the Deep Aquifers. The SWIM v4 updates were jointly completed by M&A, Marina Coast Water District Groundwater Sustainability Agency's (MCWDGSA) consultant, EKI Environment & Water, Inc. (EKI), and the Seaside Watermaster's modeler.

The SWIM v4 Baseline Scenario incorporates updated boundary conditions, well data and calibrated hydrogeologic parameters from the historical SWIM v4 into the predictive model, and updated assumptions regarding Seaside Subbasin injection and extraction. Updated Seaside Subbasin injection and extraction assumptions were developed by the Seaside Watermaster's modeler.

This document describes the assumptions used to develop the SWIM v4 Baseline Scenario and summarizes the updated model results. The Baseline Scenario will continue to be updated as future model improvements are implemented.

2 BASELINE SCENARIO MODEL DEVELOPMENT

The Baseline Scenario predicts future groundwater levels and seawater intrusion in the northern Salinas Valley if there are no changes to the Valley's current land use, reservoir operation rules, and climate conditions. The scenario includes increases in urban pumping reflecting anticipated population growth based on Association of Monterey Bay Area Governments (AMBAG) predictions (AMBAG, 2024). The Baseline Scenario simulates 50 years of monthly stress periods from October 2022 through September 2072 using a repeated 25-year representative climate sequence.

The SWIM v4 Baseline Scenario assumptions are generally the same as the SWIM v3 Baseline Scenario assumptions except for updates to the Seaside pumping rates. Additionally, updates to the SWIM v4 historical model applicable to the SWIM v4 Baseline Scenario—such as those impacting hydrogeologic parameters, well locations and screen intervals, and boundary conditions—were incorporated into the predictive model.

Several Baseline Scenario assumptions and inputs are informed by the regional Salinas Valley Integrated Hydrologic Model (SVIHM) and its predictive version known as the Salinas Valley Operations Model (SVOM). Previous SWIM model updates focused on aligning assumptions between the models. For example, the SVOM's projected agricultural pumping is used in the SWIM. The SWIM v4 Baseline Scenario assumptions are developed from the current version 1 of the SVIHM and SVOM (M&A, 2025b; 2026a).

Table 1 summarizes the assumptions and approaches for simulating boundary conditions in the Baseline Scenario, and shows which assumptions were modified during this model update. Details for each updated assumption and boundary condition are summarized in the sections following Table 1.

Table 1. Summary of Project Baseline Scenario Boundary Conditions Approach

Assumption or Model Boundary Condition	Approach	Assumption Updated Since SWIM v3 Baseline
Initial Conditions	Extracted from the final historical SWIM stress period	Updated with final historical SWIM v4 stress period
Land Use	Assumed to be the same as in the final SVIHM stress period	Unmodified
Groundwater Pumping	Extracted from SVOM simulated pumping rates at individual agricultural wells; municipal pumping based on estimated population growth	Updated Seaside Subbasin injection and extraction rates; updated well locations and screen information based on the historical SWIM v4 simulation
Groundwater Recharge	Extracted from SVOM groundwater recharge rates, averaged by Water Balance Subregion	Applied recharge scale factors to Seaside Subbasin and San Benancio Gulch in Monterey Subbasin based on the historical SWIM v4 simulation
Riparian Evapotranspiration (ET)	Average by month historical model potential ET rates from WY 2022	Unmodified
Ocean Boundary	Based on published estimates	Ocean interface boundary cell locations and conductance updated based on the historical SWIM v4 simulation
Pajaro Valley Boundary	Continuation of historical, simulated SVIHM WY 2022 values	Unmodified
Southeastern Boundary	Extracted from SVOM simulated groundwater heads at model boundary, averaged by reach	Unmodified
Surface Water Flow	Salinas Valley Watershed Model (SVWM)[1] stream inflows matching 25-year historical sequence. Salinas River at Chualar inflows from SVOM corrected for SVIHM/SVOM bias; Salinas River Diversion Facility diversions from SVOM	Unmodified

Notes:
[1]Hevesi *et al.*, 2025.

2.1 Initial Conditions

Groundwater elevations and chloride concentrations from the last stress period of the historical SWIM v4 (the end of September 2022) are imported as initial conditions for the Baseline Scenario.

2.2 Land Use

Land use remains constant throughout the simulation, reflecting 2022 patterns. Although it is not simulated directly in the SWIM, land use implemented in the SVOM affects agricultural pumping and recharge, which are transferred to SWIM as discussed below. This assumption was not modified as part of the model update.

2.3 Groundwater Pumping

Well-by-well agricultural groundwater pumping for the Baseline Scenario was extracted from the SVOM output and transferred to SWIM input files. The non-agricultural groundwater pumping assumptions for the Baseline Scenario are unmodified except for the assumptions regarding injection and extraction in the Seaside Subbasin. The Seaside Subbasin's modeler provided updated injection and extraction rates. Future urban pumping rates are developed based on population growth estimates. Rural domestic pumping is carried forward at 2022 rates and locations.

Updated Baseline Scenario injection and extraction estimates in Seaside Subbasin include all operating, under construction, or planned projects detailed in recent Seaside Watermaster and Cal-Am modeling studies (M&A 2022a; 2022b; WSC, 2021). Reported injection and pumping rates are used for WY 2023–2025. Injection and pumping during WY 2026–2072 use projected rates as described below.

Seaside Subbasin producers, except for Cal-Am, are assumed to pump at their annual safe yield allocation as set out by the Seaside Subbasin adjudication decision (Superior Court, 2007). Cal-Am pumping in the Seaside Subbasin can exceed the adjudicated safe yield allocation because it includes the recovery of injected Pure Water Monterey (PWM) project recycled water, and Carmel River Aquifer Storage and Recovery (ASR) project water. The PWM Expansion project is assumed to inject at its planned average project yield of 5,750 AF/WY. Projected monthly Carmel River diversion and ASR injection volumes are calculated from Carmel River daily streamflow records for the 25-year climate cycle while maintaining the minimum in-stream flow requirements. The total injection average for the Baseline Scenario was 7,100 AF/WY.

Cal-Am's projected monthly Seaside pumping schedule is based on an updated supply-demand forecast model developed for evaluating the impact of future projects in the Seaside Subbasin (MPWMD, 2019a; 2019b; M&A, 2022a; 2022b). Projected annual demand for the Cal-Am Monterey Main System from 2026 to 2050 is estimated to grow linearly to the projected 2050 system demand estimate of 13,732 AF/WY (CPUC, 2025a; 2025b). The total annual system demand for increases to 15,178 AF/WY between 2051 and 2072, based on projected growth estimates. Projected demand is supplied from combination of native Seaside groundwater pumping, Carmel River water rights, PWM and stored ASR injected water recovery, and existing and planned desalination projects.

In addition to modifications to the Seaside Subbasin injection and extraction rates, well locations and screen information were updated to match data from the historical SWIM v4.

The simulated pumping in the Baseline Scenario does not account for changes in pumping practices in response to continued seawater intrusion. It is possible that pumping might be reduced or moved in response to seawater intrusion. Table 2 shows the simulated average annual pumping rates for WY 2040-2064 of the Baseline Scenario to show a complete 25-year water budget cycle.

Table 2. Average Pumping Rates for the Baseline Scenario

	Total Pumping (AF/WY)[1]					
	180/400[2]	Eastside[2]	Langley	Monterey	Seaside[3]	Subbasins Total
Average WY 2040-2064 Pumping Rates	80,500	62,200	2,100	10,000	3,400	158,100
Agriculture	70,900	49,400	1,400	400	0	122,100
Water Systems, Industrial Users, and Domestic	9,600	12,800	700	9,600	3,400	36,000

[1] Values are rounded to the nearest hundred.
[2] Portion of these subbasins within the SWIM boundaries
[3] Net pumping including injection

Although the input pumping rates for the subbasins other than Seaside were unmodified from the previous version of the Baseline Scenario, the resulting simulated pumping is about 3% higher in the 180/400 and Eastside Subbasins. This is because the simulated groundwater elevations in pumping wells fall below the bottom of the screen less often and therefore there is less need for a pumping reduction in the model. The average groundwater elevations in the recalibrated SWIM v4 were about 2 to 3 feet higher in the 180-Foot and 400-Foot Aquifers and Eastside equivalent alluvial aquifers.

2.4 Groundwater Recharge

Simulated recharge includes recharge from precipitation and recharge from agricultural irrigation return flows. These 2 recharge sources are combined into a single recharge value in SWIM. Monthly recharge rates were extracted from the SVOM output for WY 2023 through 2072 and transferred to SWIM input files. The recharge rates were spatially averaged by SVOM Water Balance Subregion (WBS). Scale factors developed during the SWIM v4 update were applied to selected WBS in Seaside Subbasin and in the San Benancio Gulch in Monterey Subbasin. The recharge scale factors are summarized in Table 3.

Table 3. Groundwater Recharge Scale Factor

Area	Recharge Scale Factor
Seaside Subbasin Coastal Dune Sands (WBS 41)	0.81
Seaside Subbasin Urban (WBS 40)	0.56
Seaside Subbasin Uplands (WBS 30)	0.83
San Benancio Gulch (WBS 25)	0.50

Table 4 compares the average annual recharge for WY 2040-2064 in the Baseline Scenario to the historical model to show a complete 25-year water budget cycle. The historical model recharge estimates shown in Table 4 reflect recharge after 1985 and exclude recharge from WY 1998 because it was an anomalously wet year. The recharge rates in the 180/400, Eastside, and Langley Subbasins are unmodified, while the recharge in the Seaside Subbasin and the San Benancio Gulch portion of the Monterey Subbasin is lower because of the scale factors.

