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TECHNICAL MEMORANDUM

DATE: March 6, 2026 **PROJECT #:** 9100.6904

TO: Salinas Valley Basin Groundwater Sustainability Agency

FROM: Jonathan Reeves

REVIEWED BY: Staffan Schorr, Abby Ostovar, Ph.D.

PROJECT: Round 2 Sustainable Groundwater Management Implementation Grant for the Salinas Valley

SUBJECT: Salinas Valley Operational Model Update and Projected Baseline Simulation

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INTRODUCTION

The U.S. Geological Survey (USGS) developed the Salinas Valley Operational Model (SVOM) and publicly released it in April 2025 together with the Salinas Valley Integrated Hydrologic Model (SVIHM) (Henson *et al.* 2025, Henson *et al.* preprint). The SVIHM is calibrated to historical conditions and provides the foundation for its predictive counterpart, the SVOM, which is used to project future groundwater conditions. These models were initially developed prior to the completion of the region's Groundwater Sustainability Plans (GSPs) and before the full range of project and management action evaluation requirements under SGMA was known.

On behalf of the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA), Montgomery & Associates (M&A) updated the SVIHM to reflect the most current understanding of basin conditions (M&A, 2025). Corresponding updates were made to the SVOM to ensure consistency with the revised historical model. In addition to the current understanding of stratigraphy and aquifer properties, the updated SVOM incorporates the latest land-use information, municipal pumping projections, and revised climate assumptions.

Using a repeating 25-year projected period, M&A developed a projected baseline scenario representing status quo conditions. This baseline serves as the reference against which potential projects and management actions can be evaluated.

These updates enhance the model's reliability and relevance for SVBGSA's Sustainable Groundwater Management Act (SGMA) compliance and long-term groundwater sustainability planning.

For detailed descriptions of the original conceptual model and numerical model setup, refer to the pre-print USGS model summary report by Henson *et al.* (2025) and the subsequent model update report by M&A (2025); these details are not repeated here.

This memo outlines the updates to the revised SVOM, including to the Surface Water Operations Package (SWO) that simulates reservoir releases.

MODEL INPUTS

M&A updated the SVOM using M&A's SVIHM_v1 (M&A, 2025) as the framework for the predictive model. The SVOM is structurally the same as the SVIHM, but instead of specified reservoir releases based on historical data, it uses the Surface Water Operations Package (SWO) to simulate reservoir operations (Boyce *et al.*, 2020; Boyce, 2023). As compared to the bimonthly time steps in the SVIHM, the SVOM uses 6 time steps per month, varying in length of 3 to 6 days to account for the approximately 5-day transit time for reservoir releases through the model area (Henson *et al.*, preprint).

The SVOM simulation period extends from the end of the historical model and runs from water year (WY) 2023 through WY 2072. Land use data from 2014 and historically cycled farm properties were updated from the values specified in the USGS version and set to repeat 2022 values from M&A's update to the SVIHM in this update. These parameters were input with a repeating climate sequence, described in more detail below.

Initial Conditions

Initial hydraulic heads (water level elevations) for model cells in the SVOM are based on the final hydraulic heads at the end of September 2022 from the SVIHM version 1 (M&A, 2025). These initial conditions provide a calibrated starting point for the predictive model simulations.

Wells

Wells in the SVOM are largely consistent with those included in the final year of the SVIHM. Wells that began pumping after water year (WY) 2022 were added to the model and wells that were decommissioned based on available well records were removed. Figure 1 shows the location of pumping wells in the SVOM by well type.

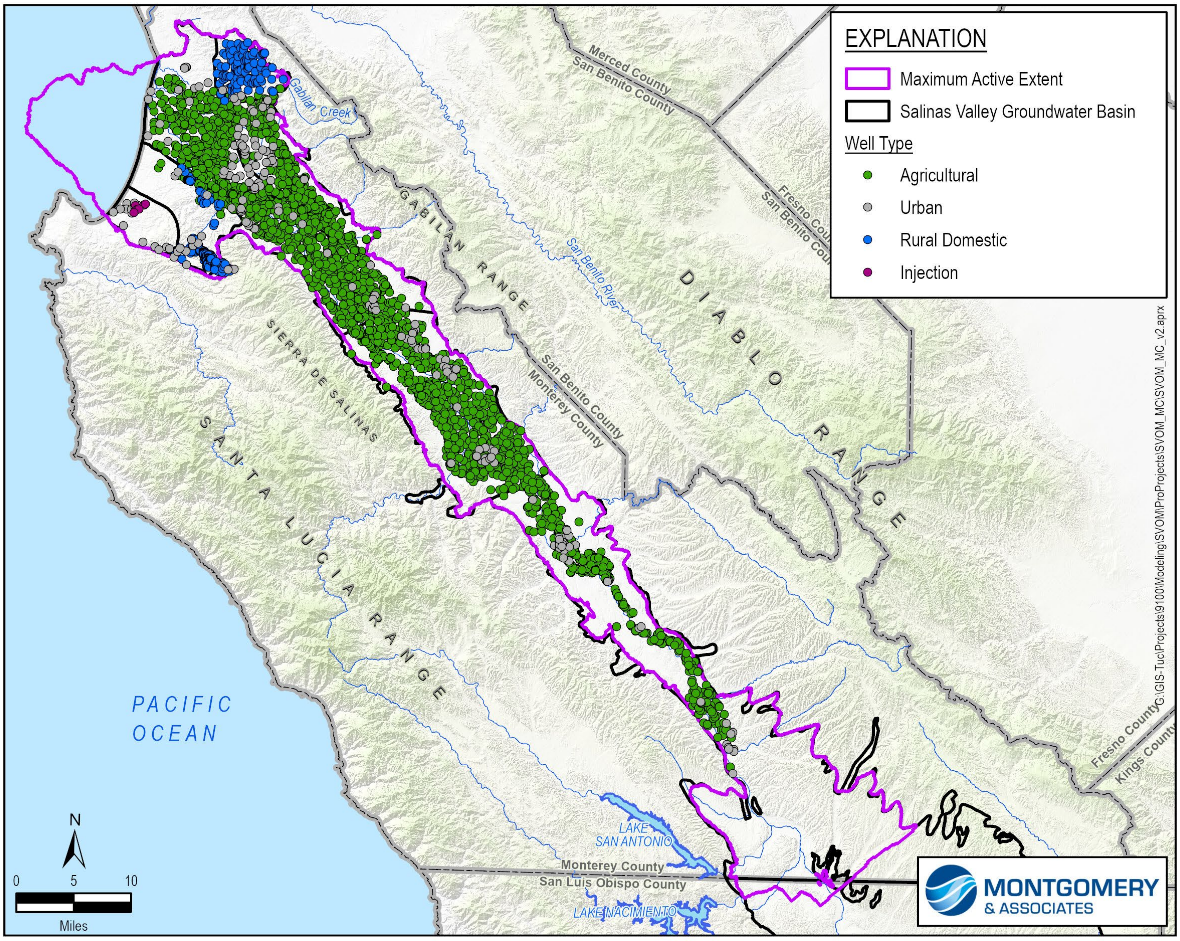

Figure 1. Location of Pumping Wells in the Model

Non-agricultural pumping rates in the model were specified as follows:

- Urban pumping rates were projected based on growth estimates from the 2026 Regional Growth Forecast prepared by the Association of Monterey Bay Area Governments (AMBAG) and the average 2020-2023 per capita water use. For wells designated as urban or industrial under the MCWRA Groundwater Extraction Management System that have no AMBAG projections, 2020-2023 average monthly extraction rates were applied.
- Rural domestic pumping was carried forward at 2022 rates and locations.
- Injection rates were developed in coordination with the Seaside Water Master.

Figure 2 shows specified non-agricultural pumping in the SVOM by well type.

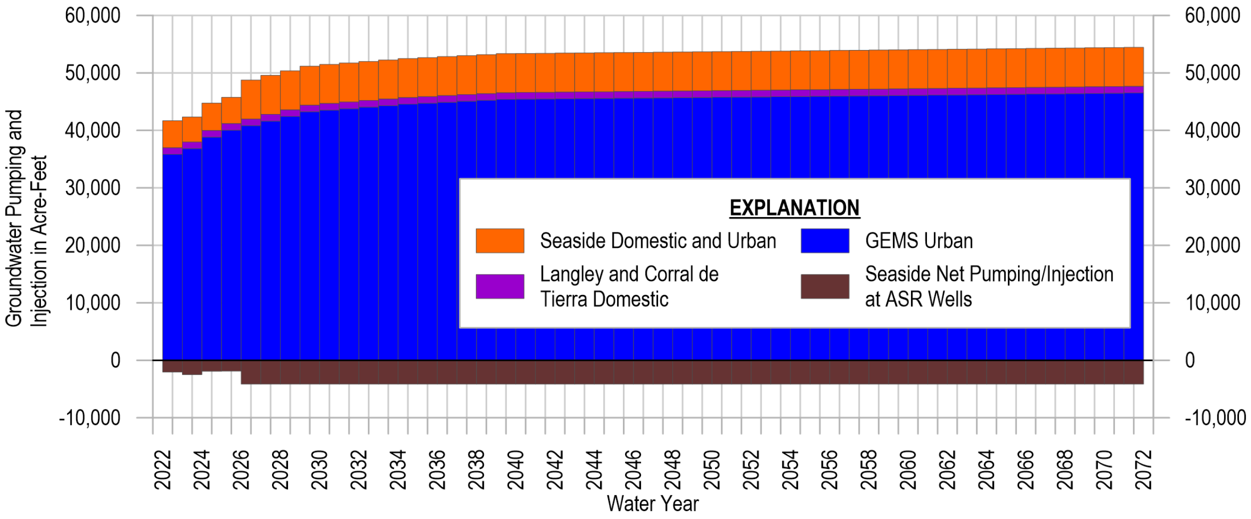

Figure 2. Specified Pumping in the SVOM

Groundwater Level Observation Locations and Bias Correction

Representative Monitoring Sites (RMS) wells and wells with data between 2023 and 2025 are included as observation locations and were used qualitatively for validation purposes during model development. In any regional-scale historical model, the calibration quality will vary in different areas. Calibration uncertainty in a historical model can lead to misleading (or biased) projections from an associated predictive model. A correction is applied to projected water levels at the RMS wells to address the bias in the historical model calibration. While still uncertain, the adjusted model projections are intended to provide a better basis for evaluating future conditions than the direct outputs from the model. A bias correction was calculated to minimize the average residual (difference between simulated and measured) of November water levels at each RMS well in the SVIHM. Bias corrections were further manually adjusted such that each RMS well used in this analysis had a similar profile of exceedances in the beginning of the projected model as observed water levels at that well show, while also accounting for groundwater level trends. Since the SVOM is structurally similar to the SVIHM, this bias correction was applied to the SVOM. Groundwater level observation locations in the SVOM are shown on Figure 3.

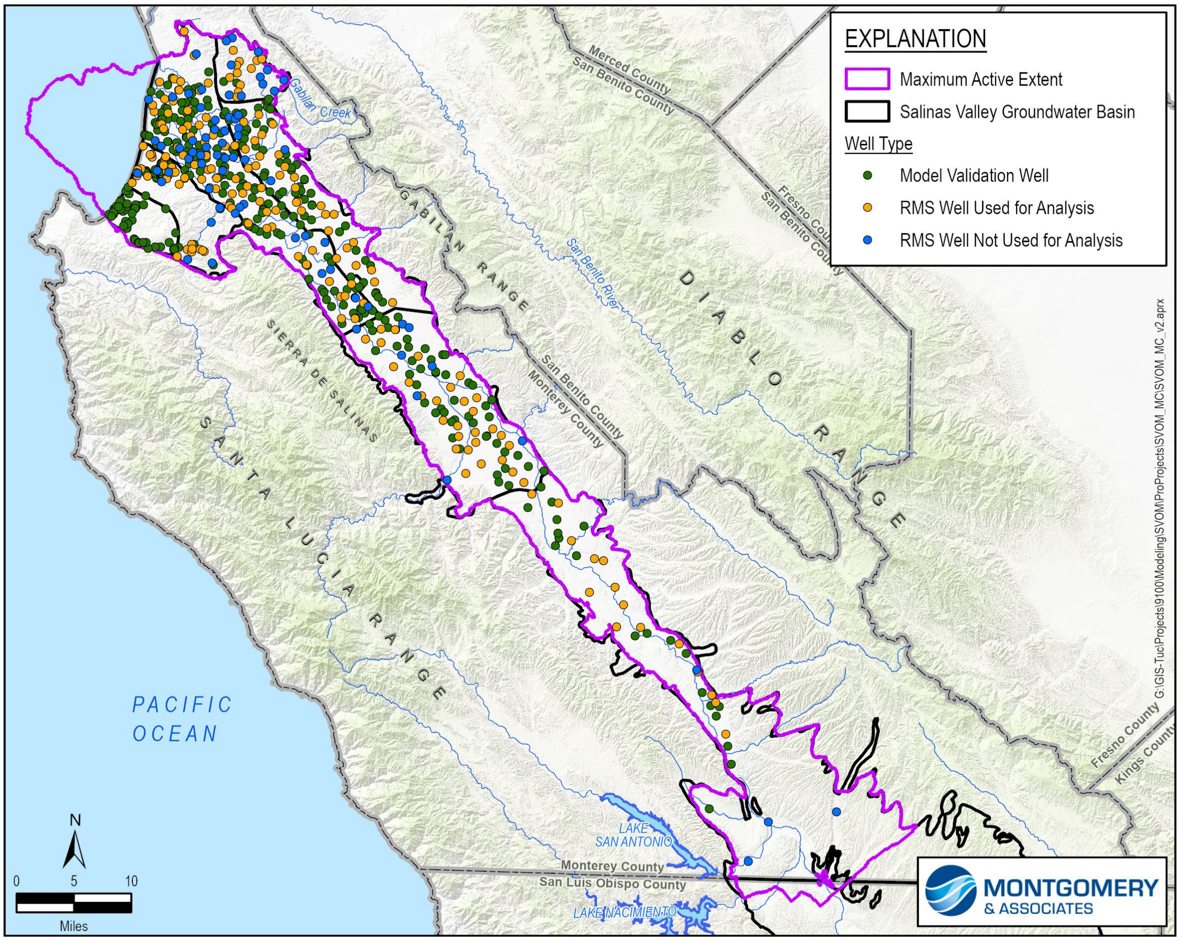

Figure 3. Groundwater Level Observation Wells in Model

Attachment 1 shows a summary of bias corrections by subbasin and aquifer. Only RMS wells that reproduce historical trends and are screened in the correct aquifer in the model as in reality are included. Attachment 2 lists the bias correction for each well that was included in the SMC assessment, the trend classification and whether there is a mismatch between which aquifer layer the well is screened in the model versus reality. Negative bias correction corresponds to the model under predicting water levels at that location, and positive corresponds to over-prediction. Attachment 3 lists RMS wells that were excluded from SMC assessment.

Boundary Groundwater Elevations: General Head Boundary (GHB)

For the inland GHB near the San Luis Obispo-Monterey County line, hydraulic head values were modified from the historical model for the Paso Robles Formation to reflect groundwater elevations at nearby wells outside the Upper Valley Subbasin and in the Paso Robles Subbasin. Figure 4 shows water level elevations for the general head boundary for the alluvium and the

Paso Robles Formation. Gorundwater levels were held constant at 2022 values for both the alluvium and the Paso Robles Formation, however, there are seasonal groundwater elevation fluctuations in the Paso Robles Formation caused by agricultural pumping south of the model boundary. GHB's representing inter-subbasin flows between the Pajaro and Salinas basins near Elkhorn Slough were kept constant at their 2022 values.

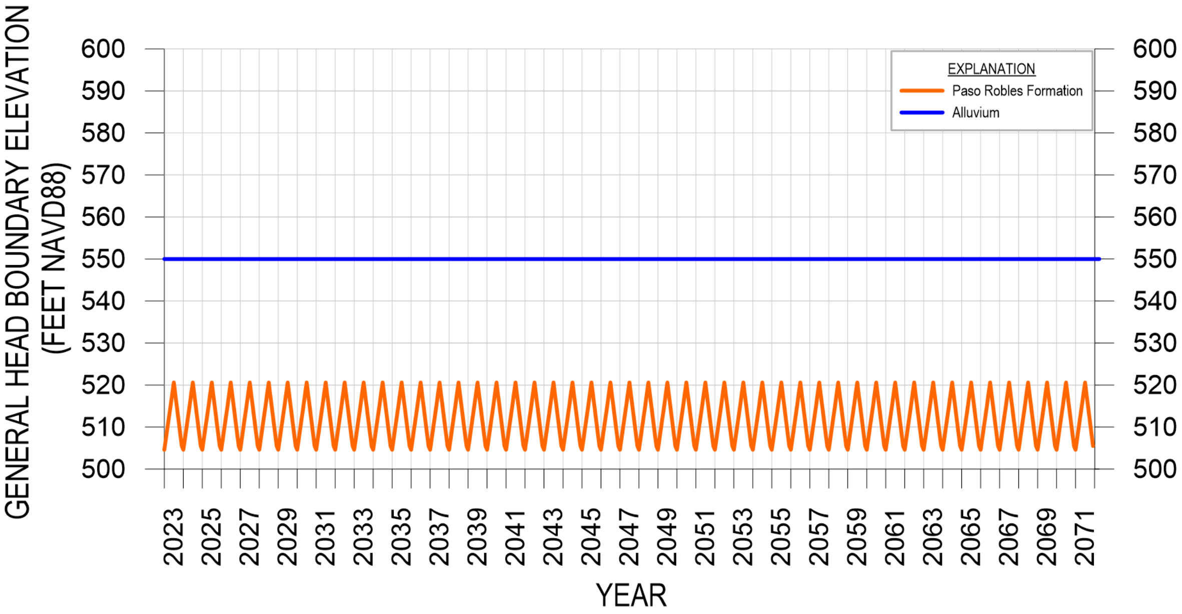

Figure 4. Inland GHB Groundwater Elevations by Unit

GHB cells are also used to represent the seawater interface. Projected sea level rises 1.2 feet between 2022 and 2072. Additional details are available in the Sea Water Intrusion Baseline Model Build (M&A, 2026 Forthcoming).

Farm Process

Similar to the SVIHM, the SVOM estimates agricultural pumping using the Farm Package (Boyce et al. 2020, Boyce 2023). The updated model uses 2022 land use and irrigation efficiencies for the projected period. All monthly farm parameters, such as crop coefficients and recharge parameters, are kept consistent with the SVIHM. Variation in climate inputs – precipitation and evapotranspiration (ET) – as well as stream flows along Salinas River and Arroyo Seco drive changes in agricultural pumping throughout the projected period.

Surface Water Operations (SWO)

The Surface Water Operations (SWO) package defines how reservoir releases, SRDF diversions, and downstream flow conditions are simulated in the SVOM. Modifications to the SWO package during this update were made to be consistent with prior refinements to earlier versions of the SVOM—led by Monterey County Water Resources Agency (MCWRA)—before USGS public release of the original SVOM. The implementation of MCWRA operational rules in SWO for the previous SVOM is described in WE&IS (2023); only minor modifications were made in the current update. Those refinements were intended to better represent natural variability in stream inflow, align operational rules with MCWRA's operational approach, and support preparation of the valley's Habitat Conservation Plan (HCP).

Review of SWO performance during the SVOM update focused on (1) how SRDF operations are supported by reservoir releases, (2) how losses and gains along the Salinas River are represented, and (3) how operational thresholds are interpreted for SRDF operations including channel-wetting and fish-passage accounting. This review resulted in several targeted updates to improve consistency with permit requirements and operational practice.

Minimum Conservation Release

At the request of MCWRA, a minimum conservation release requirement was incorporated into the SVOM to prevent diversion of natural Salinas River flow at SRDF. MCWRA's diversion permit does not allow diversion of unregulated river flow; therefore in practice, SRDF diversions must be supplied by reservoir releases. To address this requirement, MCWRA developed a minimum conservation release table based on analysis of SVOM-simulated streamflow losses along the Salinas River between the reservoirs and SRDF. Table 1 shows the monthly minimum combined reservoir release required for SRDF operation (Baillie, 2025, personal communication). Losses were calculated as monthly averages for wet, normal, and dry year types. The SRDF diversion target of 36 cubic feet per second (cfs) was added to the calculated losses to define a minimum reservoir release required when SRDF is active.