Table 4. Average Recharge by Subbasin

	Total Recharge (AF/WY)[1]					
	180/400[2]	**Eastside**[2]	**Langley**	**Monterey**	**Seaside**	**Subbasins Total**
Baseline Scenario (WY 2040-2064 average)	36,800	16,700	6,000	11,800	3,500	74,800
Historical Model (WY 1985-2022 average, excluding WY 1998)	43,500	17,000	5,300	11,200	3,300	80,300

[1] Values are rounded to the nearest hundred.
[2] Portion of these subbasins within the SWIM boundaries

2.5 Riparian Groundwater Evapotranspiration

Evapotranspiration (ET) in riparian areas is simulated using the MODFLOW evapotranspiration package (EVT). This boundary condition was not modified as part of the model update.

2.6 Ocean Boundary Conditions

The ocean is modeled as a general head boundary (GHB) and is present in cells that represent the aquifer/ocean interface. The GHB cells and conductance parameter values were updated to match the historical SWIM v4. The GHB reference groundwater levels representing monthly sea levels and projected sea level rise were not modified as part of the model update.

2.7 Pajaro Valley Boundary Condition

The northern boundary of the model shared with Pajaro Valley near Elkhorn Slough is modeled with a GHB. This boundary condition was not modified as part of the model update.

2.8 Southeastern Boundary Condition

The southeastern boundary of the model, near the confluence of Chualar Creek and the Salinas River, is modeled with a time-dependent constant head (CHD) boundary. This boundary condition was not modified as part of the model update.

2.9 Surface Water Flows and Diversions

Streams are simulated using the connected linear node (CLN) package. The surface water flows and diversions were not modified as part of the model update. The streambed leakance was reduced for selected segments of a small intermittent stream in Laguna Seca and El Torro Creek in Corral de Tierra to match the historical SWIM v4.

3 MODEL RESULTS

Model results are assessed by comparing projected groundwater conditions at the end of the 50-year Baseline Scenario simulation to the conditions at the start of the Baseline Scenario simulation. Results are analyzed either at the end of the simulation period (2072) or in 2070, which is the Sustainable Groundwater Management Act's planning horizon for the 180/400 Subbasin. Results are summarized by model layer, which include the stratigraphic equivalents of the named aquifers in the same model layer.

3.1 Groundwater Levels

Figure 1 through Figure 3 show groundwater level changes between WY 2023 and WY 2072. This represents the groundwater level changes during the 50-year simulation period. Positive values shown in green correspond to water level increases, and negative values shown in red correspond to water level decreases. The figures show groundwater level changes in the 180-Foot Aquifer (Figure 1), 400-Foot Aquifer (Figure 2), and Deep Aquifers (Figure 3). The 180-Foot Aquifer is represented by the model layer 3 through 5 average head difference. The 400-Foot Aquifer is represented by the head difference in model layer 7. The Deep Aquifers are represented by the model layer 9 through 11 average head difference.

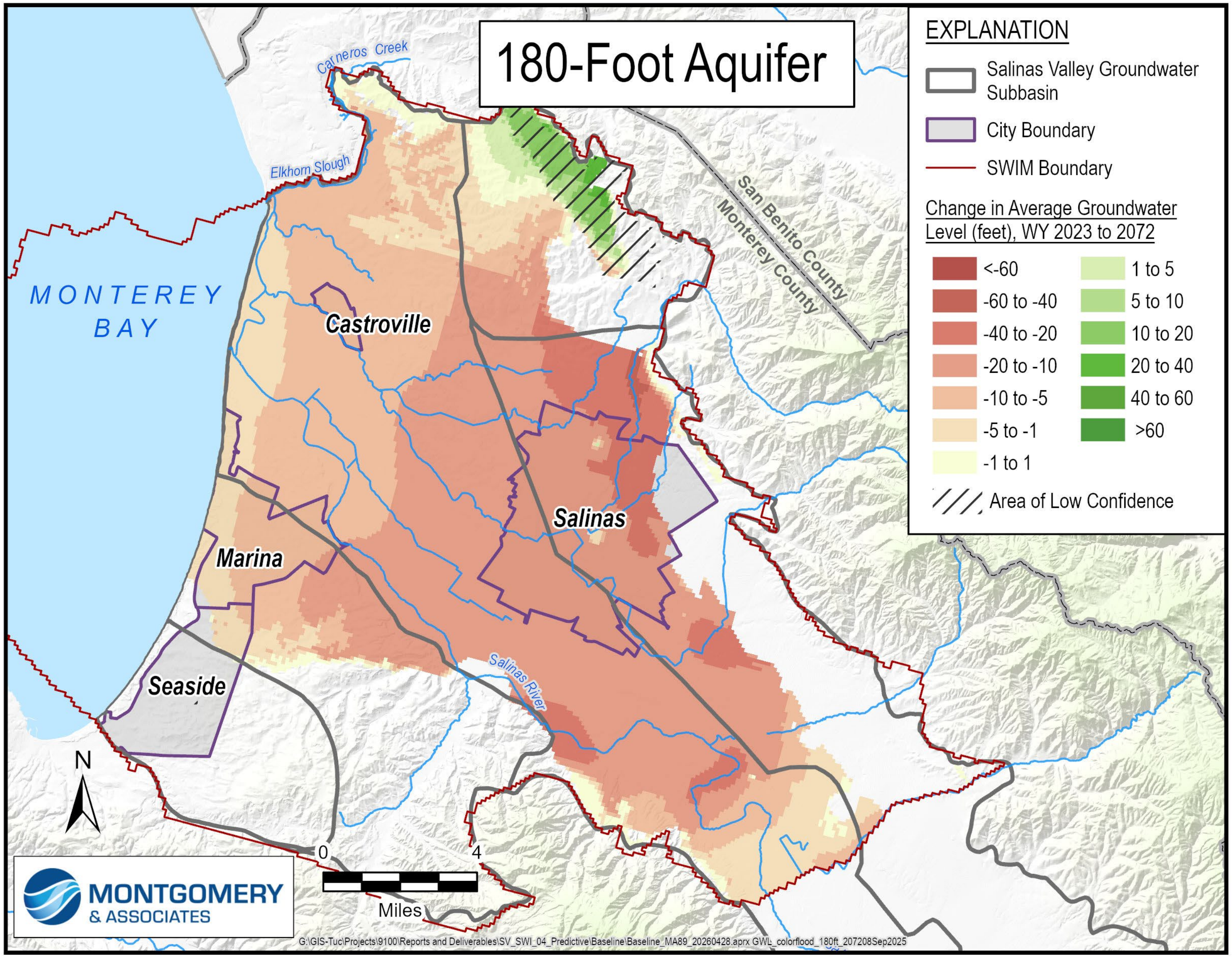

Figure 1. Projected Groundwater Elevation Change Between WY 2023 and 2072 for the 180-Foot and Equivalent Aquifers (Model Layers 3-5)

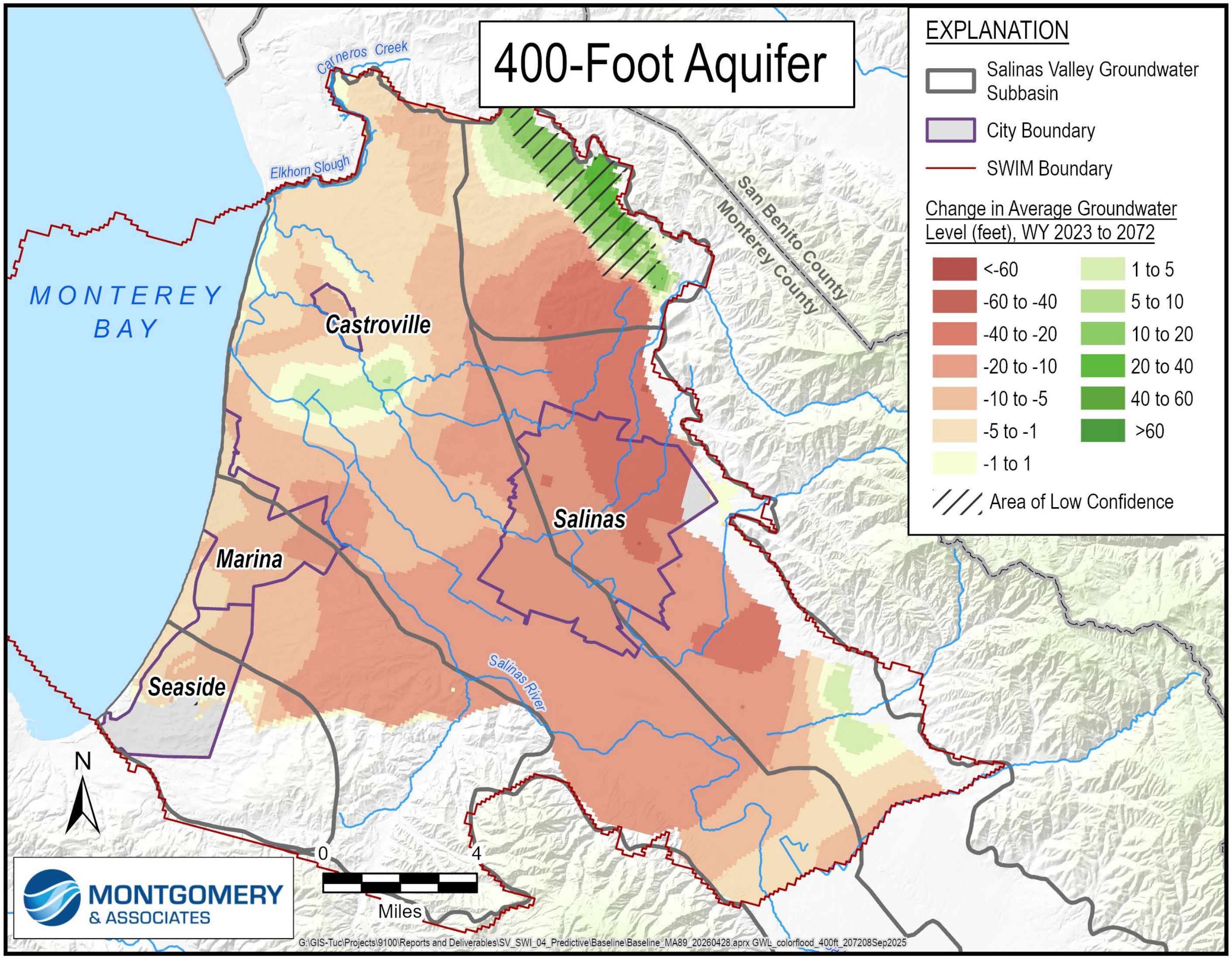

Figure 2. Projected Groundwater Elevation Change Between WY 2023 and 2072 for the 400-Foot and Equivalent Aquifers (Model Layer 7)

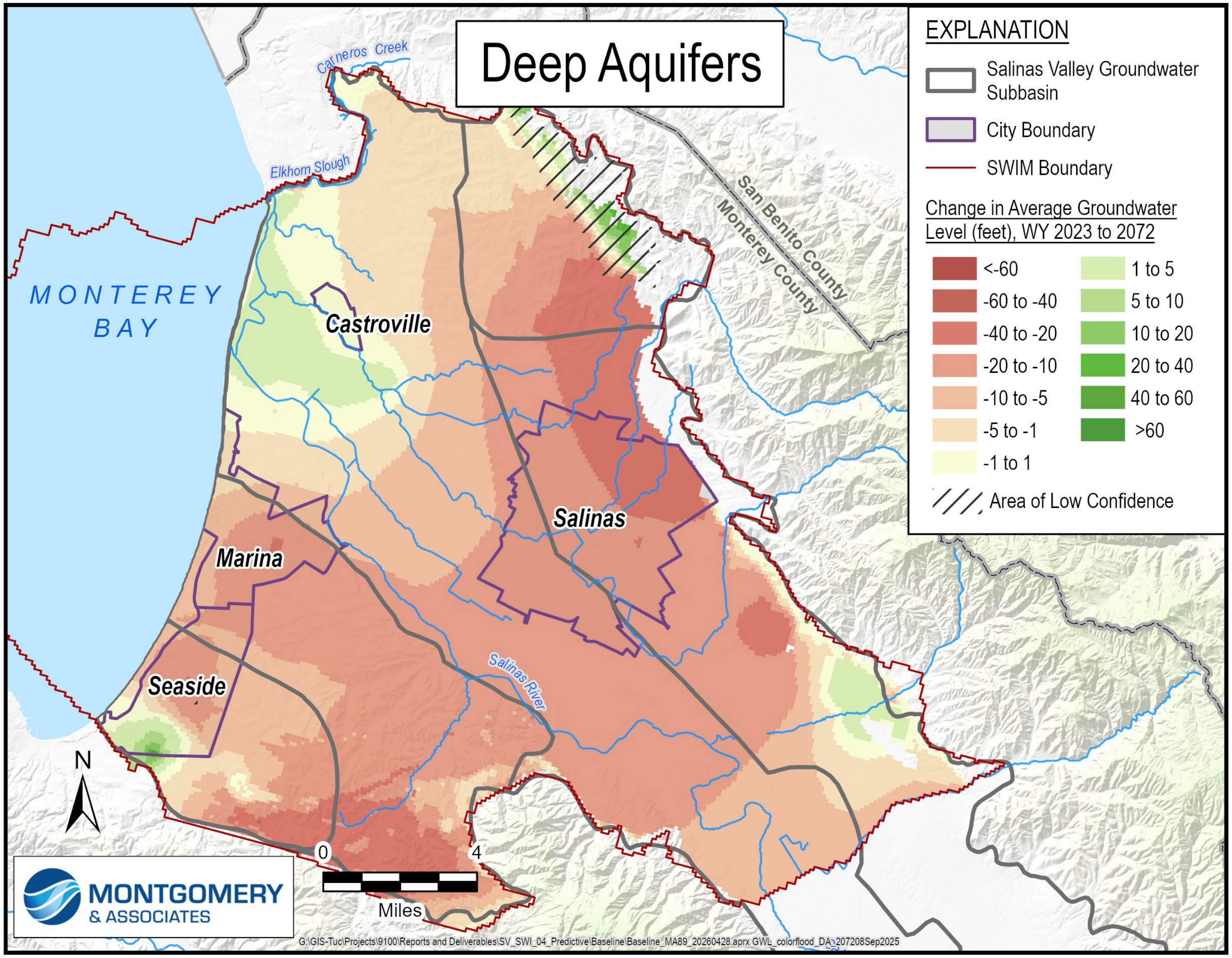

Figure 3. Projected Groundwater Elevation Change Between WY 2023 and 2072 for the Deep Aquifers and Equivalent Aquifers (Model Layers 9-11)

The SWIM estimates that over the 50-year simulation, groundwater levels will generally decrease in the Salinas Valley between 5 and 20 feet in the 180-Foot, 400-Foot, and Deep Aquifers under the Baseline Scenario.

Figure 3 shows average groundwater levels are projected to increase slightly in a small portion of the Deep Aquifers near the coast in the 180/400 Subbasin, as well as in a small portion of the overlying 400-Foot Aquifer. While some WY 2072 average groundwater levels are slightly higher than the WY 2023 average, projected hydrographs in this portion of the Deep Aquifers indicate an overall declining trend from WY 2023 to WY 2072. For example, Figure 4 is a hydrograph of historical and projected groundwater levels for Deep Aquifer well 14S02E06L01. The gray line shows the historical simulated groundwater levels, the blue line shows the projected Baseline groundwater levels and observed groundwater levels are indicated with black cross symbols. The seasonal high groundwater levels on Figure 4 indicate an overall declining trend from WY 2023 to WY 2072.

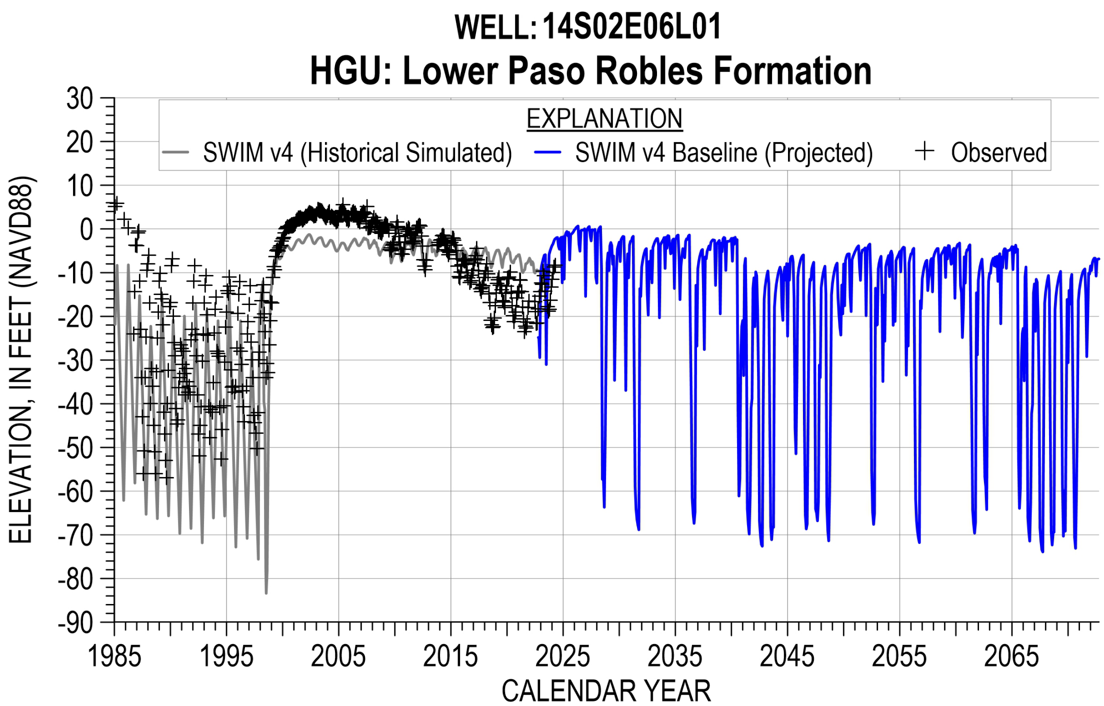

Figure 4. Simulated Groundwater Elevations in Well 14S02E06L01

Groundwater levels in the Seaside Subbasin are projected to decrease by 5 to 20 feet, except for south of the Ord Terrace Fault near the Plumas4 production well, where groundwater levels are projected to increase in response to a decrease in the projected pumping at this well. Projected pumping in the Seaside Subbasin is anticipated to occur mostly from newer, higher capacity production wells north of the Ord Terrace Fault. In the Corral de Tierra Area, groundwater levels are projected to decrease by 20 to 40 feet.

In the Eastside Subbasin, groundwater levels are projected to decrease by 10 to 60 feet. The greatest decline in groundwater levels is projected in the same area as the existing regional groundwater depression north-northeast of the City of Salinas. There is an area with increasing groundwater levels predicted in Granite Ridge area in eastern Langley; however, it is an area where most wells are installed in the fractured granite and model results are likely unreliable in this area.

Figure 5, Figure 6, and Figure 7 show November 2070 groundwater levels in the 180-Foot Aquifer, 400-Foot Aquifer, and Deep Aquifers, respectively. The groundwater levels along the coast in the 180-Foot Aquifer are at least 5 feet below the 2022 and 2070 simulated sea level. Sea level is approximately 3 feet NAVD88 in 2022, increasing a total of 1.2 feet during the simulation period. In the 400-Foot Aquifers and Deep Aquifers, the groundwater levels along the coast are approximately 25 feet below sea level in the 180/400 and Monterey Subbasins. In the Seaside Subbasin, groundwater levels are below sea level on the north side of the Ord Terrace Fault. As observed in current trends, the groundwater gradient is inland toward the depression north and east of the City of Salinas in the Eastside Subbasin. In 2070, the groundwater levels in the inland groundwater depression are up to 100 feet below sea level.