Table 1. Monthly Minimum Combined Reservoir Releases Required for SRDF Operation

Month	Wet	Normal	Dry
4	119	153	332
5	187	247	358
6	220	275	367
7	279	340	379
8	322	371	317
9	328	378	285
10	380	400	268

All values in cfs

Seepage percentages and associated minimum conservation releases were recalculated using the updated SVOM following the same general methodology. Recalculated values differed modestly; though, overall magnitudes and seasonal patterns were similar. After discussion with MCWRA, the original minimum conservation release table was retained for the SVOM update (MCWRA, personal communication).

Salinas River Streamflow Bias Evaluation

Historical versus observed streamflow exceedance probabilities were evaluated at the Spreckels and Chualar gages as part of the SVOM update. This evaluation was conducted because MCWRA has used exceedance-probability comparisons in prior model versions to assess how well simulated flows reproduce observed flow frequency and to inform interpretation of streamflow-based operational thresholds (West Yost, 2024).

Results indicate that low flows in this updated model remain somewhat overestimated relative to observations, consistent with behavior observed in the prior model. However, the updated model shows modest improvement in representation of the lowest flows (less than approximately 50 cfs). This improvement is attributed to increased surface-water/groundwater interaction resulting from corrections to streambed elevations, which allow for greater hydraulic connectivity between the river and the groundwater system and decreased attenuation of low flows.

Exceedance probability was evaluated primarily to assess whether streamflow-based thresholds used in operational rules are triggered at frequencies generally consistent with observed system behavior. The exceedance analysis was not intended to further adjust calibrated flow magnitudes, rather, exceedance probability was evaluated to confirm that streamflow-based operational thresholds are triggered at relative frequencies that are generally consistent with observed system behavior.

SRDF Operation

Based on review of exceedance probability results, efforts during this update were focused on SRDF operations and the frequency at which SRDF-related flow thresholds are met.

The SVOM assumes that the SRDF operates continuously at the maximum diversion capacity of 36 cfs whenever it is active; however, note that the SRDF diversion has historically operated at an average rate below 36 cfs (MCWRA, personal communication).

A new SRDF operational rule was implemented such that SRDF diversions are suspended when simulated flow at Spreckels remains below 20 cfs for 3 consecutive time steps. This rule prevents SRDF from prolonged operation under sustained low flow conditions and reinforces reliance on reservoir releases. Additionally, to increase linearity of SRDF diversions and Spreckels flows, semi-routed return flows representing runoff between Spreckels and the SRDF were shifted to upstream of Spreckels. Also, the Salinas River streambed leakage parameter between Spreckels and the SRDF was reduced to a minimal value to limit simulated groundwater gains in this reach.

Channel wetting in preparation for the SRDF season was found to occur infrequently under the original operational thresholds. To improve representation of channel wetting frequency, thresholds were adjusted based on the streamflow exceedance probability curve. The channel wetting initiation threshold at the Soledad gage was increased from 20 to 73 cfs, and the Spreckels “channel wet” threshold was increased from 40 to 212 cfs. These adjustments increased the frequency of channel wetting operations in the model to be more consistent with historical operations.

Fish Passage Rules

The model update included a modification to the smolt passage rule which was adjusted by MCWRA for the HCP analysis. The rule modification updated the calculation of smolt and kelt passage days. No other modifications to the fish-passage rules were included in the model update.

Exceedance analysis indicated that fish-passage thresholds are triggered at frequencies similar to those in SVOM versions previously evaluated by MCWRA. Based on discussions with MCWRA, further modification of fish-passage flow thresholds was not pursued at this time because MCWRA does not plan to immediately use the updated model for fish-passage evaluations.

SWO Solver and Convergence

Solver settings for the NWT solver and SWO package were updated to improve numerical convergence of SWO during simulation of reservoir releases. In the updated model, increased surface-water/groundwater interaction introduces greater nonlinearity into the reservoir release calculations. Under these conditions, the SWO solution is more susceptible to numerical oscillations during individual time-step calculations, which leads to nonconvergence or unstable intermediate solutions if solver tolerances are not adjusted.

Simulated reservoir releases in the updated model exhibit greater variability between individual time steps within a stress period compared to the original SVOM. At the scale of individual time steps, the model may overshoot or undershoot downstream flow requirements. However, when evaluated over the full monthly stress period, the model consistently meets simulated flow requirements as intended.

Because of this increased short-term variability, interpretation of simulated streamflow and reservoir operations is best performed using monthly averages rather than individual time-step values. Monthly-scale evaluation appropriately reflects the intended operational behavior of the system. In the updated SVOM, many stress periods failed to converge. Nonetheless, the model is acceptable based on small mass balance errors, reasonable monthly reservoir releases, and overall adherence to operational rules.

Climate-dependent data sets

Precipitation, evaporation, runoff, and surface water flows to the reservoir were cycled using the projected climate sequence described below.

Streamflow Routing (SFR)

Surface water inflows for the projected period use repeated historical SVIHM flows for the climate sequence described below. These flows were originally generated using the Salinas Valley Watershed Model (Henson *et al.*, 2022).

CLIMATE SEQUENCE FOR PROJECTED BASELINE SCENARIO

The USGS SVOM uses a projected climate sequence that repeated a 50-year period from the SVIHM. There are many approaches for estimating future climate. Long model run times (on the order of 4 to 6 days) limited the ability to run a suite of climate realizations. Therefore, for the baseline projected SVOM, M&A developed a singular climate realization that, on average, represents historical climate conditions. The updated SVOM uses precipitation, reference ET, streamflow and runoff to reservoir data from the selected projected climate sequence. The projected model can be run with different climate sequences to assess the impacts of future climate.

Climate Sequence Selection

Rather than repeating a 50-year sequence, M&A created a 25-year sequence that repeats twice, This structure ensures that any 25-year window in the projected period produces a water budget that is comparable with any other 25-year period. Climate input data from the SVIHM was cycled to develop a projected climate sequence. Because this is not intended to forecast specific future weather events, model results should not be interpreted as year-by-year predictions; instead, multi-year averages should be used to evaluate how groundwater levels and basin water budgets may respond to average future climate conditions.

To anchor the beginning of the projected period, proxy years for 2023 through 2025 were selected by identifying historical years that closely matched observed annual precipitation at the

King City and Salinas Airport weather stations. The projected climate sequence therefore begins by repeating the years 1993, 2019, and 1975, followed by climate data from 1999 through 2020 taken from the SVIHM dataset. Figure 5 compares the projected average model-wide precipitation to various historical records.

Within the historical model period, 1998 stands out as the wettest year. When this outlier is excluded, the long-term average precipitation decreases by more than 20,000 acre-feet per year (AFY). By 2020, the 25-year rolling average of the historical model aligns with the average excluding 1998, indicating that this period is representative of typical historical climate conditions. While the projected sequence substitutes proxy years for the first 3 years, the resulting climate series is only slightly drier than the historical average (excluding 1998), providing a conservative basis for evaluating projected groundwater conditions.

Overall, the projected climate sequence is intentionally structured so that any 25-year segment of the predictive model produces a comparable water budget, supporting consistent evaluation of groundwater sustainability across the entire simulation period.

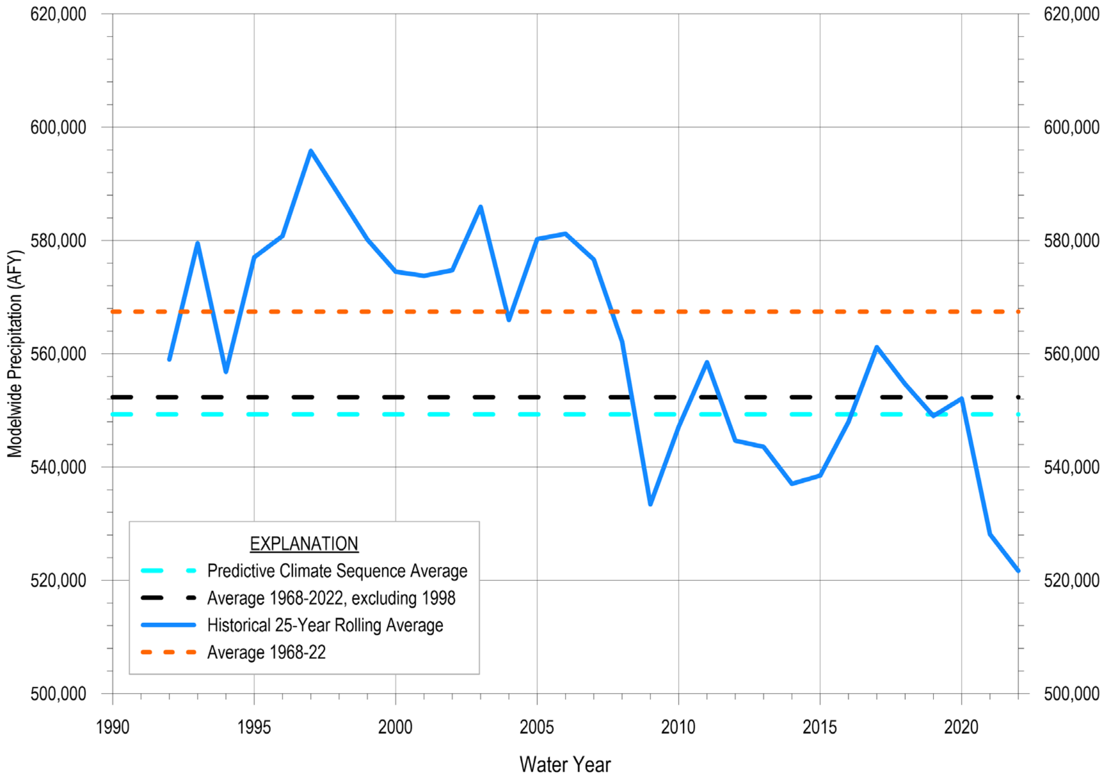

Figure 5. Projected Climate Sequence Modelwide Precipitation Versus Historical Record

To validate the projected climate sequence, streamflow on the Arroyo Seco, the largest unregulated river in the basin, were analyzed. Figure 6 shows the average annual flows for Arroyo Seco at the gauge below Reliz Creek near Soledad. This is where the Arroyo Seco enters the model area.

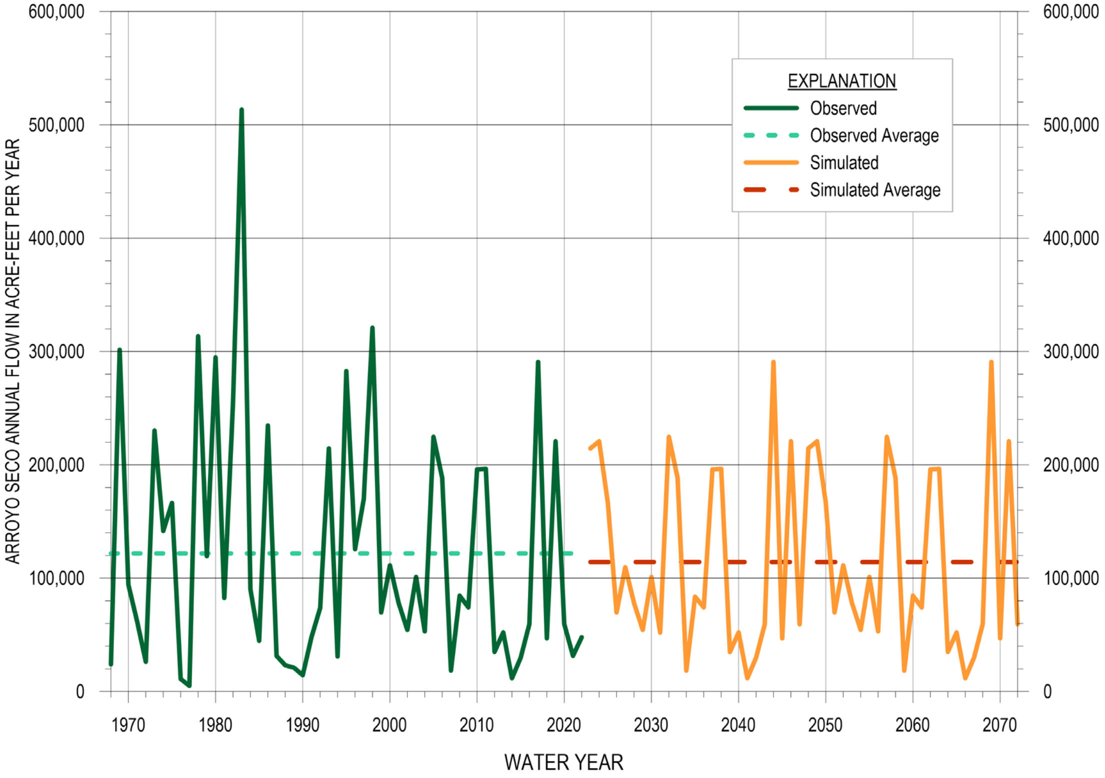

Figure 6. Average Annual Arroyo Seco Flows at Model Boundary

The average annual projected streamflow for the Arroyo Seco is 94% of the average of historical data for WY 1968-2022. While both the model-wide precipitation and Arroyo Seco streamflow are slightly drier than in the historical period, they are similar enough and representative of a slightly conservative assumption for estimating the efficacy of water supply projects moving forward. Given that this model presents on a single climate sequence, results from this baseline model should be averaged over a 25-year period whenever possible.

The projected climate sequence presented here is only one possibility. Since the future climate is unknown, the updated model is set up so that the effects of different climate sequences can be tested.

Validation of Climate Period

Figure 10 and Figure 11 show the monthly boxplots of evapotranspiration and precipitation for the entire model, respectively. The historical values are calculated from the entire SVIHM (WY 1968-2022), whereas the projected values are calculated from the entire SVOM (projected WY 2023-2072). The monthly distributions of both precipitation and evapotranspiration are similar between the historical and projected period. All box and whisker plots in this section show the whiskers as 1.5 times the interquartile range (IQR) with outliers excluded. If 1.5 times the IQR is greater than the maximum or less than the minimum, the maximum or minimum is shown for the whisker, respectively.

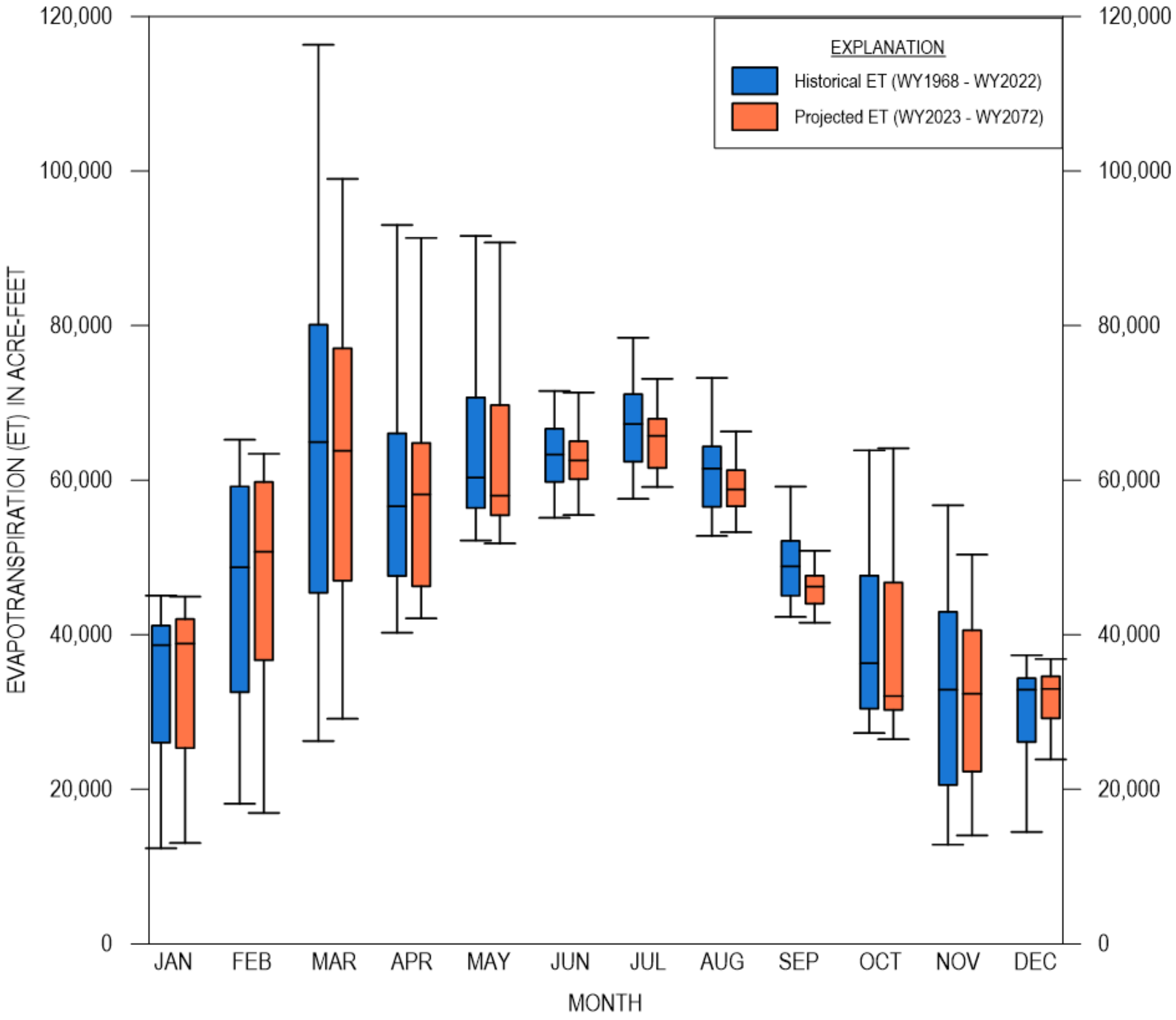

Figure 7. SVIHM and SVOM Model-wide Monthly Evapotranspiration

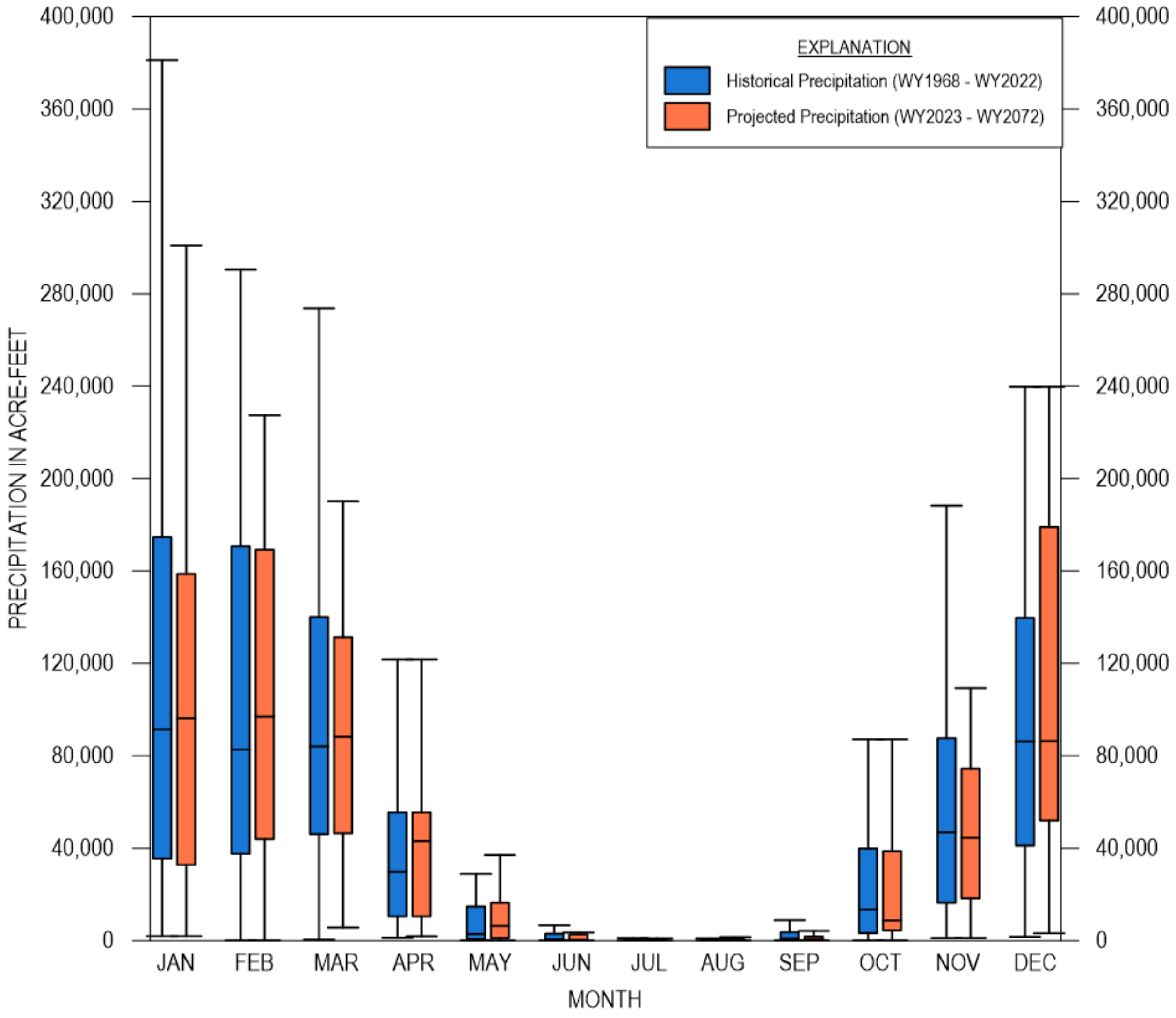

Figure 8. SVIHM and SVOM Model-wide Monthly Precipitation

MODEL OUTPUTS

The following section describes key outputs for the updated SVOM. The results focus on the 180/400, Eastside, Forebay, and Upper Valley Subbasins. Due to the complex geology of the Langley area and the resultant quality of the calibration, results are highly uncertain and are not a focus in this report. A sustainability assessment is not included for the Monterey Subbasin, as Marina Coast Water District and SVBGSA plan to use the Seawater Intrusion Model (SWIM) for assessment in that subbasin. The updated SWIM has updates to recharge in the Seaside Subbasin, hydraulic parameters in the Monterey, Seaside, and offshore units, and improved calibration in the Deep Aquifers. The Seaside Subbasin is an adjudicated basin and is not subject to SGMA. As such, it is also not a focus of this investigation.

Reservoir Operations

Figure 9 shows the combined releases out of the San Antonion and Nacimiento Reservoirs. Reservoir releases in the SVIHM were estimated based on available data. Beginning in 2010, reservoir operations changed to a management schedule more similar to today. In general, projected reservoir flows from the updated SVOM are similar to releases during the historical period that was operating under the same rules (after 2010).

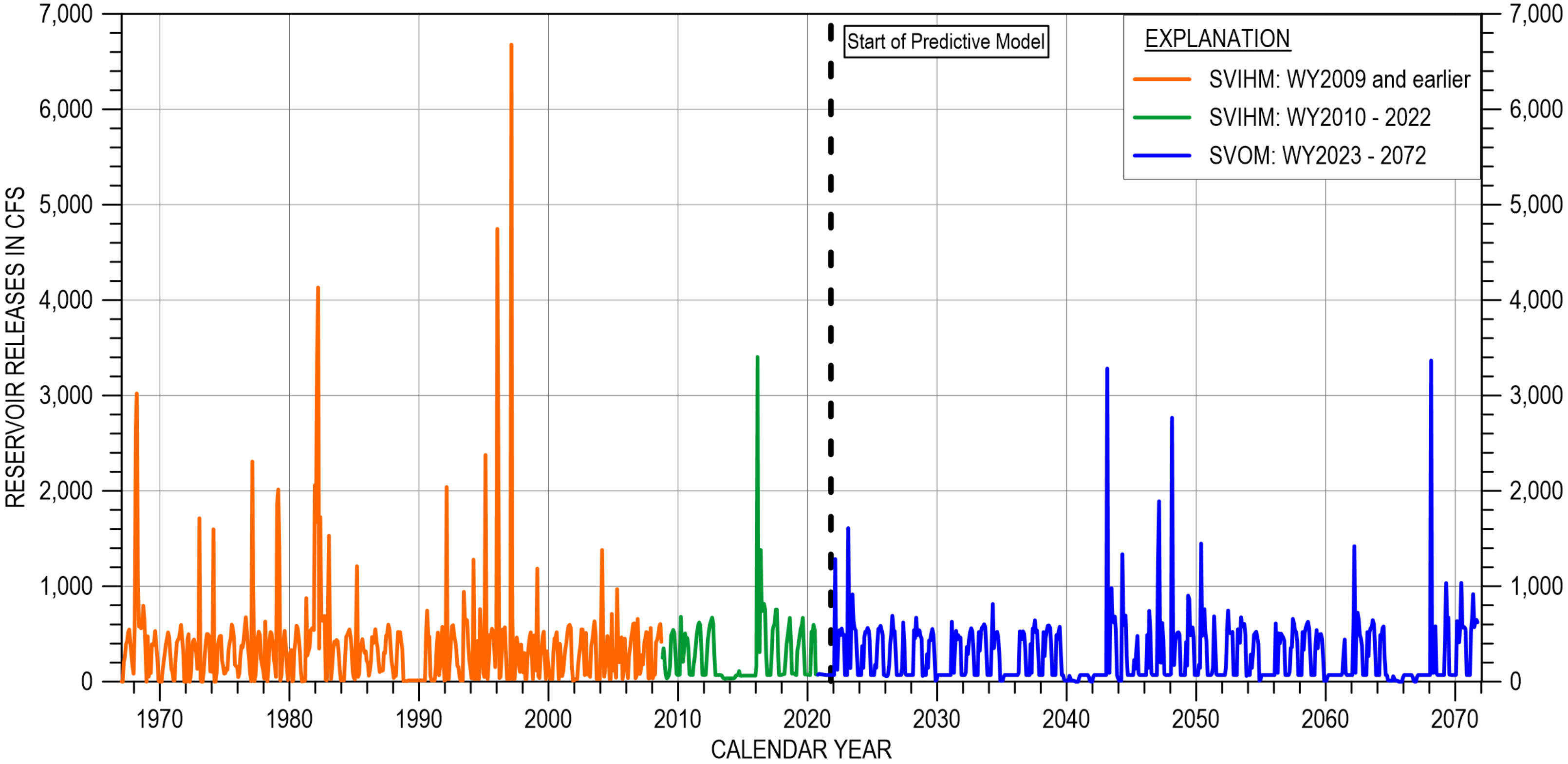

Figure 9. Combined Simulated and Projected Reservoir Releases

Figure 10 shows the average monthly distribution of combined reservoir flows. In general, the updated SVOM has similar releases to the SVIHM from 2010 onward.

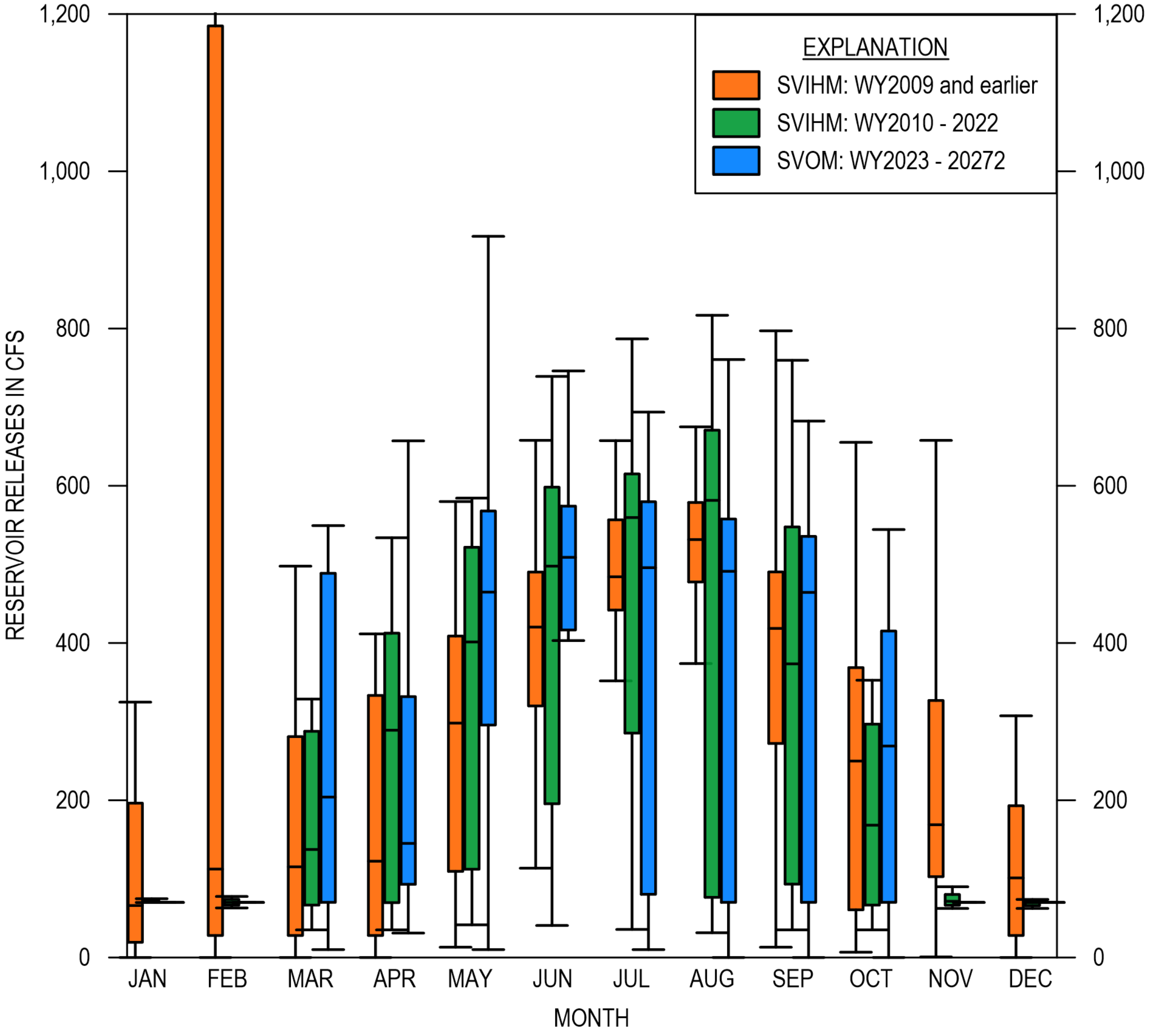

Figure 10. Average Combined Reservoir Releases by Month

Figure 11 shows the monthly distributions of simulated and projected streamflow diversions at the Salinas River Diversion Facility (SRDF). Overall from May through October, simulated diversions are higher in the projected model than the historical period. Future SRDF diversions are anticipated to be higher than in the past. The SVOM assumes that SRDF will be operating at a maximum of 36 cubic feet per second (CFS), whereas the historical period (WY 2010-2022) is operating at a lower capacity. Additionally, 2012-2016 were drought years and SRDF typically does not operate in the driest years.

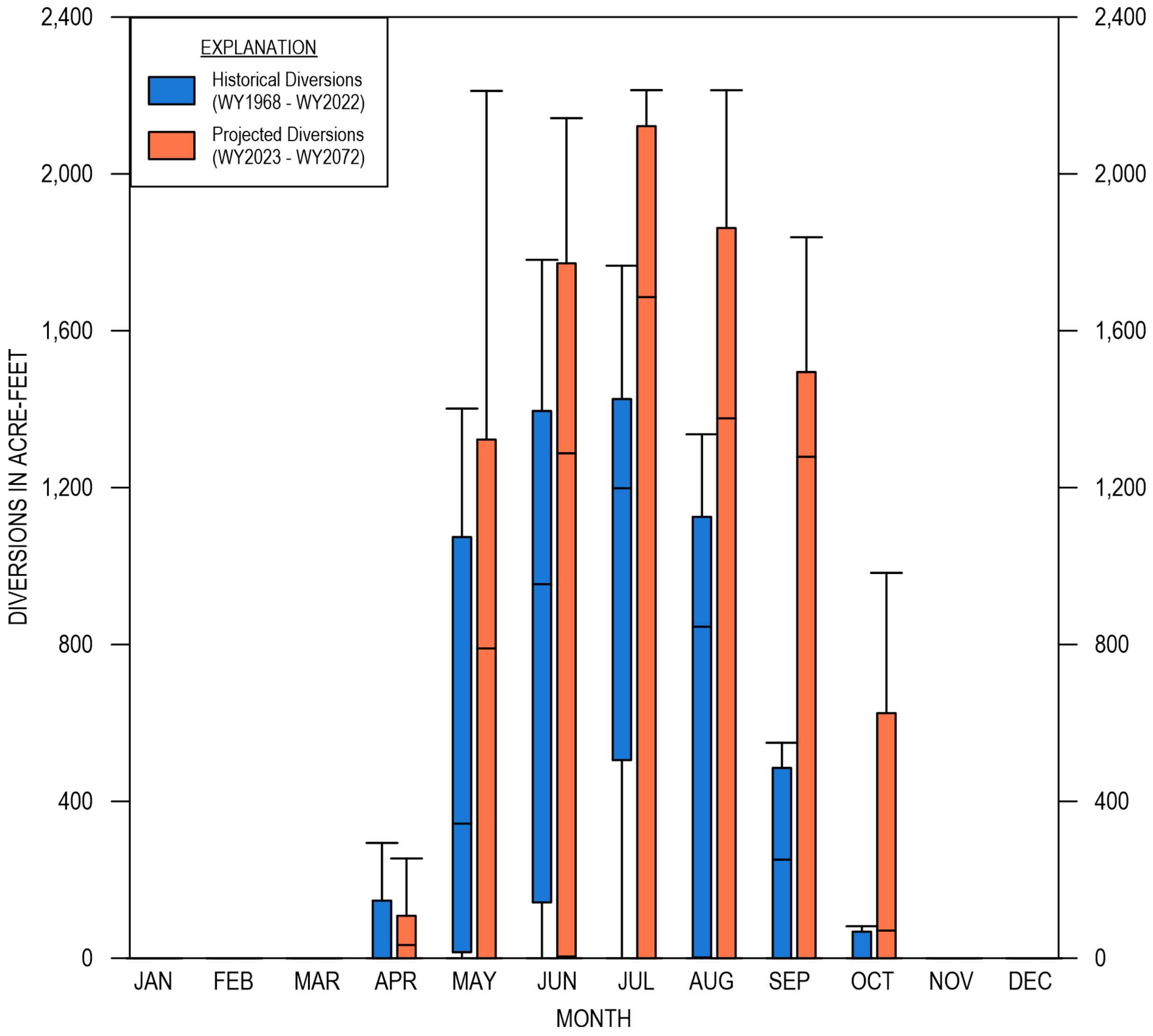

Figure 11. Simulated and Projected Monthly SRDF Diversions

Representative Hydrographs

Figure 12 shows an example groundwater elevation hydrograph for well 15S/05E-08F01, located in the 400-Foot Aquifer. Additional groundwater elevation hydrographs for selected RMS wells are included in Attachment 4. Only the bias adjusted outputs are shown for the historical and projected simulated water levels; details on the bias adjustment for each well can be found in Attachment 2. In most hydrographs, particularly those with significant interannual variability, the effects of the 25-year climate sequence are visible. The 2012-2016 drought is repeated in 2039-2043 and again in 2064-2068, and all 3 events are evident in the hydrographs. The hydrograph shows the measurable objective (MO) and minimum threshold (MT), which are part of the Sustainable Management Criteria (SMC). November groundwater levels are evaluated against these criteria to assess sustainability.

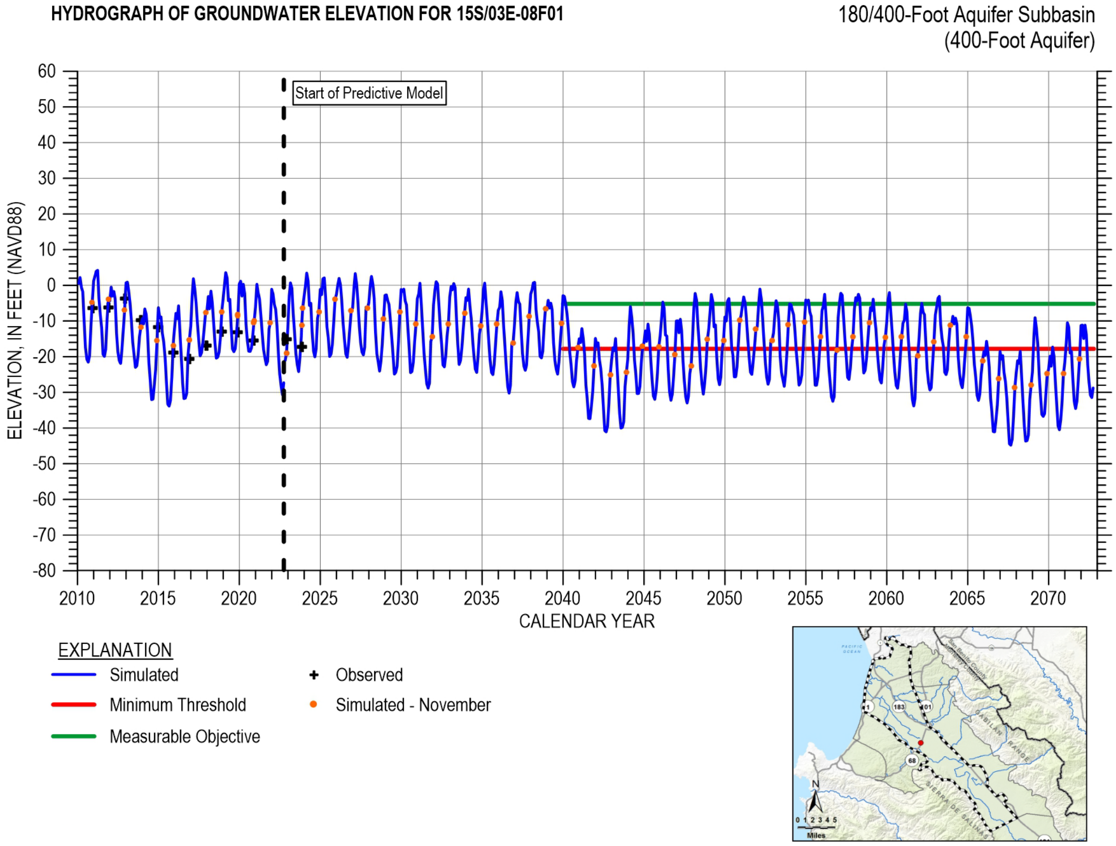

Figure 12. Example Groundwater Elevation Hydrograph for RMS Well

Groundwater Elevation Change Maps

Figure 13 through Figure 15 show groundwater elevation change between November 2040 and November 2065. This 25-year period represents average historical climate conditions. Positive values shown in green correspond to water level increases, and negative values shown in red correspond to water level decreases. In the bulk of the 180-Foot Aquifer, groundwater level declines are most often between 1 and 5 feet. Similar levels of declines are found in the 400-Foot Aquifer and the Deep Aquifers outside of Monterey and Seaside Subbasins. In the Monterey and Seaside Subbasins, particularly away from the coast, there are significantly greater groundwater level declines simulated in the model. Groundwater levels rise dramatically in northern Langley Subbasin due to low hydraulic conductivity values, preventing recharge. Groundwater levels in the Upper Valley Subbasin are included with the Deep Aquifers and equivalent map because model layer 9 represents the Paso Robles Formation which underlies the entire Upper Valley

Subbasin and extends to the southern edge of the model. Although most wells in the area are screened in the shallow sediments, the modeled groundwater level changes in those shallow deposits closely mirror the behavior of the Paso Robles Formation.