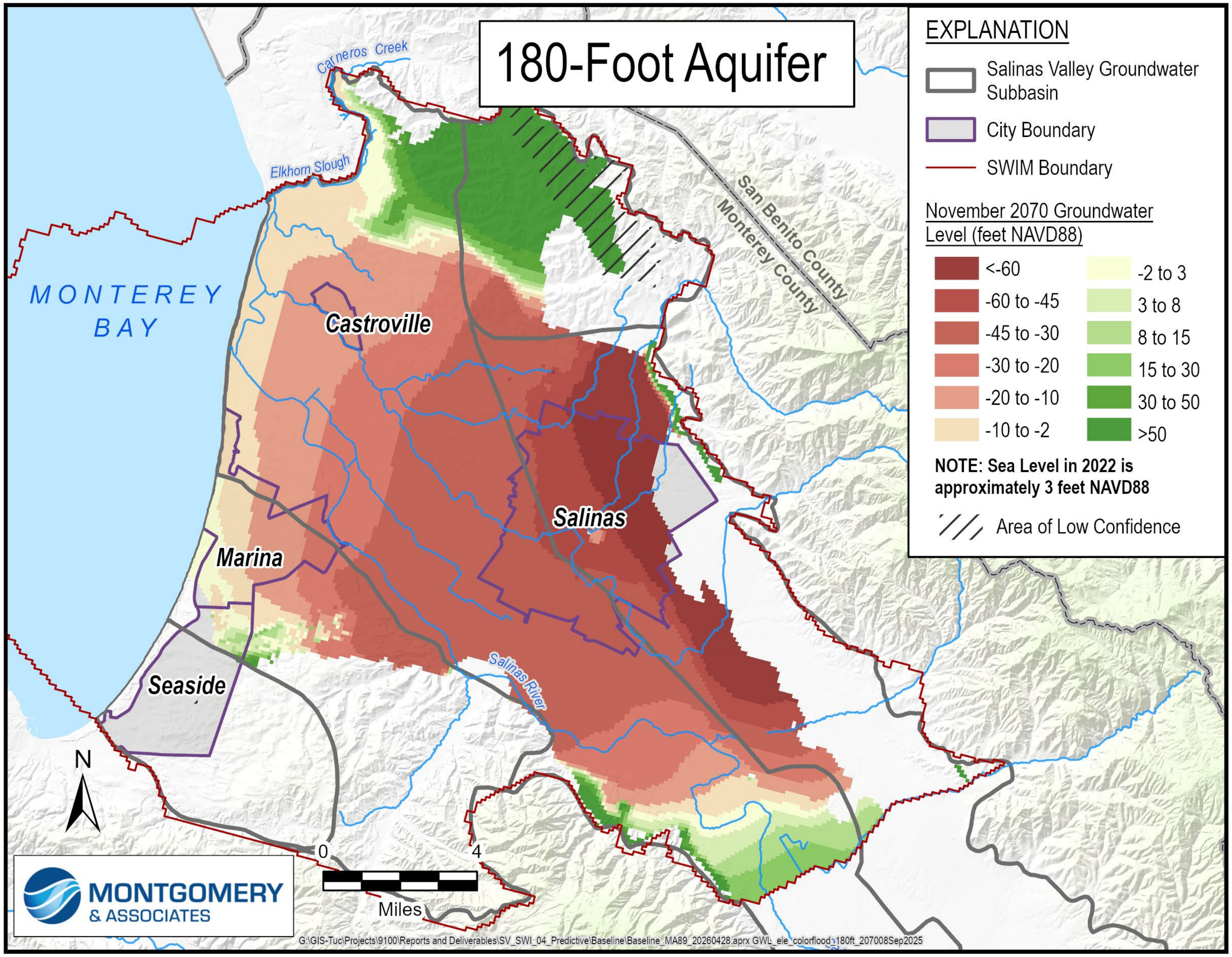

Figure 5. Projected Groundwater Levels November 2070 for the 180-Foot and Equivalent Aquifers (Model Layers 3-5)

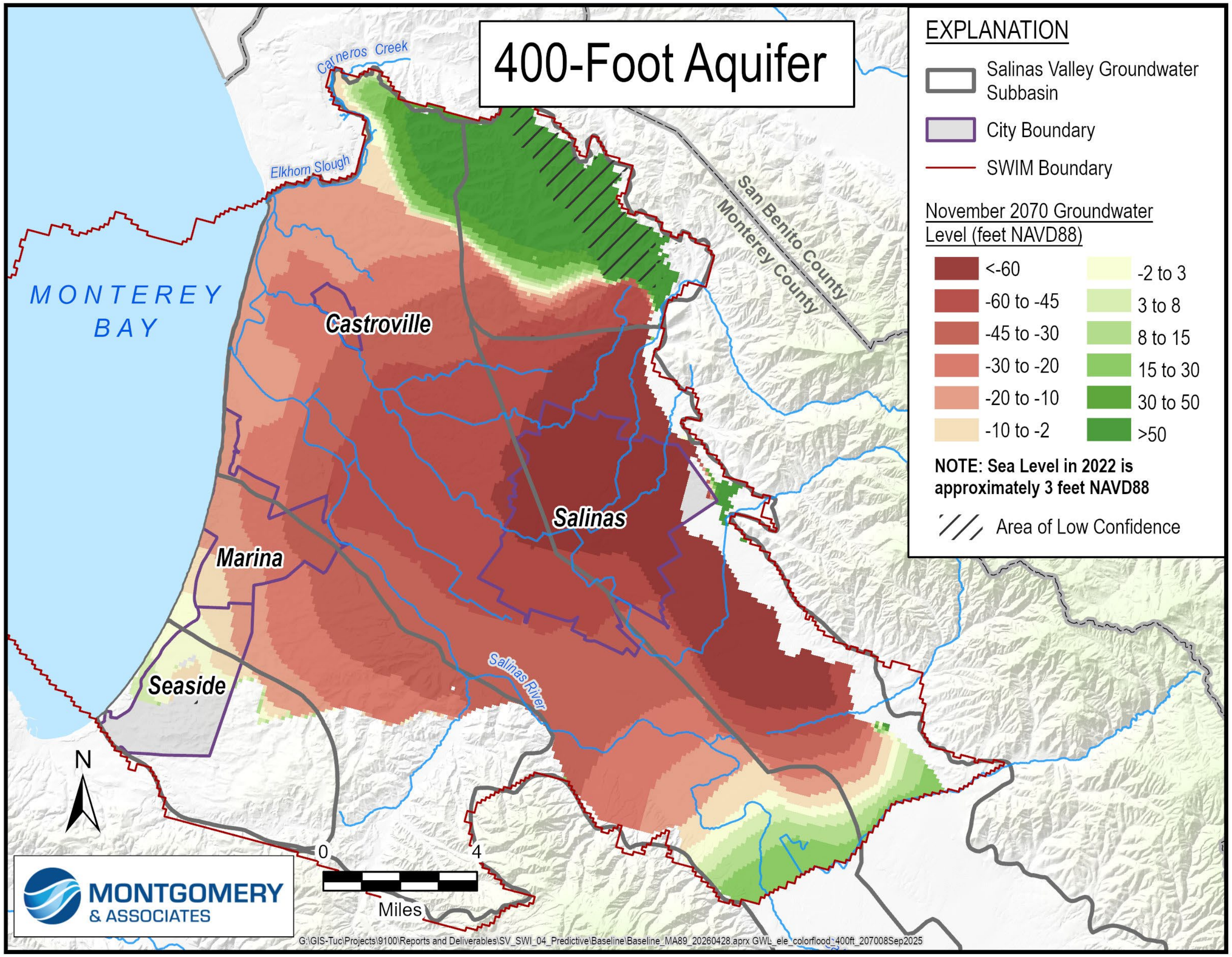

Figure 6. Projected Groundwater Levels November 2070 for the 400-Foot and Equivalent Aquifers (Model Layer 7)

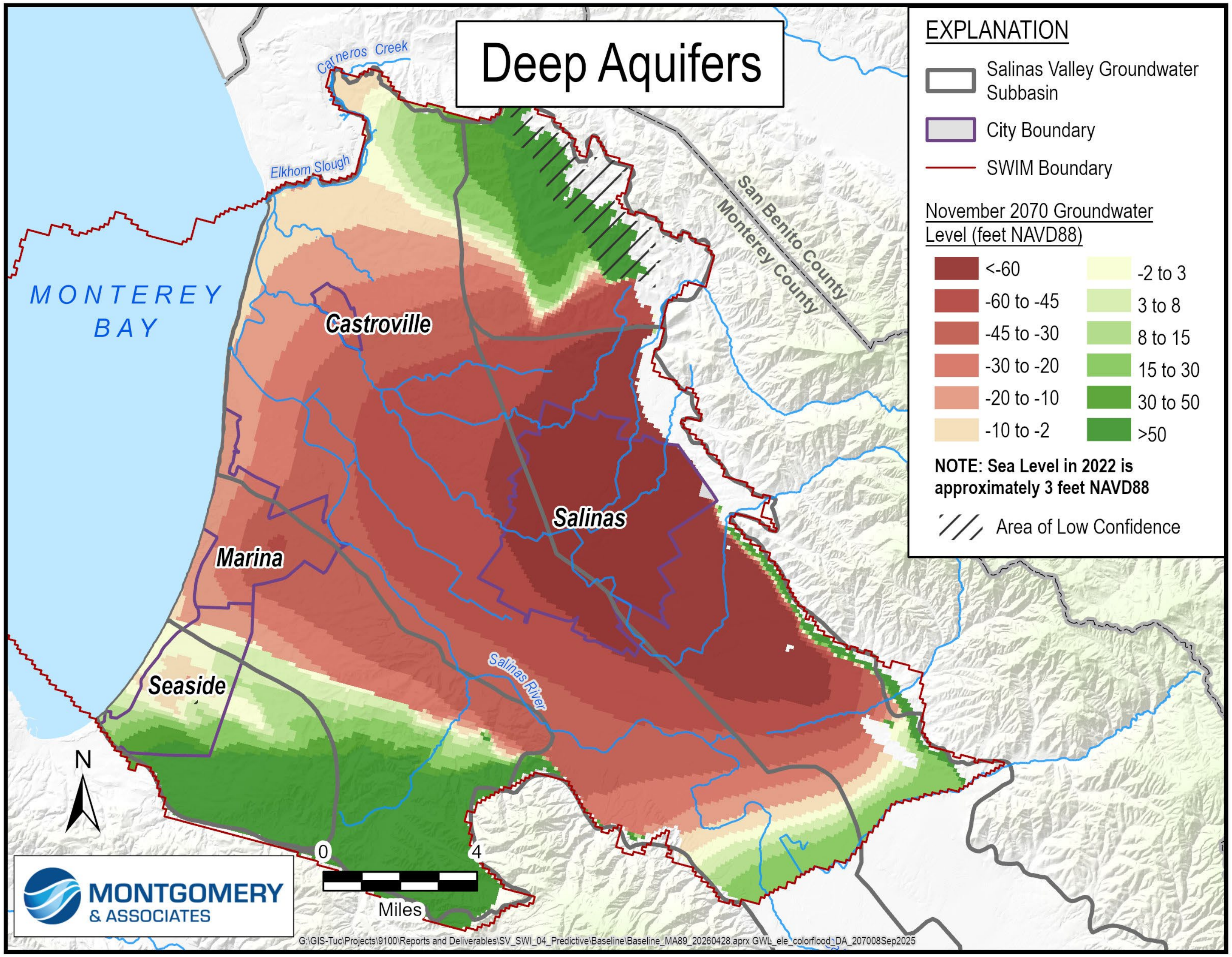

Figure 7. Projected Groundwater Levels November 2070 for the Deep Aquifers and Equivalent Aquifers (Model Layers 9-11)

3.2 Chloride Concentrations

The SWIM v4 Baseline Scenario projects that seawater intrusion in the 180-Foot and 400-Foot Aquifers will steadily advance inland from 2022 through 2072. Seawater intrusion into the Deep Aquifers is not projected to occur, although leakage of saline groundwater from the 400-Foot Aquifer to the Deep Aquifers may occur in Deep Aquifer pumping areas.

Seawater intrusion is defined by the simulated 500 milligrams per liter (mg/L) chloride isocontour. Additional seawater intrusion into the Salinas Valley is expected under the conditions simulated in the Baseline Scenario. The simulated progression of the 500 mg/L chloride isocontour in the 180-Foot Aquifer for 2030, 2040, 2050, 2060, and 2070 is presented on Figure 8.

A map of the chloride concentrations above 100 mg/L in the 180-Foot Aquifer in 2070 is shown on Figure 9. Chloride concentrations in model layer 5 are selected to represent the 180-Foot Aquifer because the lower portion of the aquifer generally exhibits more advanced seawater intrusion. The seawater intrusion minimum threshold is shown as a solid black line on this figure. Under Baseline conditions, the seawater intrusion minimum threshold is exceeded in the 180-Foot Aquifer.

In the 180-Foot Aquifer, the main area of seawater reaches the outskirts of Salinas between 2040 and 2050 and continues advancing in the direction of the observed groundwater depression in the northern portion of City of Salinas. On the northern side of the 180-Foot Aquifer seawater intrusion front, in the vicinity of Castroville, seawater intrusion is also projected to continue inland. On the southern side of the seawater intrusion front, some additional seawater intrusion is projected east of the City of Marina toward a municipal well partially screened in the lower 180-Foot Aquifer. Additional seawater intrusion is projected in the southern direction near the City of Marina – more than in the previous version of the Baseline Scenario. The model layers representing the 180-Foot Aquifer thin and pinch out in the southern portion of the City of Marina where the 500 mg/L chloride contour stops on Figure 8 and Figure 9. This contour continues in the underlying 400-Foot Aquifer.

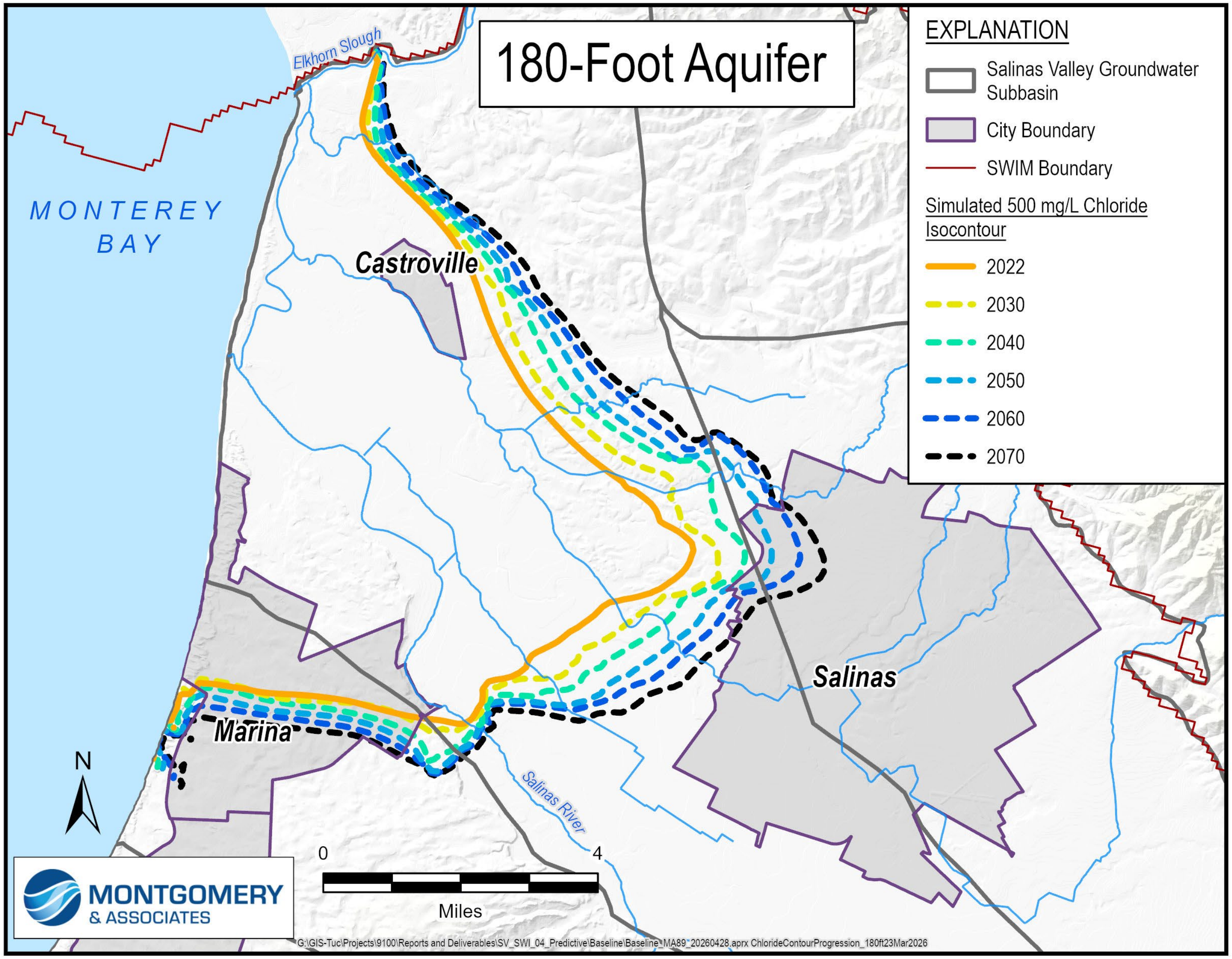

Figure 8. Lower 180-Foot Aquifer (Model Layer 5) Baseline Scenario Simulated 500 mg/L Chloride Concentration Isocontour in 2022, 2030, 2040, 2050, 2060, and 2070