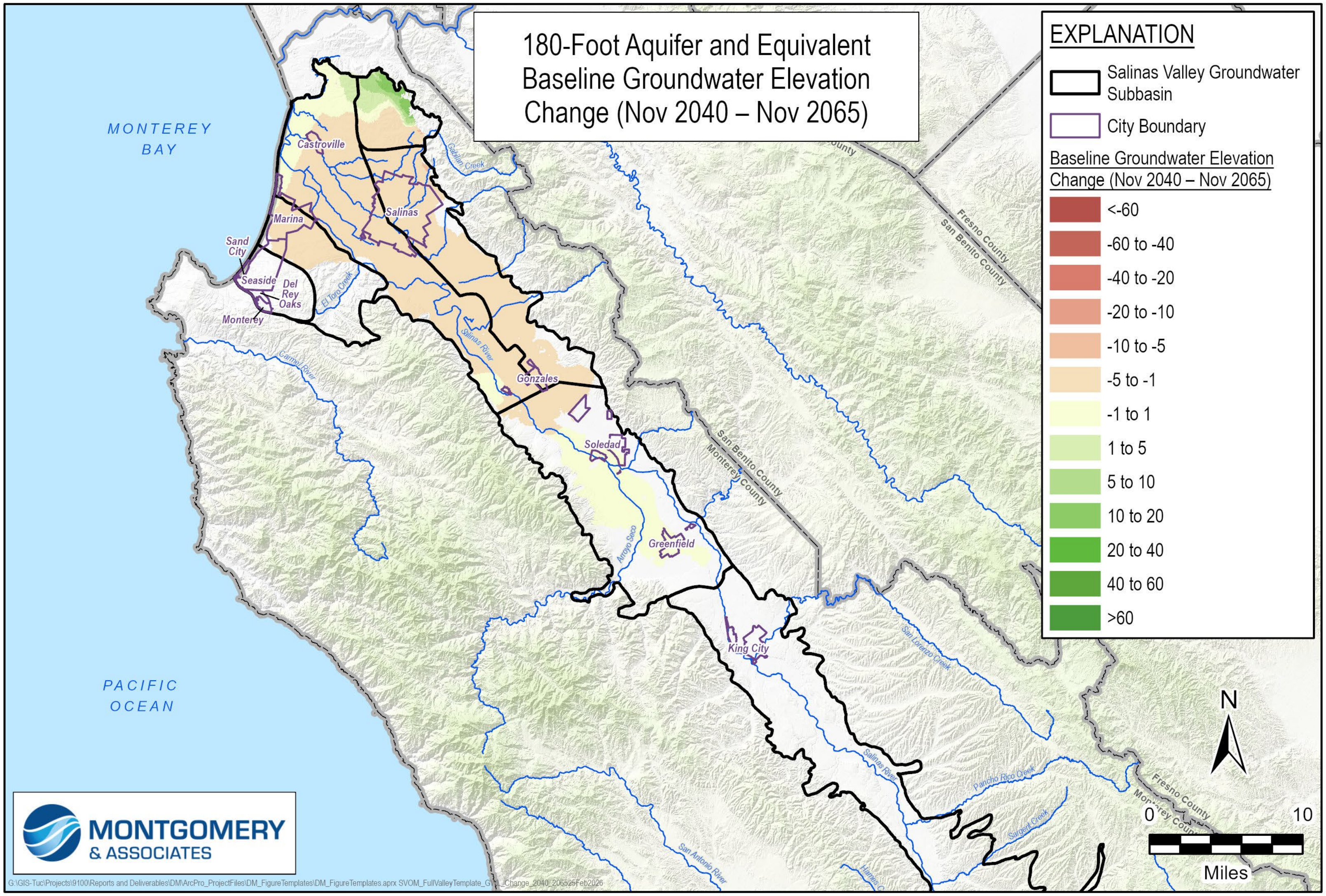

Figure 13. Projected Groundwater Elevation Change Between November 2040 and 2065 for the 180-Foot and Equivalent Aquifers

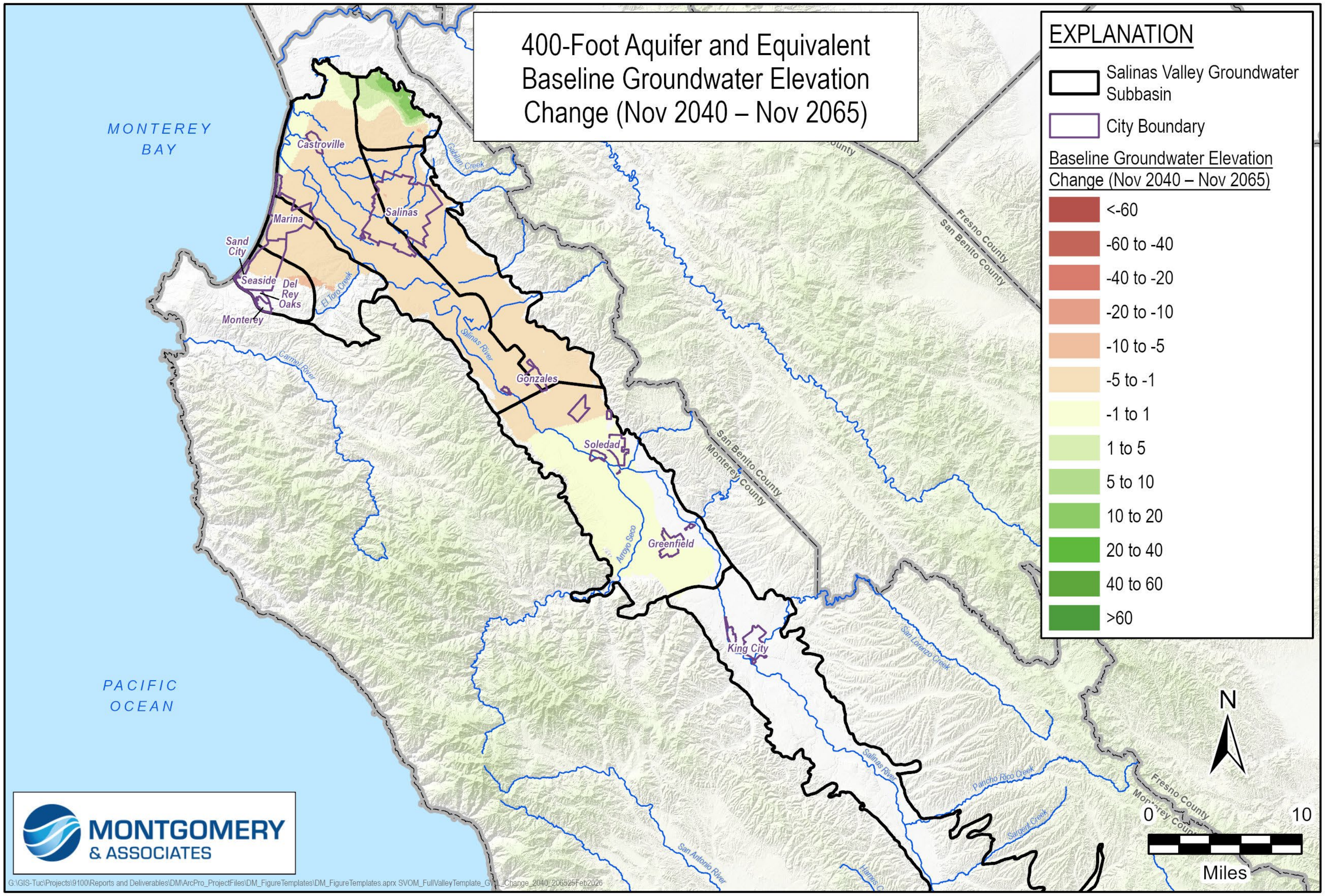

Figure 14. Projected Groundwater Elevation Change Between November 2040 and 2065 for the 400-Foot and Equivalent Aquifers

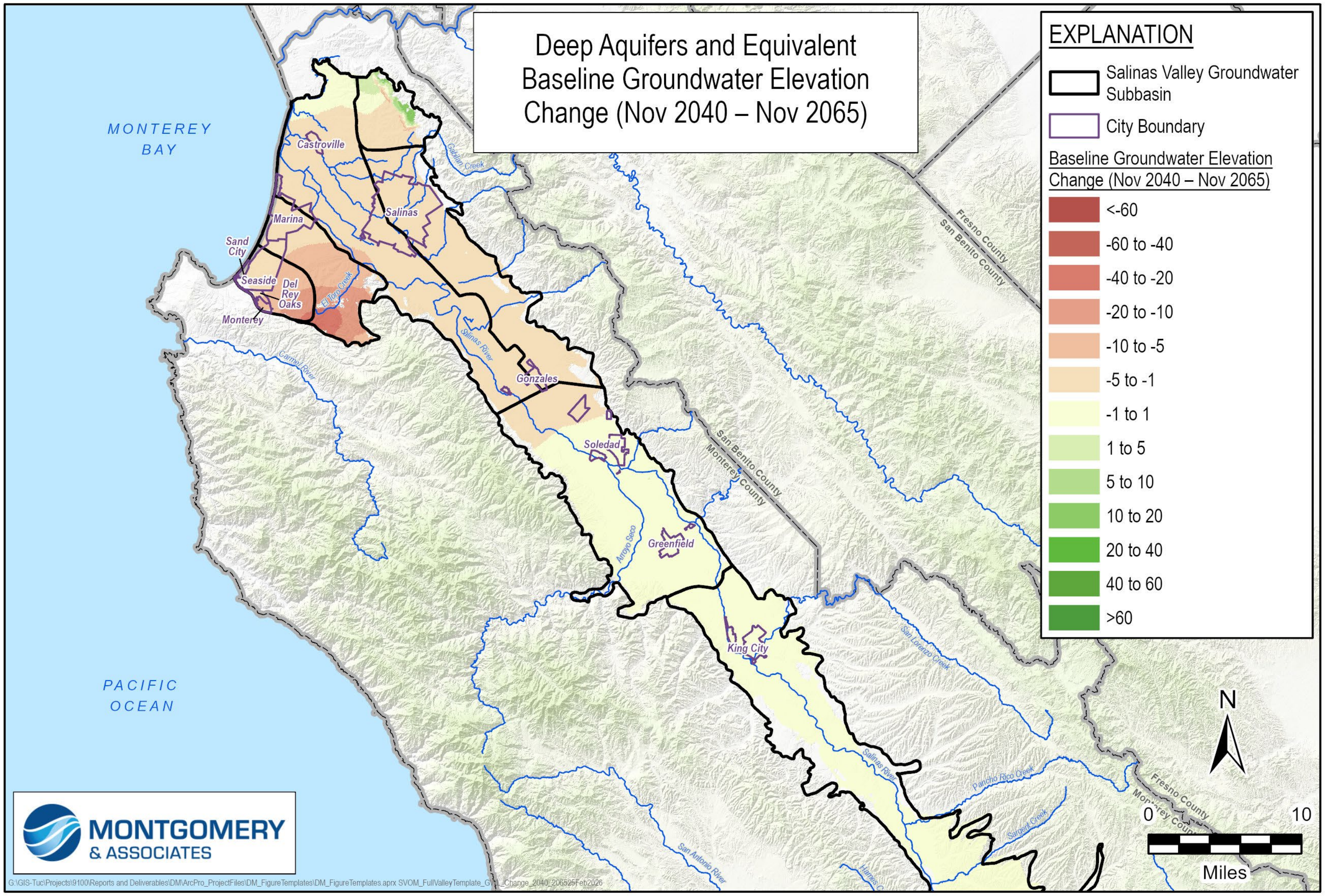

Figure 15. Projected Groundwater Elevation Change Between November 2040 and 2065 for the Deep and Equivalent Aquifers

Water Budgets

Complete summaries of projected water budgets for the SVOM will be included in the water budget chapters for planned 2027 GSP amendments. Table 2 lists the projected average annual groundwater budget values by subbasin for WY 2040 through WY 2064. This period was selected to align with GSP reporting, although any other 25-year period will show a similar water budget and be representative of historical climate conditions. The projected groundwater budget for each subbasin is summarized in Table 3. For each column, positive values represent an inflow to that subbasin's groundwater system and negative values represent an outflow. For example, groundwater flow into the Eastside Subbasin from the Forebay Subbasin is projected to be 6,400 AF/year. With the exception of Monterey and Seaside subbasins, the remaining subbasins are projected to have ±1,000 AF/year annual change in groundwater storage. The majority of the storage change occurs in Layer 1, which is expected due to the higher storage values of unconfined sediments, even though the majority of pumping occurs in deeper layers. Groundwater levels are declining in many areas as seen on Figures 13 through 16. The primary agricultural subbasins all show a slightly negative projected annual change in groundwater storage. Given the magnitude and variability of the other water budget components, the annual change in groundwater storage presented here should be considered uncertain for future conditions and the projections presented here are not precise enough to differentiate between slightly gaining and slightly losing groundwater storage over this period. Water budgets in the SVOM are extremely sensitive to the climate of the years selected. Selecting non-25-year water budgets can yield positive or negative change of groundwater storage values in the various subbasins.

Table 2. Projected Average Annual Groundwater Budget by Subbasin for 2040-2064

Water Budget Component	180/400	Eastside	Forebay	Upper Valley
GW Extraction	-108,400	-82,600	-138,600	-94,500
Net Stream Exchange	55,400	7,100	118,600	95,300
Deep Percolation	53,600	22,400	46,800	53,600
Groundwater ET	-16,500	0	-17,100	-37,400
Net Seawater Exchange	5,900	---	---	---
Net flow to Monterey	21,100	---	---	---
Net flow to Eastside	-41,400	---	-6,400	---
Net flow to Forebay	29,900	6,400	---	-25,600
Net flow to Upper Valley	---	---	25,600	---
Net flow to Langley	500	4,200	---	---
Net mountain front recharge	0	200	500	1,700
Net flow to Pajaro	-600	---	---	---
Net flow to 180-400 feet	---	41,400	-29,900	---
Net flow to Paso Robles	---	---	---	6,800
Net flow to Seaside	---	---	---	---
Net Storage Change	-500	-900	-400	-200

All values in AFY
--- = Flow Not applicable
Water budget components are rounded to the nearest 100 AFY

Sustainable Management Criteria

For this preliminary assessment of sustainability, RMS wells are compared to SMC in an average of 2040 and 2041 (2040/2041) to represent SGMA deadlines. Since the future climate is unknown, we compare SMC to the average of November 2040 and November 2041 groundwater level elevations at each individual RMS well in the model. Observed water levels are collected in November and December. The average of November 2040 and 2041 was selected as the sustainability assessment period since this average is more representative of long-term trends in the model than using 2040 alone. A subbasin or aquifer is considered sustainable if no more than 15% of the wells are below the minimum threshold in any single aquifer. Figure 16 shows the location of RMS wells used for this analysis and whether the well is above the measurable objective, between the measurable objective and minimum threshold, or below the minimum threshold. The model predicts that the majority of the northern portion of the basin will have RMS wells below the minimum threshold. Forebay and Upper Valley show a larger percentage of wells above the minimum threshold and are more likely to achieve sustainability in the future if conditions are kept similar to today. The Monterey Subbasin is excluded from this analysis since it will be assessed using the SWIM.

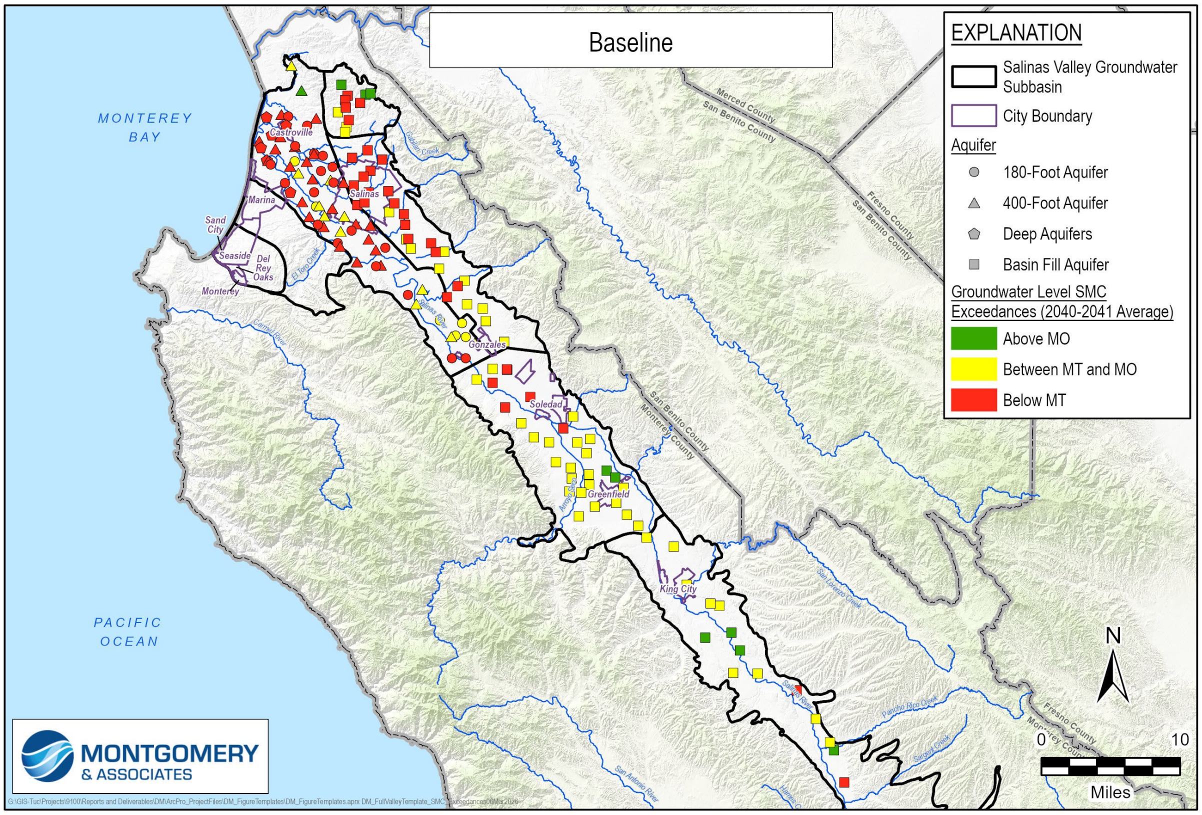

Figure 16. Groundwater Level SMC Exceedances for RMS Wells: 2040-2041 Average

Figure 17 shows the percentage of wells projected to be below the minimum threshold for the 180/400 Subbasin for the 3 principal aquifers. By 2040, all aquifers have a significantly larger percentage of wells below the minimum threshold than 15%. Groundwater levels are declining in this subbasin, and over time, a larger percentage of RMS wells drop below their respective minimum thresholds. While Figure 13 through Figure 15 primarily show 1 to 5 feet of water level declines, declines on the order of 5-10 feet are more common for the first 25 years while the model equilibrates to the updated boundary conditions of the projected period.

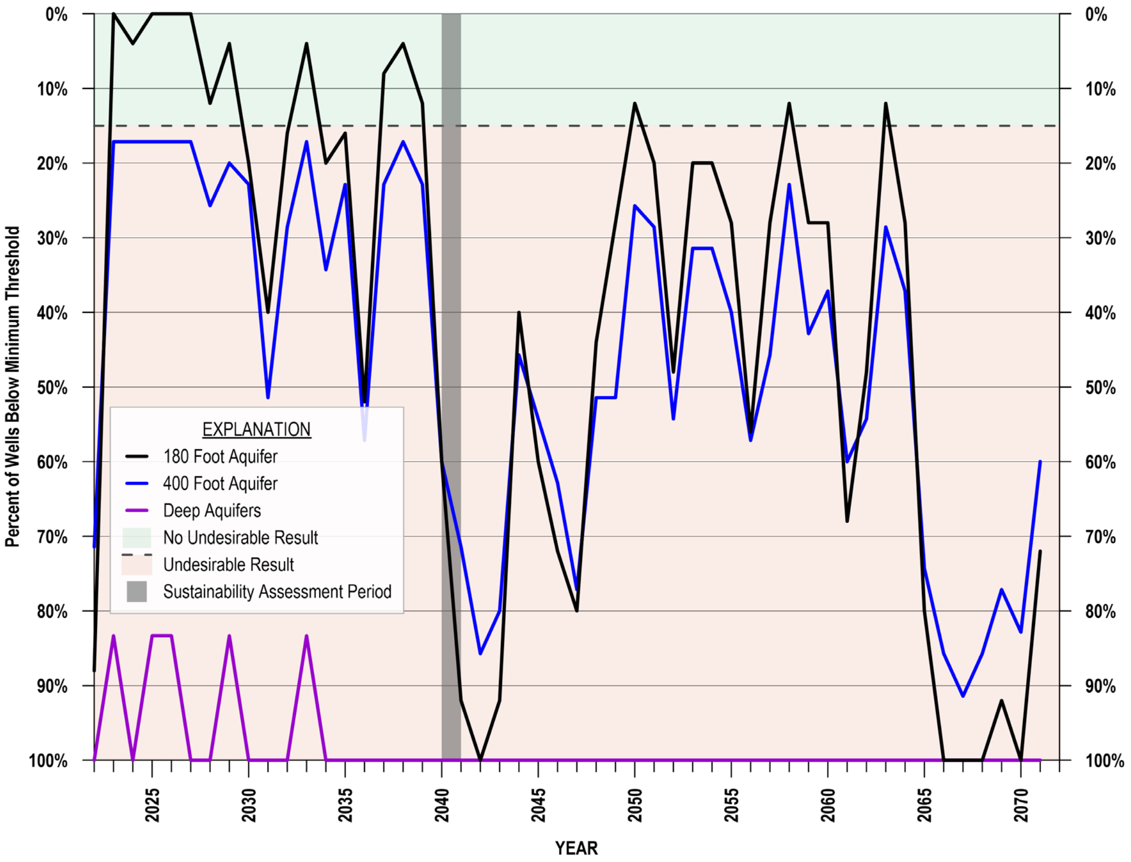

Figure 17. Percent of Wells Projected to be Below Minimum Threshold by Year for the 180/400 Subbasin

Table 3 lists the SMC at RMS wells projected to be below the minimum threshold for the 180/400 Subbasin, which is required to be managed by aquifer. The baseline model projects that none of these aquifers will be sustainable by the sustainability assessment period. The number of wells used in analysis include all RMS wells but exclude wells without historical data, wells that do not simulate historical trends, and wells where the known screened aquifer do not match the model. The effect of a single well is shown to highlight the uncertainty and show how many wells would need to switch criteria in order for a subbasin or aquifer to have undesirable results.

Table 3. SMC Projections at RMS Wells by Subbasin and by Aquifer

Subbasin	Aquifer	RMS Wells Above MO	RMS Wells Between MO & MT	RMS Wells Below MT	Wells Used In Analysis	Effect of single well
180/400	180-Foot Aquifer	0%	24%	76%	25	4%
180/400	400-Foot Aquifer	3%	31%	66%	35	3%
180/400	Deep Aquifers	0%	0%	100%	6	17%

Figure 19 show the percentage of wells projected to be below the minimum threshold for the Eastside, Forebay, and Upper Valley Subbasins. In all but the wettest years, the Eastside Subbasin has more minimum threshold exceedances than 15% and has undesirable results. In all but the driest years, the Forebay Subbasin does meet the 15% undesirable results threshold. The Upper Valley Subbasin is projected to avoid undesirable results in all years.

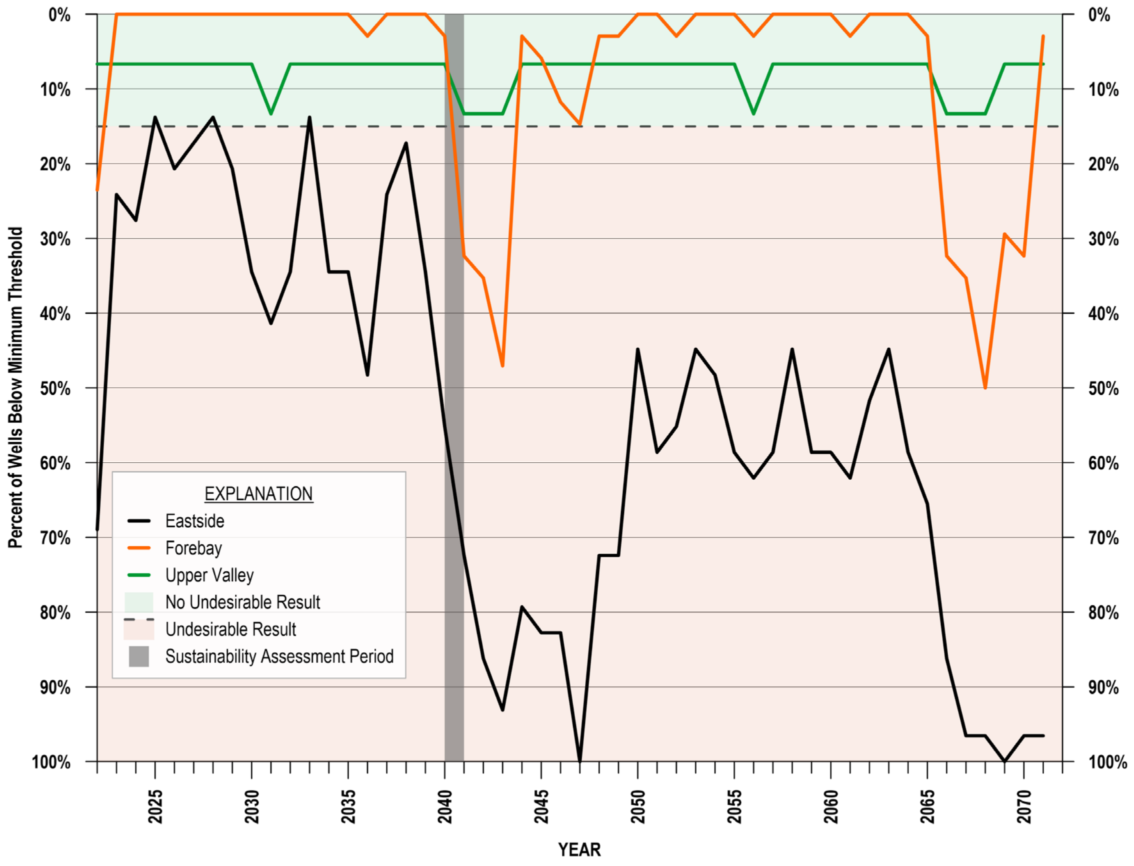

Figure 18. Percent of Wells Projected to be Below Minimum Threshold by Year
for the Eastside, Forebay, and Upper Valley Subbasins

Table 4 shows the SMC at RMS wells in the Eastside, Forebay, and Upper Valley. In the Upper Valley Subbasin, fewer than 15% of RMS wells fall below their minimum thresholds. In the Forebay Subbasin, 18% of wells are below their thresholds; however, if the model projected just one additional well above its minimum threshold, the subbasin would meet the sustainability requirement. Given inherent uncertainty, when using projected groundwater modeling results, a subbasin should not be determined to be sustainable or not based on the influence of a single well.

Table 4. SMC Projections at RMS Wells by Subbasin

Subbasin	Aquifer	RMS Wells Above MO	RMS Wells Between MO & MT	RMS Wells Below MT	Wells Used In Analysis	Effect of single well
Eastside	Basin Fill	0%	38%	62%	29	3%
Forebay	Basin Fill	6%	76%	18%	34	3%
Upper Valley	Basin Fill	27%	60%	13%	15	7%

The simulated SMC assessment for each subbasin is based on bias corrected simulated hydrographs. The bias corrections for simulated results were developed such that beginning of the projected period showed a similar pattern as the observed data at each well. Other bias corrections are defensible and could change the percentages in this SMC assessment. Regardless of the exact bias corrections used, the model provides a reasonable assessment of future sustainability when reviewed on a subbasin basis.

Surface Water Hydrographs

Figure 20 and Figure 21 show observed versus simulated flows at gauge locations along the Salinas River and Arroyo Seco, respectively. The y-axis is in log-scale for better display of higher flow values; however, this scale does not allow the display of zero flow values. In general, surface water flows in the projected model are similar to flows in the historical model. The lower flows as a result of the drought period of 2012-2016, which is cycled in 2039 through 2043 and in 2064-2068, is visible in each stream hydrograph, though is less visible in the flows along Arroyo Seco.

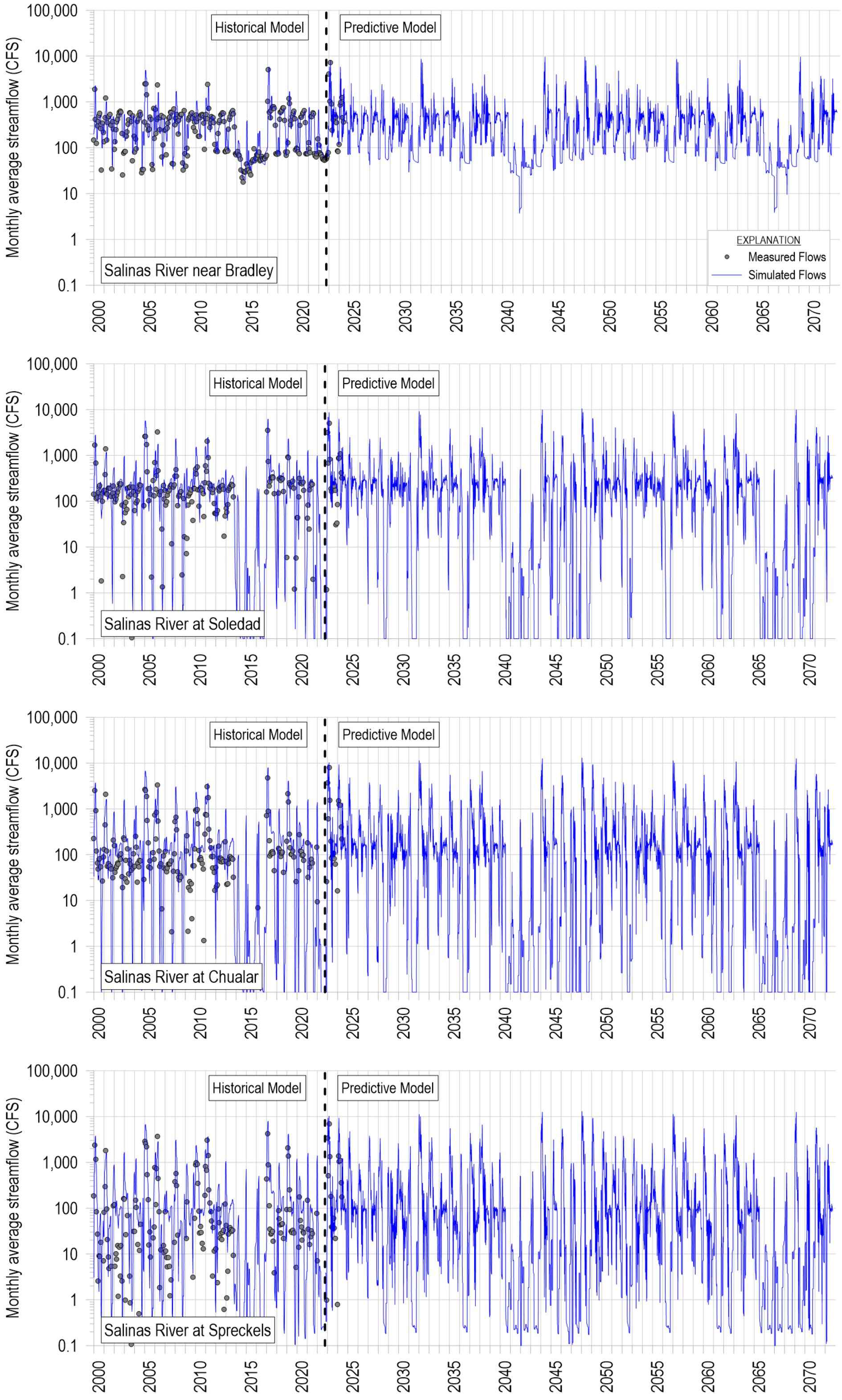

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Figure 19. Simulated and Observed Streamflow Hydrographs for Gage Locations along the Salinas River

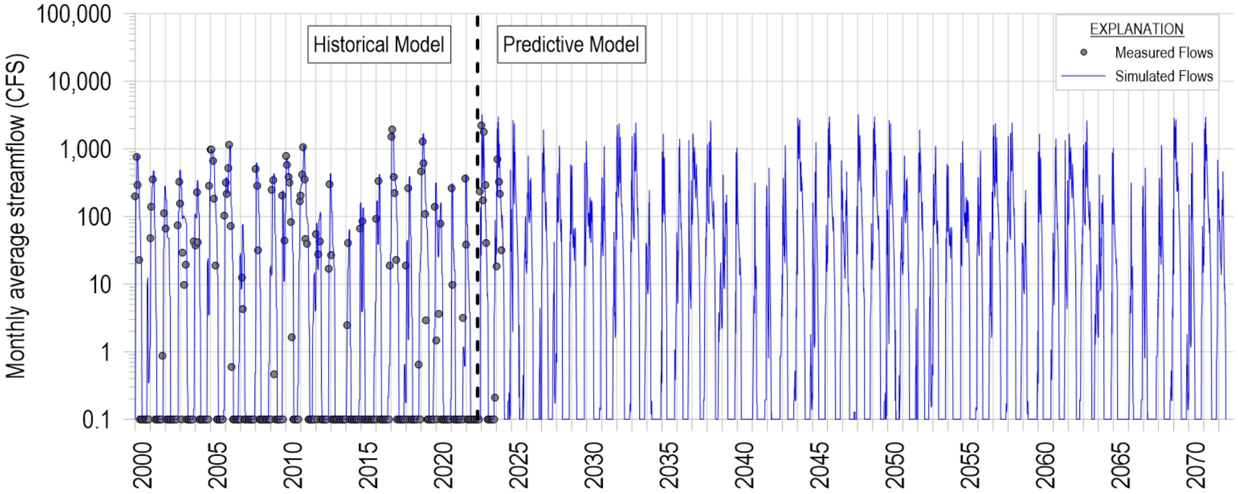

Figure 20. Observed and Simulated Hydrograph for the Arroyo Seco below Reliz Creek near Soledad Gage

SUMMARY

This technical memorandum summarizes how the SVOM baseline model was built off the SVIHM_v1. The SVOM simulates groundwater levels, surface water flows, reservoir operations, and diversion for WY 2023-2072. However, the SVOM only uses one realization of a possible climate in the future. Future climate conditions are highly uncertain and the results from this model represent one possible realization of what future conditions could be. Due to the 25-year repeating cycle of climate data, results from this model should be reviewed for the average of any 25-year period, whenever possible.

LIMITATIONS

Modeling future projections is inherently uncertain. 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. Since the updated SVOM is based on the updated SVIHM, the same assumptions and limitations apply as for the historical model SVIHM (M&A, 2025). In addition to the limitations of the historical model, the following are limitations of the updated SVOM:

- The SWO package introduces significant complexity and numerical instability to the model. This can result in slightly different model results when the same model is run on different computers. Results from SWO should only be analyzed on a stress period, and not time-step basis.

- The model only represents a single climate realization. Running a full suite of climate realizations would provide a better understanding of the uncertainty of the individual climate run selected.
- The SMC assessment results rely on bias adjustments applied at individual wells. These bias adjustments are based on professional interpretation. Further assessments of sustainability can be completed as needed.
- The Farm Process used in this model distributes irrigation demand amongst available pumping wells based on the SVIHM calibration. Pumping is then distributed to individual model layers based on model layering, well construction, and hydraulic properties.
- The model does not simulate impacts of climate change. Future studies should evaluate whether there could be significant implications for the project.

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MONTGOMERY
& ASSOCIATES

Attachment 1

Representative Monitoring Sites Bias Correction Summary

Table 1-1. Summary of Statistics for Bias Corrections

Subbasin	**Aquifer**	**Number of RMS Wells Used for Analysis**	**Average Bias Correction (feet)**	**Minimum Bias Correction (feet)**	**Maximum Bias Correction (feet)**
180/400	180-Foot Aquifer	25	-3	-34	18
	400-Foot Aquifer	35	0	-10	15
	Deep Aquifers	6	20	5	49
Eastside	Basin Fill	29	-5	-89	28
Forebay	Basin Fill	34	0	-10	9
Upper Valley	Basin Fill	15	-10	-90	23

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Attachment 2

Bias Correction for Individual RMS Wells Used for SMC Assessment

Table 2-1. RMS Wellls Included in SMC Analysis

Subbasin	Aquifer	Well Name	Measurable Objective (feet NAVD88)	Minimum Threshold (feet NAVD88)	Bias Correction (feet)
180/400	180-Foot Aquifer	13S02E21Q01	1.45	-0.65	-6.61
180/400	180-Foot Aquifer	13S02E26L01	0.47	-2.72	-7.08
180/400	180-Foot Aquifer	14S02E03F04	-4.9	-8.3	-3.86
180/400	180-Foot Aquifer	14S02E10P01	-2.6	-14	-4.06
180/400	180-Foot Aquifer	14S02E11A02	-3.4	-8	-8.77
180/400	180-Foot Aquifer	14S02E12B02	-4.6	-13.35	-9.12
180/400	180-Foot Aquifer	14S02E13F03	-1.7	-7.2	-10.92
180/400	180-Foot Aquifer	14S02E17C02	7.1	1.1	-7.56
180/400	180-Foot Aquifer	14S02E21L01	-1	-6	-4.67
180/400	180-Foot Aquifer	14S02E26H01	-6.21	-12.3	-4.98
180/400	180-Foot Aquifer	14S02E36E01	-6.2	-18.6	-4.90
180/400	180-Foot Aquifer	14S03E18C01	12.4	7.6	-33.67
180/400	180-Foot Aquifer	14S03E19G01	-3.3	-16	-11.45
180/400	180-Foot Aquifer	15S02E12C01	-2.2	-7.2	-2.00
180/400	180-Foot Aquifer	15S03E09E03	6.1	-11.9	-0.02
180/400	180-Foot Aquifer	15S03E13N01	24	1.2	-2.50
180/400	180-Foot Aquifer	15S03E17M01	17.3	0.8	0.00
180/400	180-Foot Aquifer	15S03E26F01	18.8	-1.8	10.89
180/400	180-Foot Aquifer	16S04E05M02	41.4	12.2	15.52
180/400	180-Foot Aquifer	16S04E13R02	87.5	66.1	-10.00
180/400	180-Foot Aquifer	16S04E15R02	70.6	41.3	8.40
180/400	180-Foot Aquifer	16S04E25C01	82.7	58.1	4.00
180/400	180-Foot Aquifer	16S05E30E01	87.9	63.6	0.59
180/400	180-Foot Aquifer	17S04E01D01	113.4	88.4	-2.00
180/400	180-Foot Aquifer	17S05E06C02	99.14	72.7	18.26
180/400	400-Foot Aquifer	12S02E33H02	3	-3	-3.50
180/400	400-Foot Aquifer	13S02E10K01	-3.5	-4.9	4.12
180/400	400-Foot Aquifer	13S02E21N01	-0.4	-3.7	0.00
180/400	400-Foot Aquifer	13S02E24N01	0	-7	-2.54
180/400	400-Foot Aquifer	13S02E31N02	1.7	-2.9	0.00
180/400	400-Foot Aquifer	13S02E32J03	-3.2	-10.4	2.00
180/400	400-Foot Aquifer	14S02E03F03	-9.4	-17.2	1.00
180/400	400-Foot Aquifer	14S02E05K01	3.1	-11.3	-1.74
180/400	400-Foot Aquifer	14S02E08M02	-1	-5	-0.78
180/400	400-Foot Aquifer	14S02E11A04	-14.2	-21.8	15.00
180/400	400-Foot Aquifer	14S02E11M03	-13.9	-23.9	4.00
180/400	400-Foot Aquifer	14S02E15K01	-3.2	-26.3	-4.50
180/400	400-Foot Aquifer	14S02E16A02	-6.2	-17.9	0.00
180/400	400-Foot Aquifer	14S02E23A02	-20	-25	3.00
180/400	400-Foot Aquifer	14S02E34A03	-3.3	-8.2	4.57
180/400	400-Foot Aquifer	14S02E36G01	-5.2	-18.8	-10.00
180/400	400-Foot Aquifer	14S03E19C51	-20.35	-29.35	-10.00
180/400	400-Foot Aquifer	14S03E20C01	-35	-41	-2.00
180/400	400-Foot Aquifer	14S03E31L01	-3	-9	-7.57
180/400	400-Foot Aquifer	15S02E01A03	-3.8	-18.4	-5.47