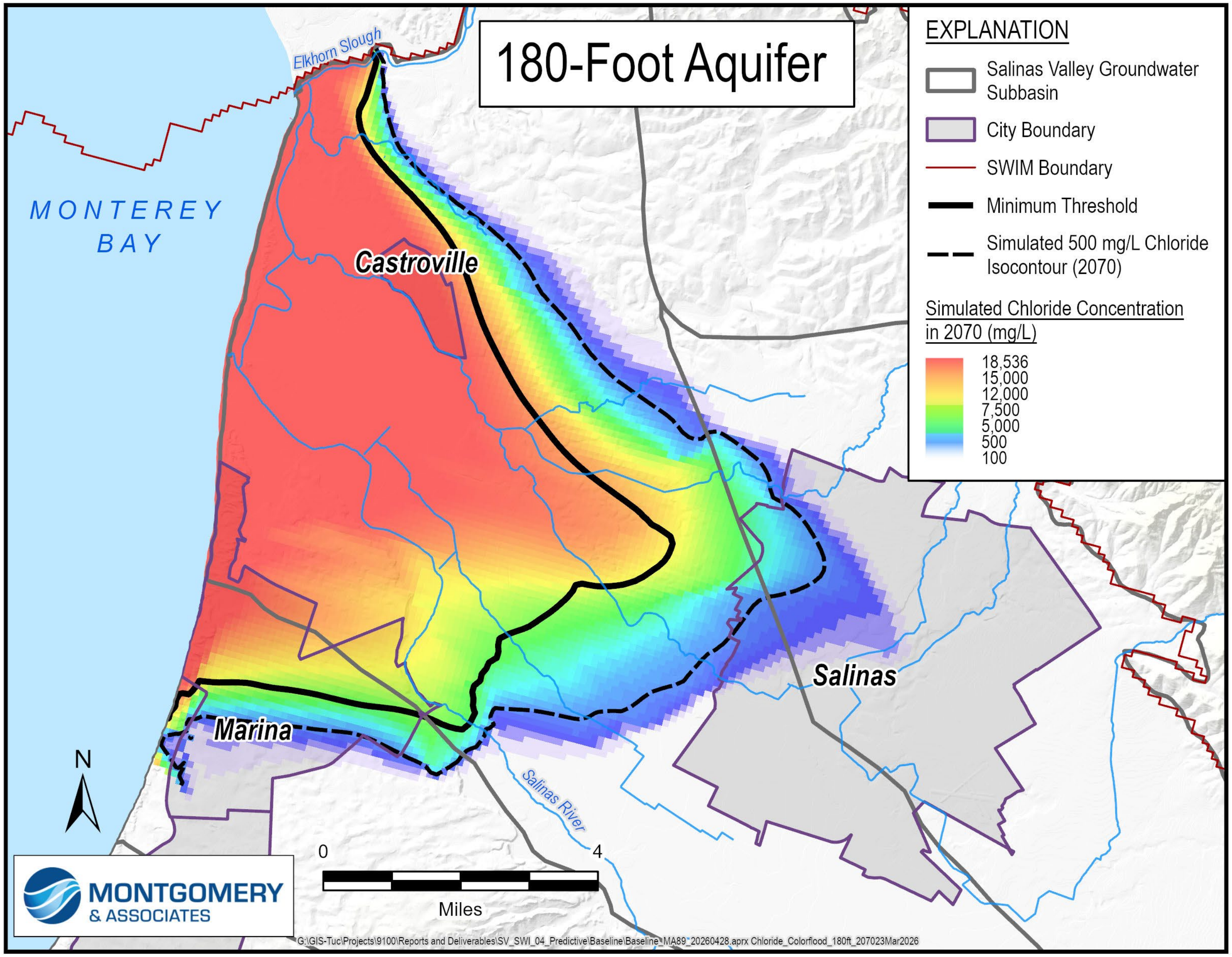

Figure 9. Lower 180-Foot Aquifer (Model Layer 5) Baseline Scenario Simulated Chloride Concentrations in 2070

The progression of the 500 mg/L isocontour in the 400-Foot Aquifer is presented on Figure 10. A map of the chloride concentrations above 100 mg/L in the 400-Foot Aquifer in 2070 is shown on Figure 11. Chloride concentrations in model layer 7 are shown to represent seawater intrusion in the 400-Foot Aquifer. The seawater intrusion minimum threshold is shown as a solid black line on this figure. Under Baseline conditions, the seawater intrusion minimum threshold is exceeded in the 400-Foot Aquifer.

In the 400-Foot Aquifer, seawater intrusion advances toward the northern portion of the City of Salinas. The main lobe of seawater advances as far as where the isolated island of seawater was in 2022. Additional seawater islands appear between the advancing front of seawater in the 400-Foot Aquifer and the City of Salinas, and east of the City of Castroville. These islands migrate toward the observed groundwater depression in the northern portion of the City of Salinas over time. The appearance of these seawater islands in the 400-Foot Aquifer is facilitated by downward flow from the 180-Foot Aquifer through groundwater wells screened across both aquifers. These model results demonstrate that seawater could flow from the 180-Foot Aquifer into the 400-Foot Aquifer in the future through cross-screened wells. However, locations of wells screened in multiple aquifers is only estimated in the model. These model results should not be interpreted as an accurate prediction of where new seawater intrusion islands may appear. They highlight the importance of identifying wells screened in multiple aquifers to prevent this as a potential migration pathway in the future.

Seawater intrusion is projected to continue on the northern side of the seawater intrusion front in the 400-Foot Aquifer in the vicinity of Castroville. On the southern side of the seawater intrusion front, additional seawater intrusion is projected east and south of the City of Marina. The projected extent of seawater intrusion is slightly greater in the southern portion of the City of Marina compared to the previous version of the Baseline Scenario, and approximately the same as the previous version in other portions of the 400-Foot Aquifer.

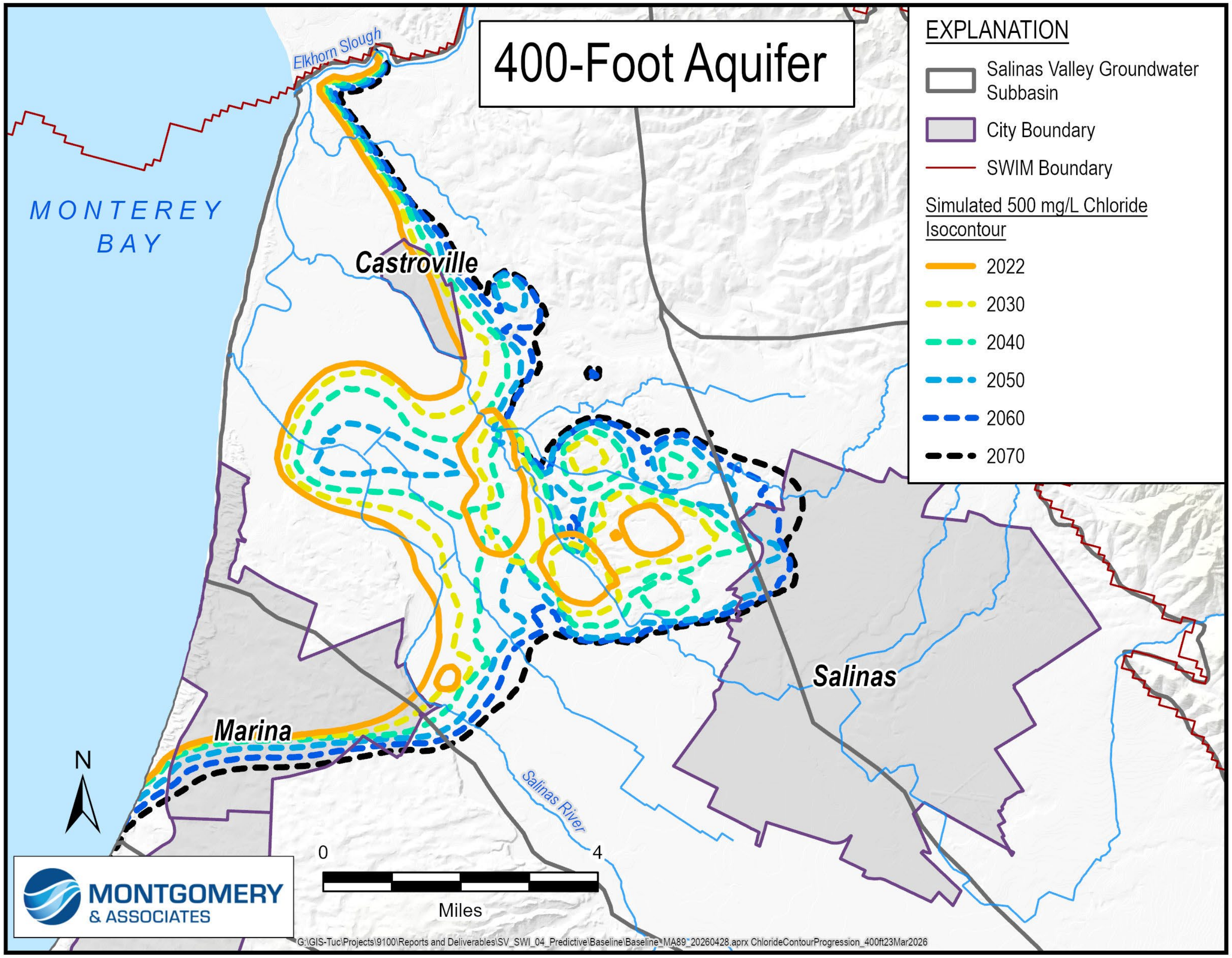

Figure 10. 400-Foot Aquifer (Model Layer 7) Baseline Scenario Simulated 500 mg/L Chloride Concentration Isocontour in 2022, 2030, 2040, 2050, 2060, and 2070

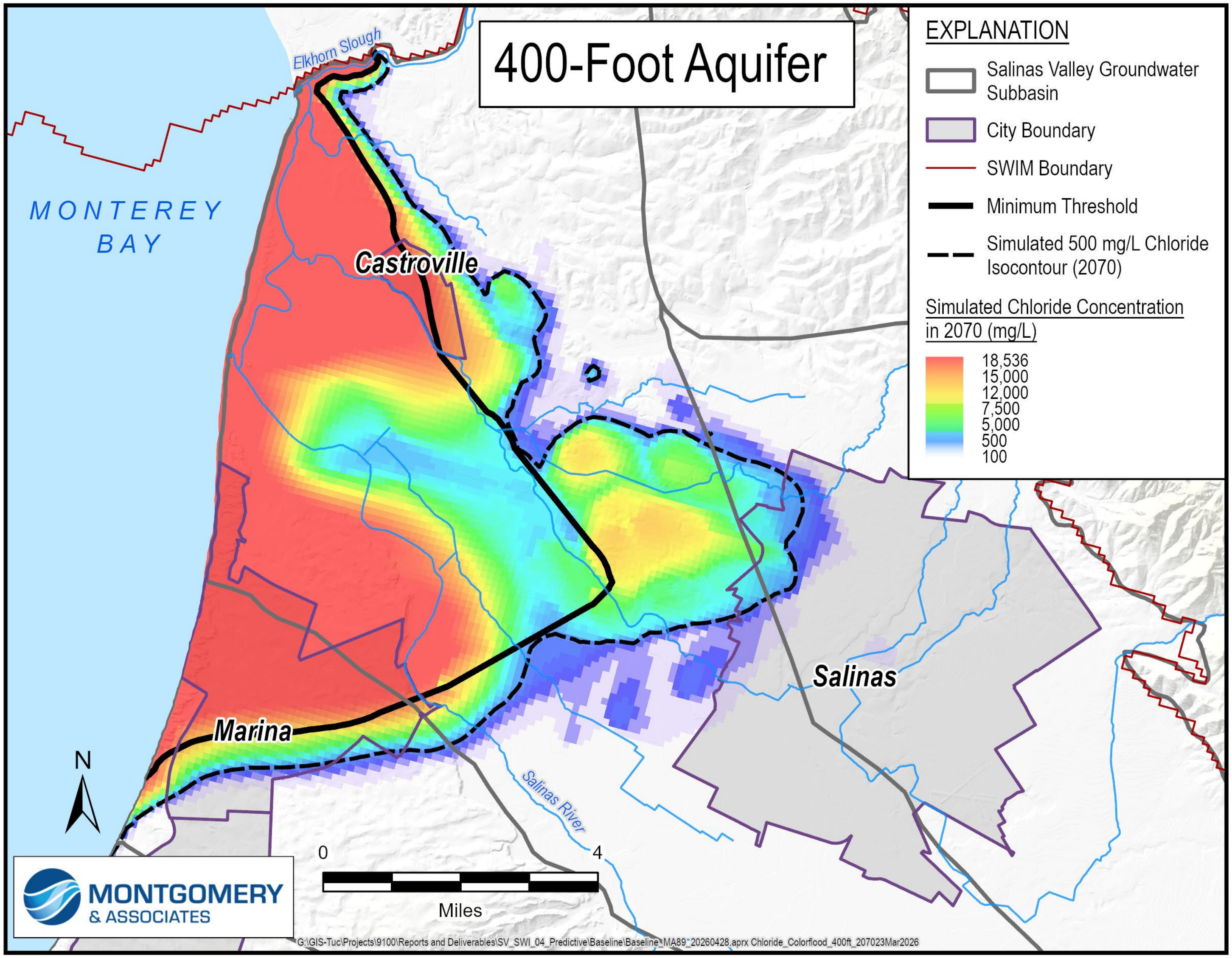

Figure 11. 400-Foot Aquifer (Model Layer 7) Baseline Scenario Simulated Chloride Concentrations in 2070

A map of the chloride concentrations above 100 mg/L in the Deep Aquifers in 2070 is shown on Figure 12. A map of the 500 mg/L chloride isocontour is not presented because the simulated concentrations in the Deep Aquifers are less than 500 mg/L except for small, isolated areas appearing around 2070, which are displayed on Figure 12. Chloride concentrations in model layer 9 are shown to represent seawater intrusion in the Deep Aquifers because this layer is the source of most Deep Aquifer pumping in the 180/400 and Monterey Subbasins.

The Baseline Scenario does not predict lateral intrusion of seawater with chloride concentrations greater than 500 mg/L in the Deep Aquifers. This is only an estimate, because the offshore location of the 500 mg/L isocontour in the Deep Aquifers is unknown. If the offshore location of the 500 mg/L chloride isocontour is closer to the shoreline than estimated by SWIM v4, seawater intrusion could be detected in the Deep Aquifers sooner.

Gradual leakage of saline groundwater from the 400-Foot Aquifer to the Deep Aquifers is predicted in Deep Aquifer pumping areas located in the City of Marina and west of the City of Salinas. The projected chloride concentration in these areas is generally between 100 and 500 mg/L, though it is projected to exceed 500 mg/L in isolated areas by 2070. The SWIM v4 Baseline simulates lower groundwater levels in the Deep Aquifers compared to previous versions, resulting in stronger downward vertical groundwater gradients from the 400-Foot Aquifer to the pumping areas in the Deep Aquifers. It is likely that the projected chloride impacts to the Deep Aquifers through leakage from the 400-Foot Aquifer are also sensitive to the simulated thickness and hydraulic properties of the Deep Aquitard.

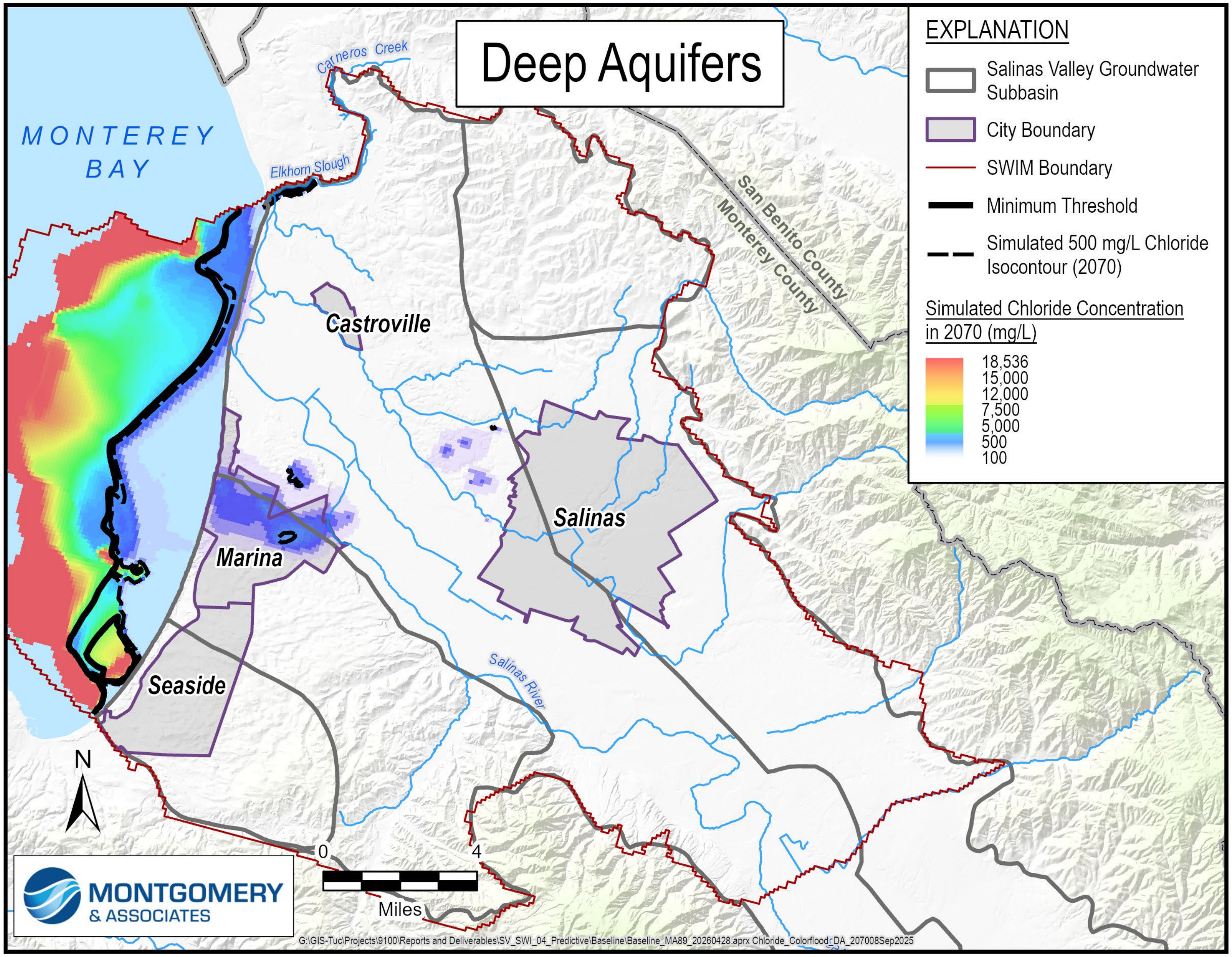

Figure 12. Deep Aquifers (Model Layer 9) Baseline Scenario Simulated Chloride Concentrations in 2070

3.3 Simulated Pumping from Impacted Wells

The Baseline Scenario predicts that by 2070 the seawater intrusion front will advance through an area of mainly agricultural groundwater users and into the City of Salinas. In the Baseline Scenario model, wells impacted by seawater intrusion continue to pump throughout the simulation. No attempt was made to cease pumping from impacted wells because stopping pumping at these wells would require providing an alternative water supply or changing land use. Future projects simulations could include such scenarios.

Groundwater extracted from agricultural wells was assessed for simulated chloride concentrations exceeding 100 mg/L and 500 mg/L. Figure 13 shows the predicted annual amount of water pumped by wells impacted by seawater intrusion from 2022 to 2072. Figure 14 is a map of the annual extraction of wells impacted by chloride concentrations above 500 mg/L by 2070. By 2070, wells pumping approximately 18,000 AF/yr are projected to be impacted by chloride concentrations exceeding 500 mg/L. Wells pumping approximately 32,000 AF/yr will be impacted by chloride concentrations above 100 mg/L in the Baseline Scenario. The majority of the impacted wells are in the 400-Foot Aquifer.

By 2045, two agricultural Deep Aquifers wells on the southern side of the 180/400 Subbasin are impacted by chloride concentrations exceeding 500 mg/L. While chloride concentrations in this part of the Deep Aquifers are projected to be less than 500 mg/L, these wells are partially screened in the model layer corresponding to the Deep Aquitard that has higher concentrations of chloride.