Table 2-1. RMS Wellls Included in SMC Analysis

Subbasin	Aquifer	Well Name	Measurable Objective (feet NAVD88)	Minimum Threshold (feet NAVD88)	Bias Correction (feet)
180/400	400-Foot Aquifer	15S02E02G01	-5.3	-22.1	11.60
180/400	400-Foot Aquifer	15S02E12A01	-1	-13.4	0.73
180/400	400-Foot Aquifer	15S03E03R02	-1	-17	0.85
180/400	400-Foot Aquifer	15S03E04Q01	1.6	-9.4	-4.77
180/400	400-Foot Aquifer	15S03E05C02	-9.3	-20.3	-5.50
180/400	400-Foot Aquifer	15S03E08F01	-8.3	-20.9	1.61
180/400	400-Foot Aquifer	15S03E14P02	16.3	-3.8	0.00
180/400	400-Foot Aquifer	15S03E15B01	12.8	-7.1	5.46
180/400	400-Foot Aquifer	15S03E17P02	7.3	-7.7	14.43
180/400	400-Foot Aquifer	15S03E26A01	15	-4.5	4.61
180/400	400-Foot Aquifer	15S03E28B02	15	-0.5	1.38
180/400	400-Foot Aquifer	16S04E04C01	46	10.5	1.23
180/400	400-Foot Aquifer	16S04E08H03	55.75	26.1	-1.34
180/400	400-Foot Aquifer	16S04E25G01	78	52.9	4.50
180/400	400-Foot Aquifer	16S05E30J02	92.2	68.7	-5.76
180/400	Deep Aquifers	13S02E19Q03	6.3	-2.4	5.49
180/400	Deep Aquifers	13S02E28L03	-15.4	-20.4	27.52
180/400	Deep Aquifers	13S02E32E05	1.6	-9.2	6.00
180/400	Deep Aquifers	14S02E06L01	3	-7.2	11.00
180/400	Deep Aquifers	14S02E07J03	-4.48	-9.48	18.44
180/400	Deep Aquifers	14S02E28H04	-43	-58	49.00
Eastside	Basin Fill	14S03E03K01	-36.8	-59.2	23.00
Eastside	Basin Fill	14S03E09E02	-38.2	-54	-23.91
Eastside	Basin Fill	14S03E11H01	81.6	18.5	-88.58
Eastside	Basin Fill	14S03E15H03	-34.1	-52.7	11.00
Eastside	Basin Fill	14S03E21L01	-22.6	-36	-20.00
Eastside	Basin Fill	14S03E22D01	-48.5	-60.5	-15.00
Eastside	Basin Fill	14S03E25C01	-42.9	-66.1	0.00
Eastside	Basin Fill	14S03E25C02	-42.2	-65.4	-3.70
Eastside	Basin Fill	14S03E27B01	-0.7	-8.5	-23.00
Eastside	Basin Fill	14S03E33G01	-4.8	-15.9	2.00
Eastside	Basin Fill	14S03E34C01	-22	-31	4.00
Eastside	Basin Fill	14S03E36A01	-27.4	-52.9	-10.50
Eastside	Basin Fill	14S03E36P02	-18.7	-39.54	-25.00
Eastside	Basin Fill	14S04E31Q02	-23	-44	-12.00
Eastside	Basin Fill	15S04E06R01	-1.1	-27.5	-18.00
Eastside	Basin Fill	15S04E07R02	22.8	0.4	-25.00
Eastside	Basin Fill	15S04E08N01	4.5	-8.5	-16.76
Eastside	Basin Fill	15S04E14N01	15.7	-32.9	28.31
Eastside	Basin Fill	15S04E15D02	3.3	-23	18.00
Eastside	Basin Fill	15S04E15P02	0.2	-25.6	22.60
Eastside	Basin Fill	15S04E17P02	17.5	-18	4.87
Eastside	Basin Fill	15S04E27G01	29.8	0.1	3.81
Eastside	Basin Fill	15S04E36H01	58.9	15.6	9.31
Eastside	Basin Fill	15S04E36P01	55.4	31.1	7.00

Table 2-1. RMS Wellls Included in SMC Analysis

Subbasin	Aquifer	Well Name	Measurable Objective (feet NAVD88)	Minimum Threshold (feet NAVD88)	Bias Correction (feet)
Eastside	Basin Fill	16S04E02Q03	59.4	34.1	7.49
Eastside	Basin Fill	16S05E07G01	71.1	40.5	-6.50
Eastside	Basin Fill	16S05E08Q01	67.8	46.9	3.63
Eastside	Basin Fill	16S05E17R01	78.4	63.2	-8.00
Eastside	Basin Fill	16S05E27G01	92.2	81.5	-2.27
Forebay	Basin Fill	17S05E02N04	110.25	91.5	4.50
Forebay	Basin Fill	17S05E03R50	112.93	91.1	-6.50
Forebay	Basin Fill	17S05E04R01	101.75	82.7	2.21
Forebay	Basin Fill	17S05E08L02	102.88	86	-9.56
Forebay	Basin Fill	17S05E09R01	116.79	97.1	1.23
Forebay	Basin Fill	17S05E27A01	139.3	121.6	-10.19
Forebay	Basin Fill	17S05E36F02	136.58	120.9	-1.40
Forebay	Basin Fill	17S06E19D01	138.68	121.8	-2.60
Forebay	Basin Fill	17S06E27K01	156.2	137.9	3.95
Forebay	Basin Fill	17S06E33R01	164.75	146	4.00
Forebay	Basin Fill	17S06E33R02	161.52	143.8	3.43
Forebay	Basin Fill	18S06E01E01	175.45	150.7	-1.78
Forebay	Basin Fill	18S06E02N01	168.75	147	-0.33
Forebay	Basin Fill	18S06E05R03	153.95	136.1	5.62
Forebay	Basin Fill	18S06E06M01	163.78	146	-9.68
Forebay	Basin Fill	18S06E11J01	180.83	158.1	6.02
Forebay	Basin Fill	18S06E16L01	168.38	140.4	8.89
Forebay	Basin Fill	18S06E22B02	178.7	151.1	9.36
Forebay	Basin Fill	18S06E22B03	178.43	151.8	0.69
Forebay	Basin Fill	18S06E24M01	188.5	163	2.38
Forebay	Basin Fill	18S06E24M02	188.45	163.1	1.62
Forebay	Basin Fill	18S06E25F01	200.35	169.3	0.72
Forebay	Basin Fill	18S06E27A01	190.73	159.6	-1.34
Forebay	Basin Fill	18S06E34B01	198.15	165.9	2.87
Forebay	Basin Fill	18S06E35F01	195.94	166.44	3.04
Forebay	Basin Fill	18S06E35F02	203.25	169.6	-2.65
Forebay	Basin Fill	18S07E19G02	176.33	151.8	-6.07
Forebay	Basin Fill	18S07E20K01	173.2	150.1	-6.14
Forebay	Basin Fill	18S07E28N01	208.8	186	-2.99
Forebay	Basin Fill	19S06E01H01	206.95	181.3	0.50
Forebay	Basin Fill	19S06E11C01	206.28	175.6	7.88
Forebay	Basin Fill	19S07E04Q01	218.4	201.6	-8.71
Forebay	Basin Fill	19S07E05B02	209.98	189.2	-4.53
Forebay	Basin Fill	19S07E10P01	224.65	201.4	-1.17
Langley	Surficial Sediments	13S03E08D01	177.6	172.6	-26.47
Langley	Surficial Sediments	13S03E10N01	278.8	273.2	4.00
Langley	Surficial Sediments	13S03E10Q01	440.9	435.9	-111.00
Langley	Surficial Sediments	13S03E16J01	57.2	50.4	92.00
Langley	Surficial Sediments	13S03E17B01	173.3	168.3	-26.50
Langley	Surficial Sediments	13S03E17F02	-25.4	-35.4	143.00

Table 2-1. RMS Wellls Included in SMC Analysis

Subbasin	Aquifer	Well Name	Measurable Objective (feet NAVD88)	Minimum Threshold (feet NAVD88)	Bias Correction (feet)
Langley	Surficial Sediments	13S03E19H01	1.4	-3.6	51.00
Langley	Surficial Sediments	13S03E20B02	117.4	112.4	-25.00
Langley	Surficial Sediments	13S03E29A01	-33.9	-43.9	97.00
Langley	Surficial Sediments	13S03E29K01	-28.6	-38.6	35.93
Langley	Surficial Sediments	13S03E32H01	-38	-47	24.86
Upper Valley	Basin Fill	19S07E14N02	232.6	187.7	-0.17
Upper Valley	Basin Fill	19S08E19K03	256.1	215.5	4.59
Upper Valley	Basin Fill	20S08E05R03	267.8	223.6	7.30
Upper Valley	Basin Fill	20S08E14K01	297.8	261.6	4.87
Upper Valley	Basin Fill	20S08E15H03	297.1	253.7	7.12
Upper Valley	Basin Fill	20S08E25Q01	312.3	305.3	-90.00
Upper Valley	Basin Fill	20S08E34G01	381.8	362.1	-85.00
Upper Valley	Basin Fill	21S08E13H01	397.1	387.9	-57.16
Upper Valley	Basin Fill	21S09E06F50	325.9	316.1	-3.00
Upper Valley	Basin Fill	21S09E16E01	344.65	330	3.43
Upper Valley	Basin Fill	21S09E24L01	370.7	361	5.85
Upper Valley	Basin Fill	21S10E32N01	385.7	375.6	4.09
Upper Valley	Basin Fill	22S10E09P01	399	380.9	13.75
Upper Valley	Basin Fill	22S10E16K01	397.7	372.4	22.54
Upper Valley	Basin Fill	22S10E34G01	435	429.4	18.59

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Attachment 3

RMS Wells Excluded from SMC Assessment

Table 3-1. RMS Wells Excluded From SMC Analysis

Subbasin	Well Name	Trend Characterization	Simulated Well Screen Consistent with Known Well Screen Geology	MT (feet NAVD88)
180/400	14S02E27A01	Reproduces historical trends - good	No	-9.9
180/400	14S03E30G08	Does not reproduce historical trends	No	-12.2
180/400	14S03E31F01	Does not reproduce historical trends	Yes	-13.8
180/400	15S03E16M01	Does not reproduce historical trends	No	-6
180/400	15S04E31A02	Does not reproduce historical trends	No	11.05
180/400	16S04E15D01	Reproduces historical trends - good	No	32.4
180/400	16S05E32C01	No Data for Validation in Historical Period	Yes	67.8
180/400	13S02E27P01	Does not reproduce historical trends	Yes	-35.7
180/400	14S02E02C03	Does not reproduce historical trends	Yes	-27
180/400	14S02E12B03	Does not reproduce historical trends	No	-30.2
180/400	14S02E12Q01	Reproduces historical trends - good	No	-6.7
180/400	14S03E18C02	Does not reproduce historical trends	No	-19.7
180/400	14S03E29F03	Does not reproduce historical trends	Yes	-16.9
180/400	15S03E16F02	Does not reproduce historical trends	Yes	-6.5
180/400	15S04E29Q02	Does not reproduce historical trends	Yes	12.4
180/400	16S04E10R02	Does not reproduce historical trends	Yes	36
180/400	13S01E36J02	Does not reproduce historical trends	Yes	-4.2
180/400	14S02E14R02	Not Enough Data for Validation in Historical Period	Yes	-30.84
180/400	14S02E20E01	Does not reproduce historical trends	Yes	-23.7
180/400	14S02E21K04	Does not reproduce historical trends	Yes	-44.42
180/400	14S02E22A03	Does not reproduce historical trends	Yes	-45.14
180/400	14S02E23J02	Not Enough Data for Validation in Historical Period	Yes	-42.23
180/400	14S02E25A03	Not Enough Data for Validation in Historical Period	Yes	-31.48
180/400	14S02E26G01	Not Enough Data for Validation in Historical Period	Yes	-31.32
180/400	14S02E27K02	Not Enough Data for Validation in Historical Period	Yes	-33.79
180/400	14S02E35B01	Not Enough Data for Validation in Historical Period	Yes	-28.82
180/400	14S03E19C01	Not Enough Data for Validation in Historical Period	Yes	-51.66
180/400	13S02E26L02	No Data for Validation in Historical Period	Yes	NA
180/400	13S02E32H01	No Data for Validation in Historical Period	Yes	NA
180/400	15S02E12C02	No Data for Validation in Historical Period	No	NA
180/400	15S04E34F01	No Data for Validation in Historical Period	Yes	NA
180/400	16S05E30F02	No Data for Validation in Historical Period	Yes	NA
180/400	TSS-1A	No Data for Validation in Historical Period	Yes	NA
180/400	TSS-1B	No Data for Validation in Historical Period	Yes	NA
180/400	TSS-2	No Data for Validation in Historical Period	Yes	NA
Eastside	14S03E06R01	Reproduces historical trends - good	No	-25
Eastside	14S03E08C01	Reproduces historical trends - good	No	-48
Eastside	14S03E08Q03	Does not reproduce historical trends	Yes	-34.1
Eastside	14S03E17F01	Does not reproduce historical trends	Yes	-48
Eastside	14S03E24H01	Does not reproduce historical trends	Yes	-78.9
Eastside	15S03E02G01	Does not reproduce historical trends	Yes	-33.5
Eastside	14S03E05K01	No Data for Validation in Historical Period	Yes	NA

Table 3-1. RMS Wells Excluded From SMC Analysis

Subbasin	Well Name	Trend Characterization	Simulated Well Screen Consistent with Known Well Screen Geology	MT (feet NAVD88)
Eastside	ES-1A	No Data for Validation in Historical Period	Yes	NA
Eastside	ES-1B	No Data for Validation in Historical Period	Yes	NA
Eastside	ES-1C	No Data for Validation in Historical Period	Yes	NA
Forebay	17S05E06Q01	Reproduces historical trends - good	No	73.9
Forebay	17S06E29C01	Does not reproduce historical trends	Yes	133.4
Forebay	17S05E02G01	No Data for Validation in Historical Period	Yes	NA
Forebay	17S05E12	No Data for Validation in Historical Period	Yes	NA
Forebay	F-DA-1	No Data for Validation in Historical Period	Yes	NA
Forebay	F-ISW-1	No Data for Validation in Historical Period	Yes	NA
Forebay	F-ISW-2	No Data for Validation in Historical Period	Yes	NA
Forebay	F-ISW-3	No Data for Validation in Historical Period	Yes	NA
Upper Valley	24S10E25H50	No Data for Validation in Historical Period	Yes	NA
Upper Valley	24S11E05Q01	No Data for Validation in Historical Period	Yes	NA
Upper Valley	24S11E05Q02	No Data for Validation in Historical Period	Yes	NA
Upper Valley	UV-GWL-2	No Data for Validation in Historical Period	No	NA
Upper Valley	UV-GWL-3	No Data for Validation in Historical Period	Yes	NA
Upper Valley	UV-ISW-2	No Data for Validation in Historical Period	Yes	NA
Langley	13S03E30R01	No Data for Validation in Historical Period	Yes	NA
Langley	13S03E14M01	No Data for Validation in Historical Period	Yes	364.8
Langley	13S03E22F01	Does not reproduce historical trends	Yes	66.2
Langley	13S03E33T50	Does not reproduce historical trends	Yes	-50
Langley	12S03E31R02	No Data for Validation in Historical Period	Yes	NA
Langley	13S03E18H03	No Data for Validation in Historical Period	Yes	NA
Langley	13S03E22Q51	No Data for Validation in Historical Period	Yes	NA
Langley	13S03E26J03	No Data for Validation in Historical Period	Yes	NA
Langley	L-GWL-1	No Data for Validation in Historical Period	Yes	NA
Langley	L-GWL-4	No Data for Validation in Historical Period	Yes	NA
Langley	L-GWL-6	No Data for Validation in Historical Period	Yes	NA

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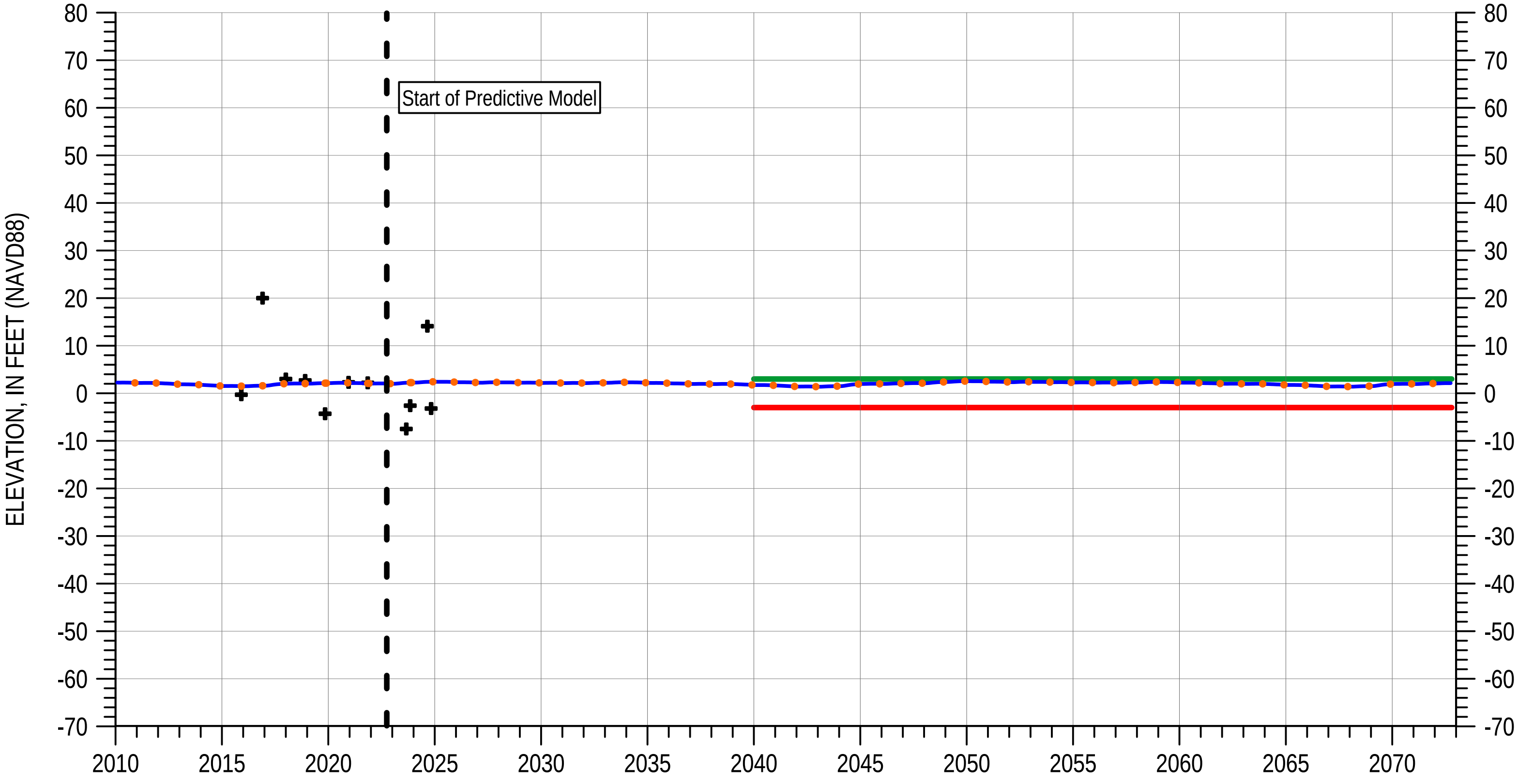
Attachment 4

RMS Hydrographs

HYDROGRAPH OF GROUNDWATER ELEVATION FOR 12S/02E-33H02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



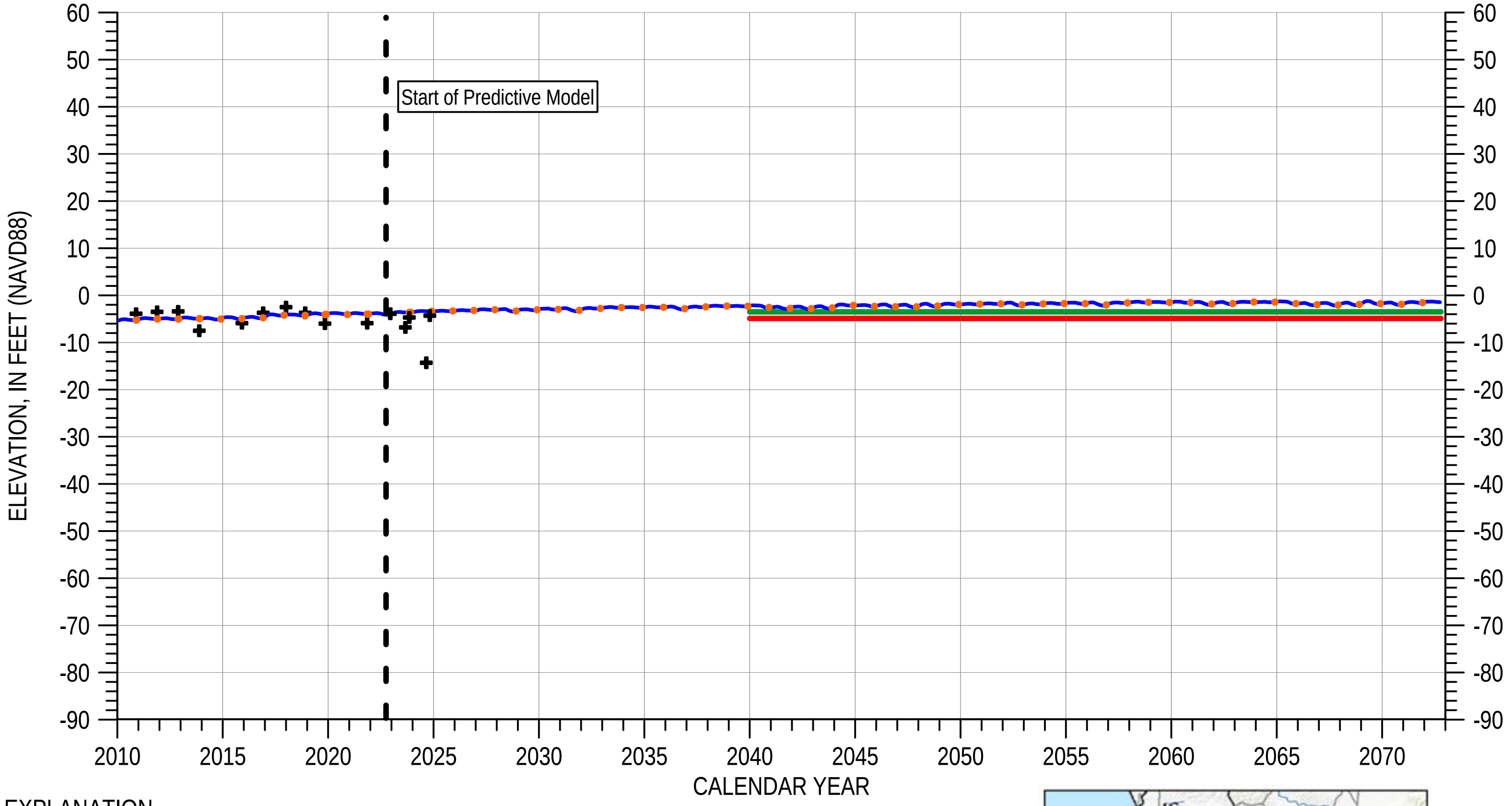
EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November

S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grfwithNov_points

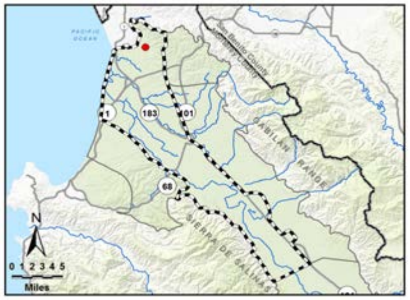
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/02E-10K01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



EXPLANATION

―	Simulated	✚	Observed
―	Minimum Threshold	●	Simulated - November
―	Measurable Objective		



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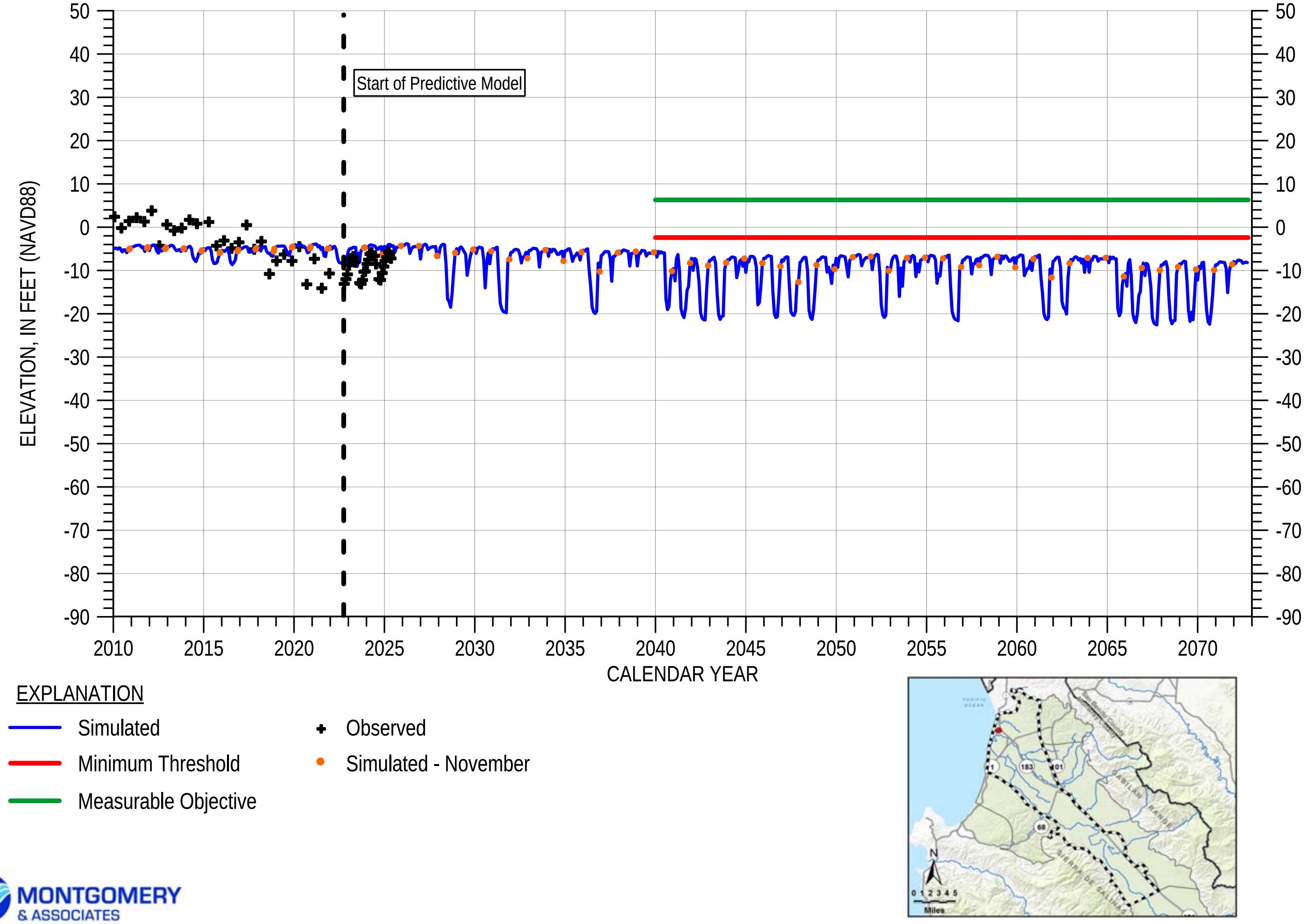
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/02E-19Q03

180/400-Foot Aquifer Subbasin
(Deep Aquifers)



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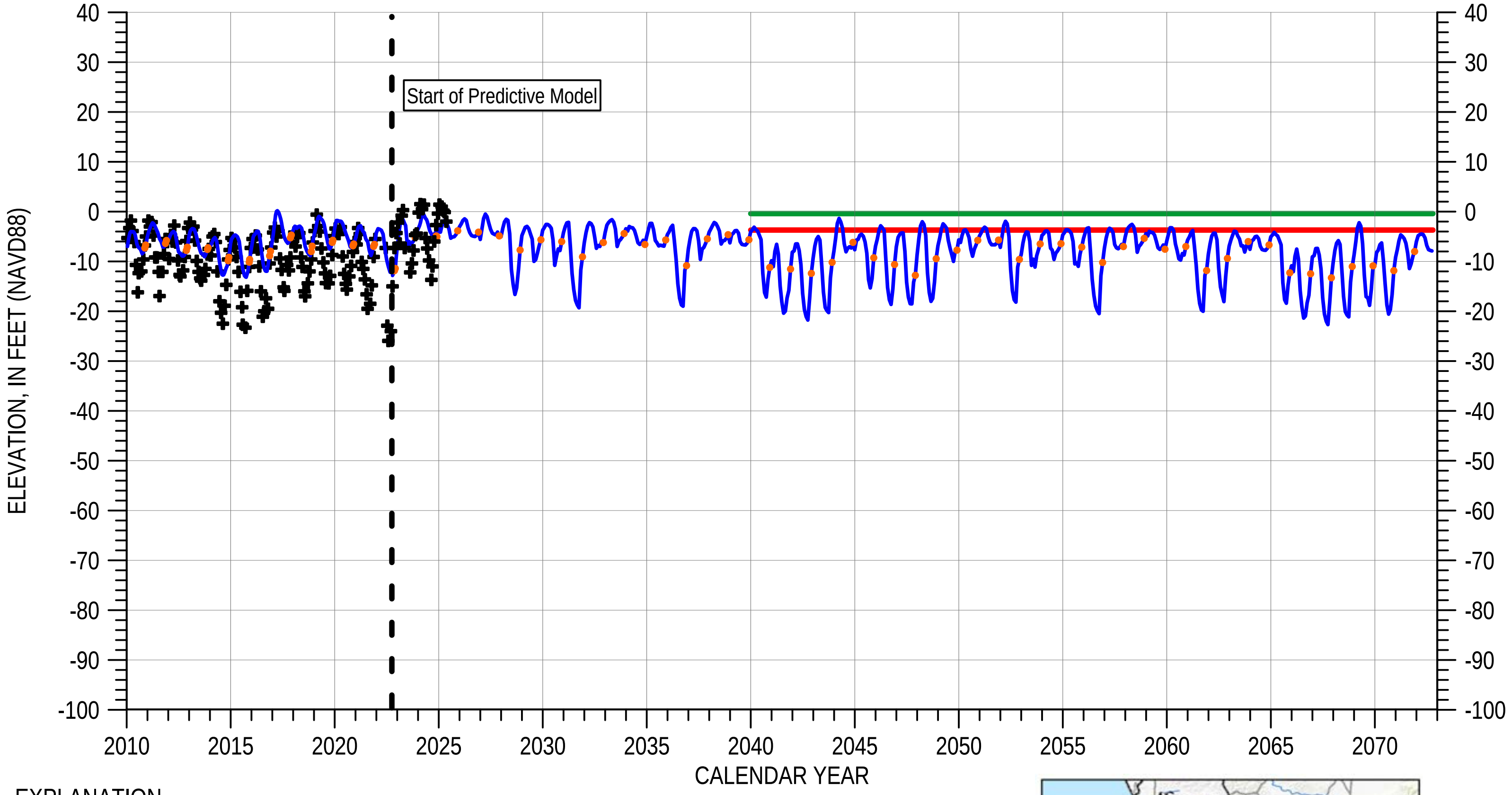
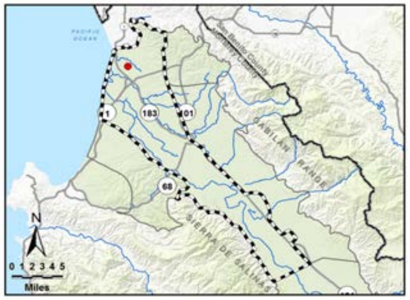
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/02E-21N01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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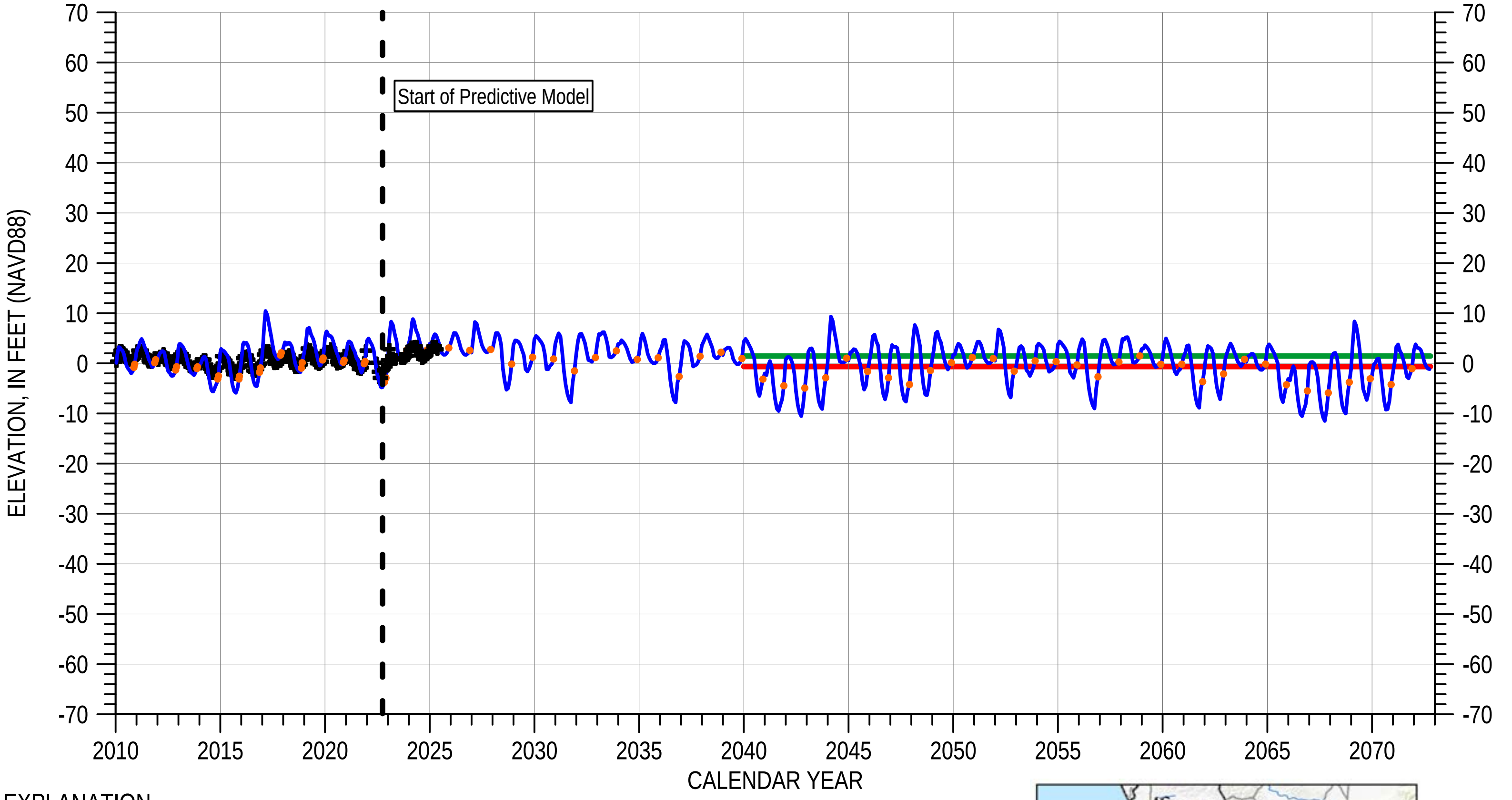
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/02E-21Q01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)



EXPLANATION

— Simulated

— Minimum Threshold

— Measurable Objective

✚ Observed

● Simulated - November

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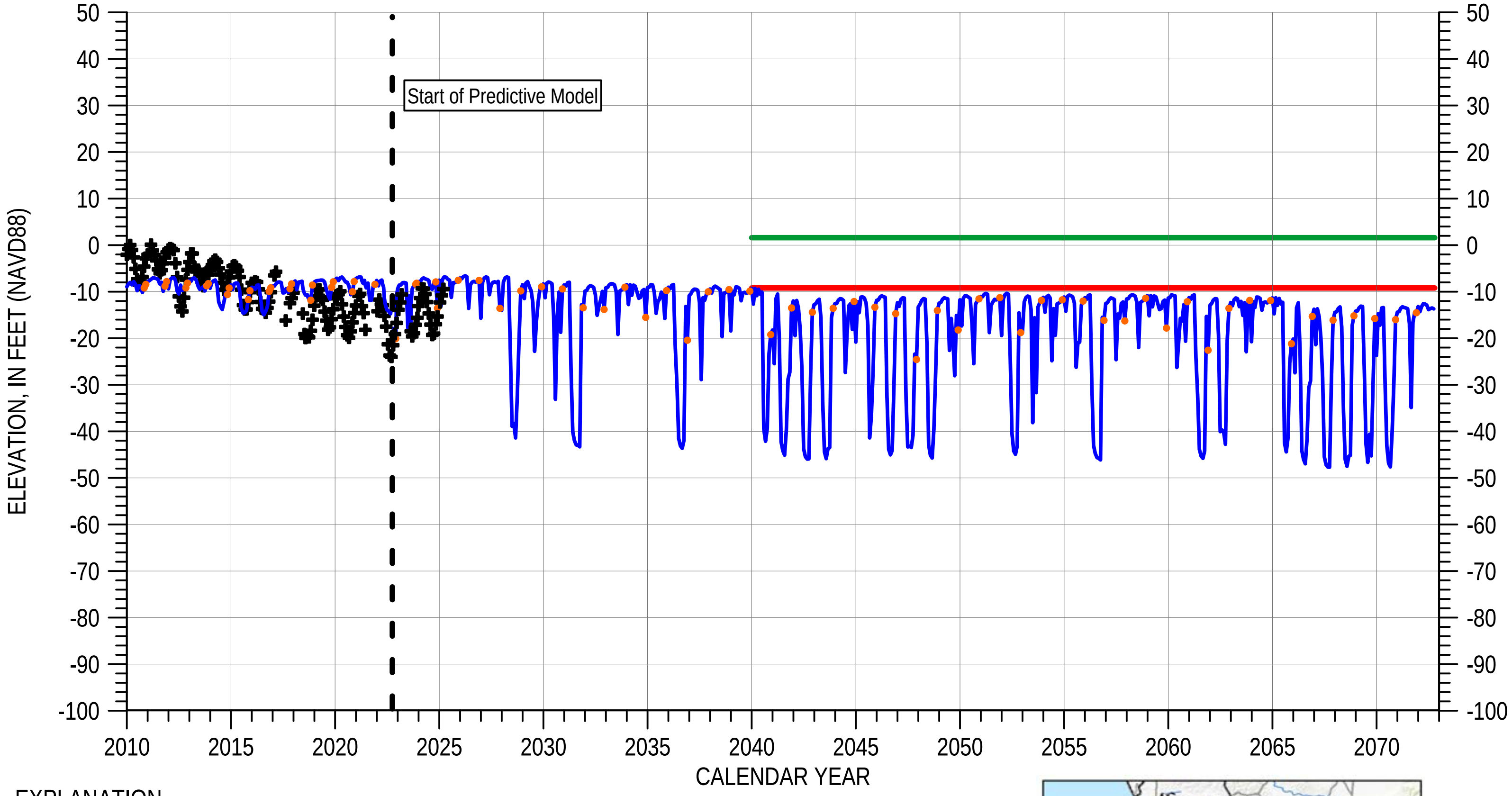
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/02E-32E05

180/400-Foot Aquifer Subbasin
(Deep Aquifers)