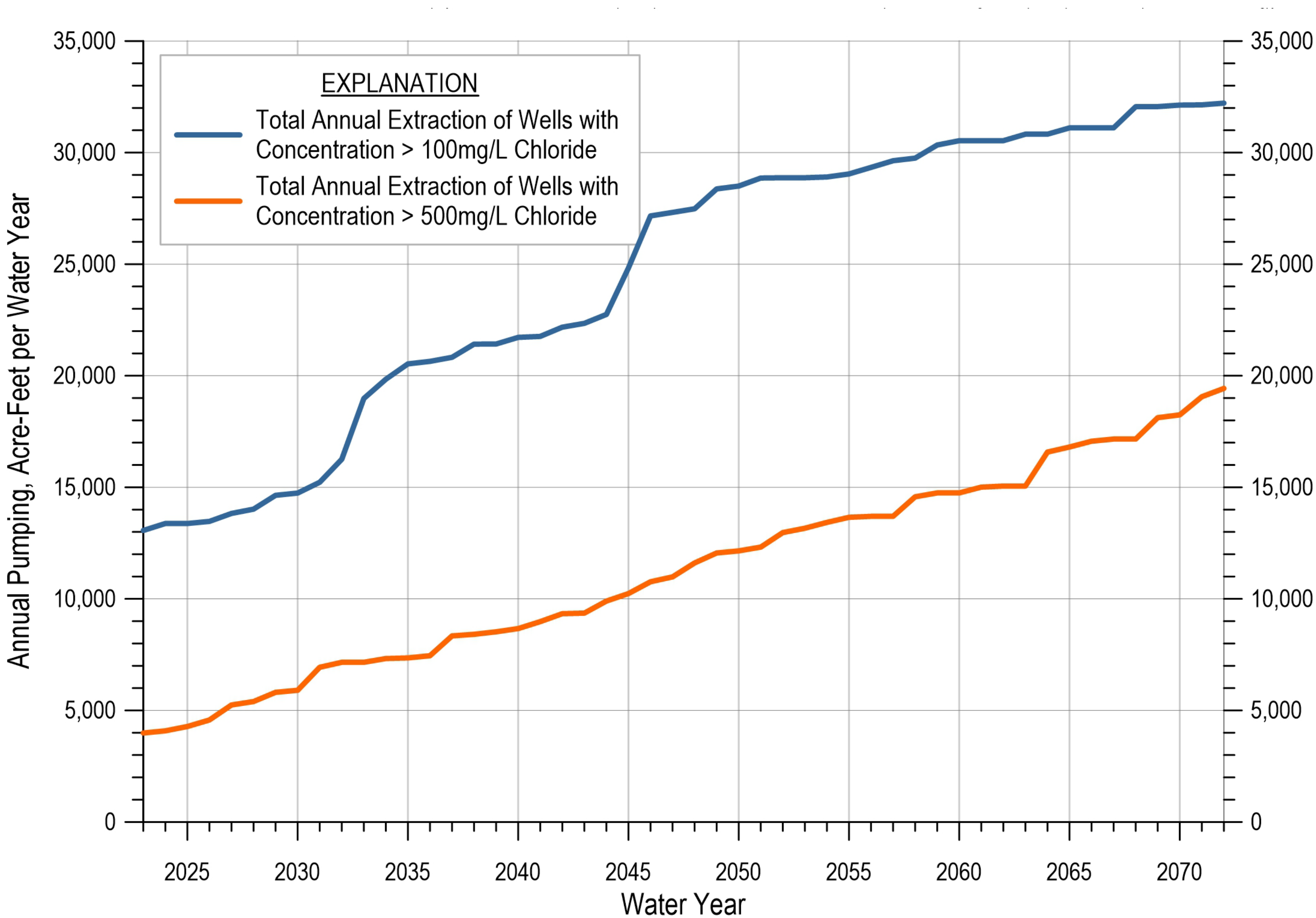

Figure 13. Simulated Groundwater Demand Impacted by Seawater Intruded Wells

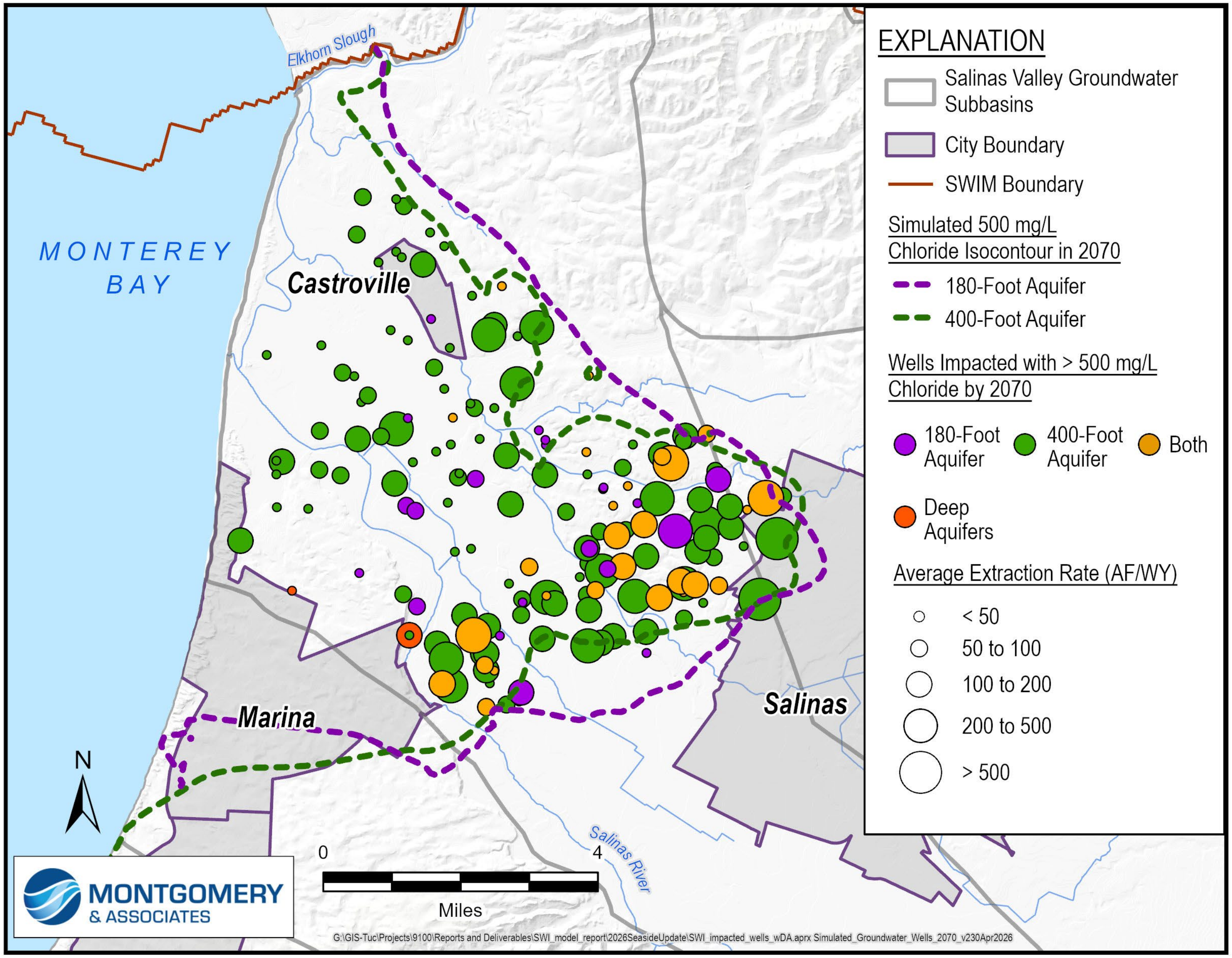

Figure 14. Simulated Groundwater Wells Impacted by Chloride Concentrations Exceeding 500 mg/L by 2070

4 CONCLUSION

M&A developed a predictive version of the SWIM v4 that projects 50 years of groundwater conditions in the coastal portion of the Salinas Valley. Future groundwater conditions were simulated with the Baseline Scenario model to serve as a comparative reference for other projects and management actions. The SWIM v4 Baseline Scenario simulates groundwater conditions that may occur in the Salinas Valley with current land use, reservoir operating rules, climate conditions, and increases in urban pumping reflecting anticipated population growth. Hydrologic conditions such as agricultural pumping, recharge, and streamflows are based on simulated outputs from SVOM version 1. Published sea level rise estimates are included in the SWIM v4; however—as in the previous version—climate change is not.

The SWIM v4 Baseline Scenario is an update to the SWIM v3 Baseline and carries forward updates to projected simulations that improved the model calibration in the Seaside and Monterey Subbasins in the historical model. SWIM v4 updates were completed in coordination with MCWDGSA and Seaside Watermaster modeling teams. The SWIM v4 Baseline contains similar assumptions to the previous version of the Baseline Scenario, but includes updated projections of Seaside Subbasin injection and recovery rates.

The Baseline Scenario projects that groundwater levels will decrease by 1 to 10 feet near the coast and up to 20 feet near the City of Salinas in the 180-Foot, 400-Foot, and Deep Aquifers. In the equivalent stratigraphic units in the Eastside Subbasin, groundwater levels are projected to decrease by 10 to 40 feet, with the greatest decline projected north and east of the City of Salinas. Groundwater levels in Seaside are projected to decrease by 5 to 20 feet in the major pumping center near the coast. In the Corral de Tierra area, groundwater levels are projected to decrease by 20 to 40 feet.

Seawater intrusion in the 180-Foot and 400-Foot Aquifers is projected to continue if current groundwater management practices remain in place. Additionally, the Baseline Scenario indicates future potential for seawater to migrate downward from the 400-Foot Aquifer to underlying large pumping centers in the Deep Aquifers. Movement of chloride between the aquifers through wells indicates the importance of identifying wells in the path of seawater intrusion that may be screened in both the 180-Foot and 400-Foot Aquifers if they do exist.

The Baseline Scenario will be updated alongside future model improvements. These results demonstrate a baseline against which potential projects and management actions may be compared. The Baseline Scenario may be used for assessing, comparing, and designing projects and management actions that reach groundwater sustainability goals.

5 LIMITATIONS

The model simulations reflect professional judgment and represent the best available estimates of potential groundwater conditions. The model's accuracy is affected by simplifying assumptions and data limitations that underpin the model. Given the nature of this initial preliminary feasibility analysis these simplifying assumptions were a necessary step.

In addition to the Baseline Scenario modeling assumptions stated previously, the same assumptions and limitations apply as for the SVIHM and SVOM (M&A, 2025b; 2026a). In addition, the SVOM will require a subsequent update to ensure consistency with the revised parameterization and assumptions incorporated in SWIM v4.

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