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November

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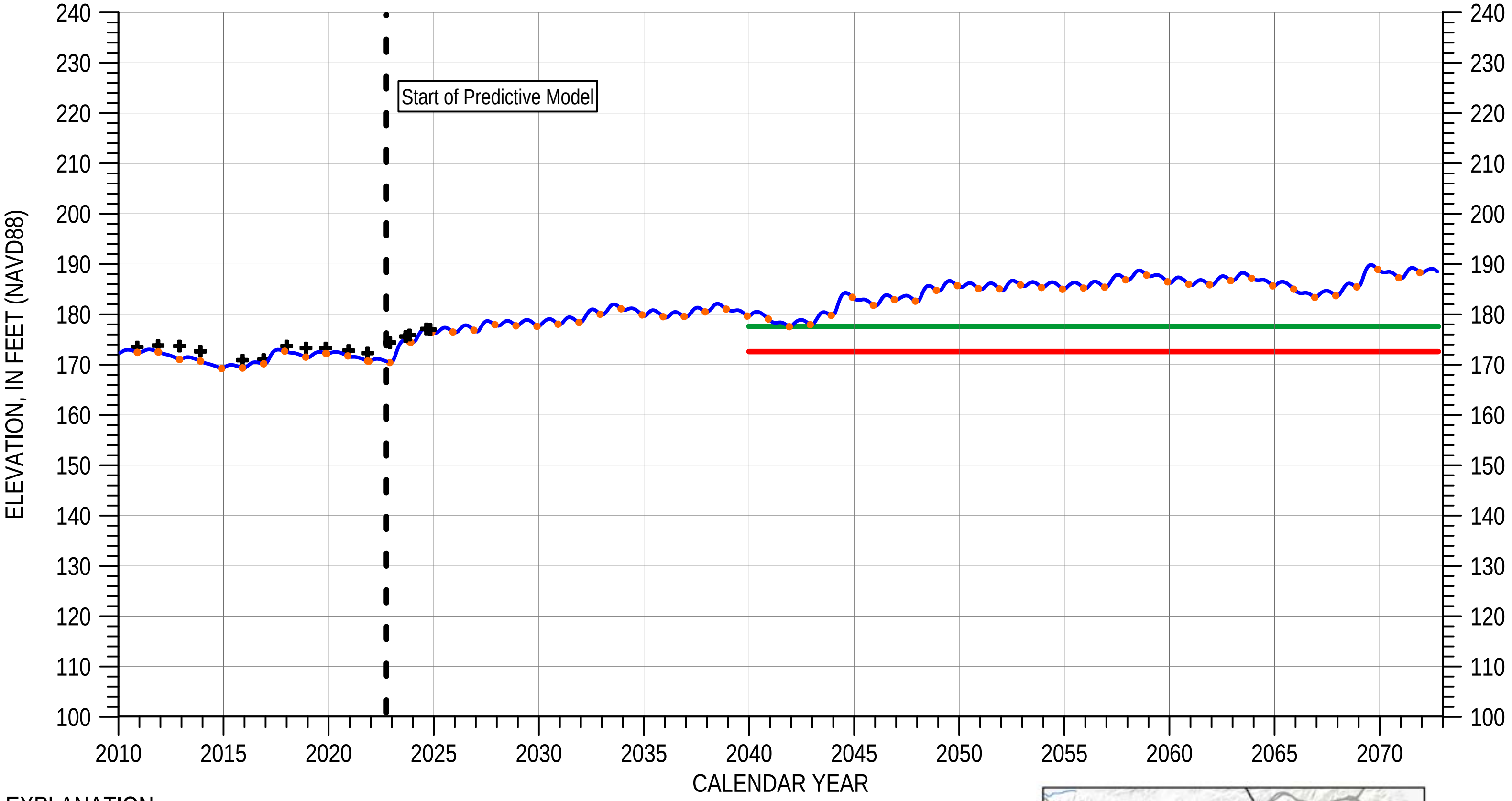
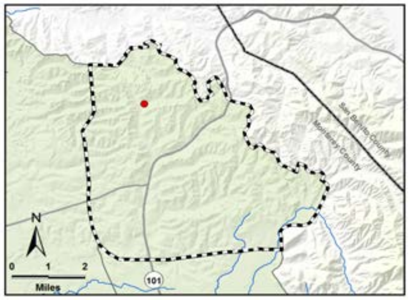
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/03E-08D01

Langley Area Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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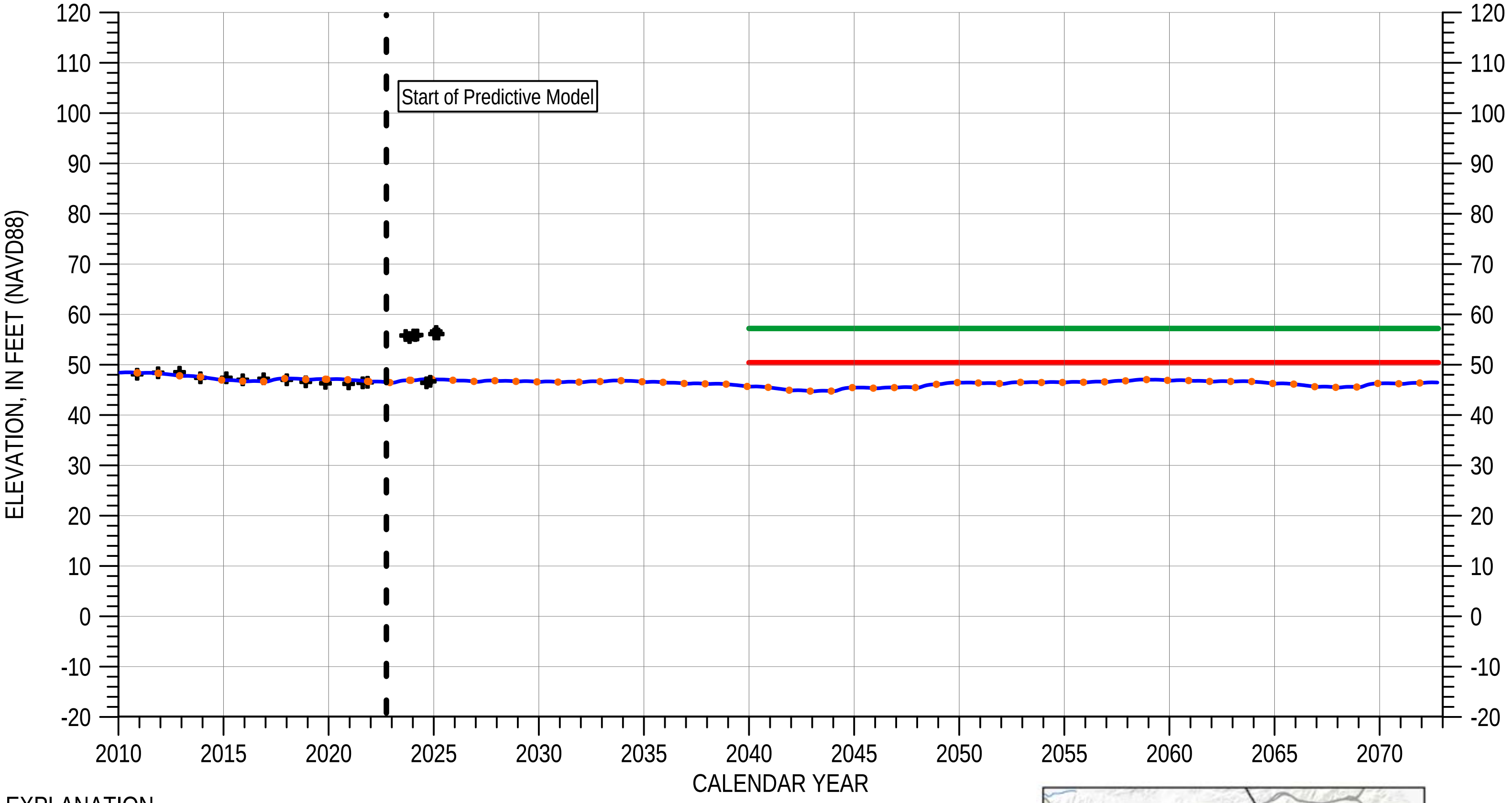
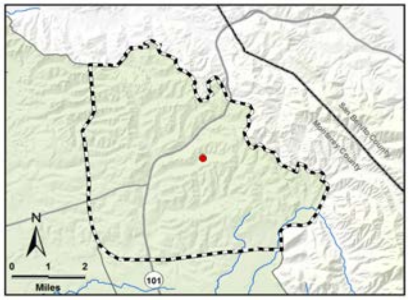
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/03E-16J01

Langley Area Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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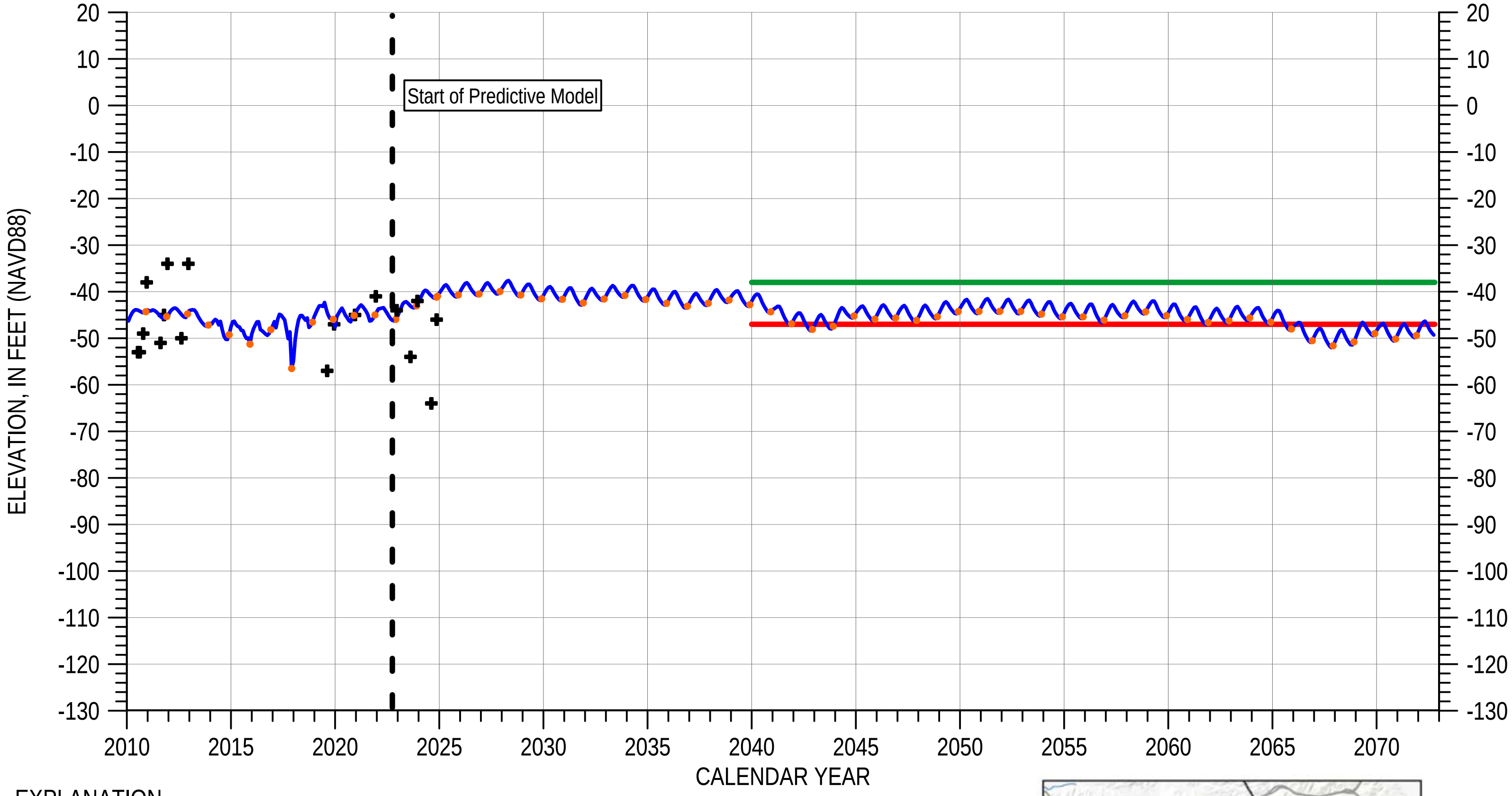
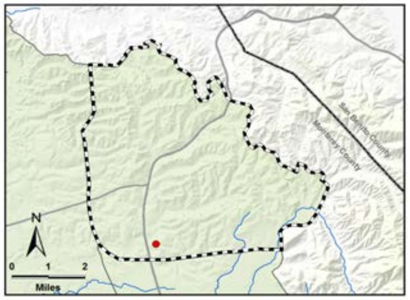
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 13S/03E-32H01

Langley Area Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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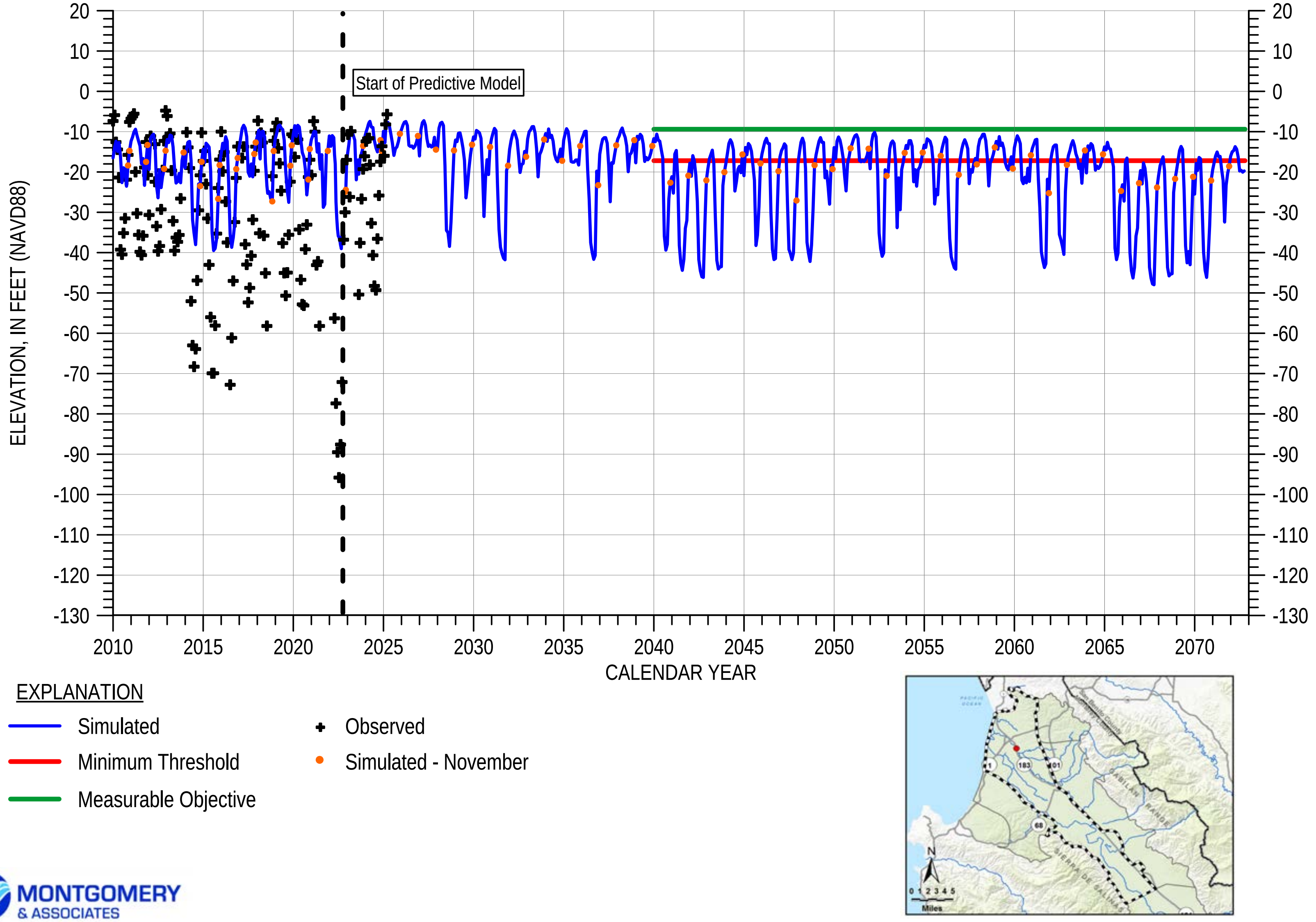
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 14S/02E-03F03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



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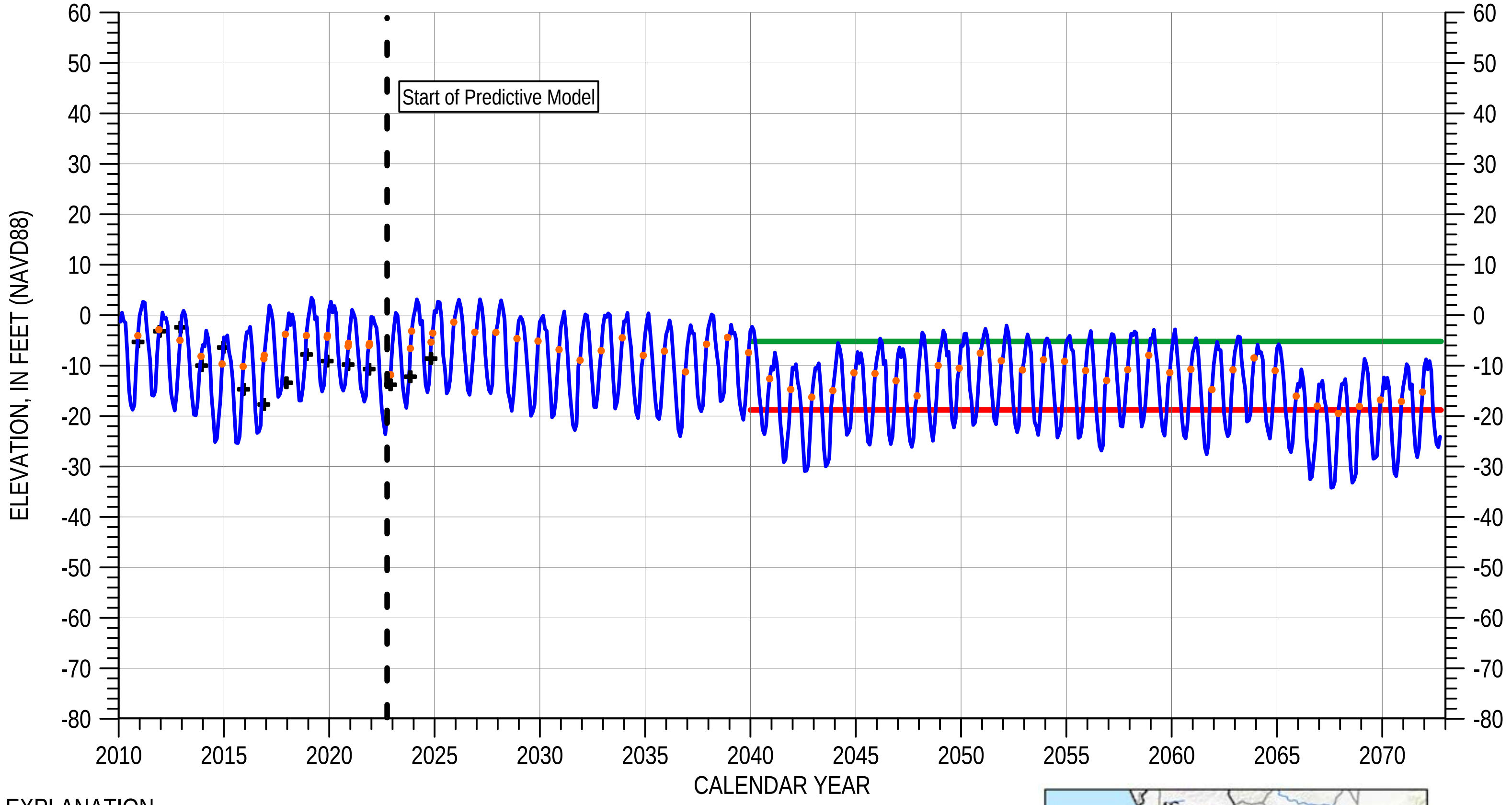
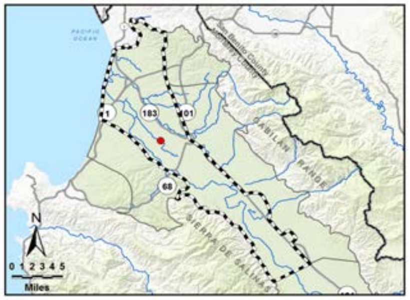
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 14S/02E-36G01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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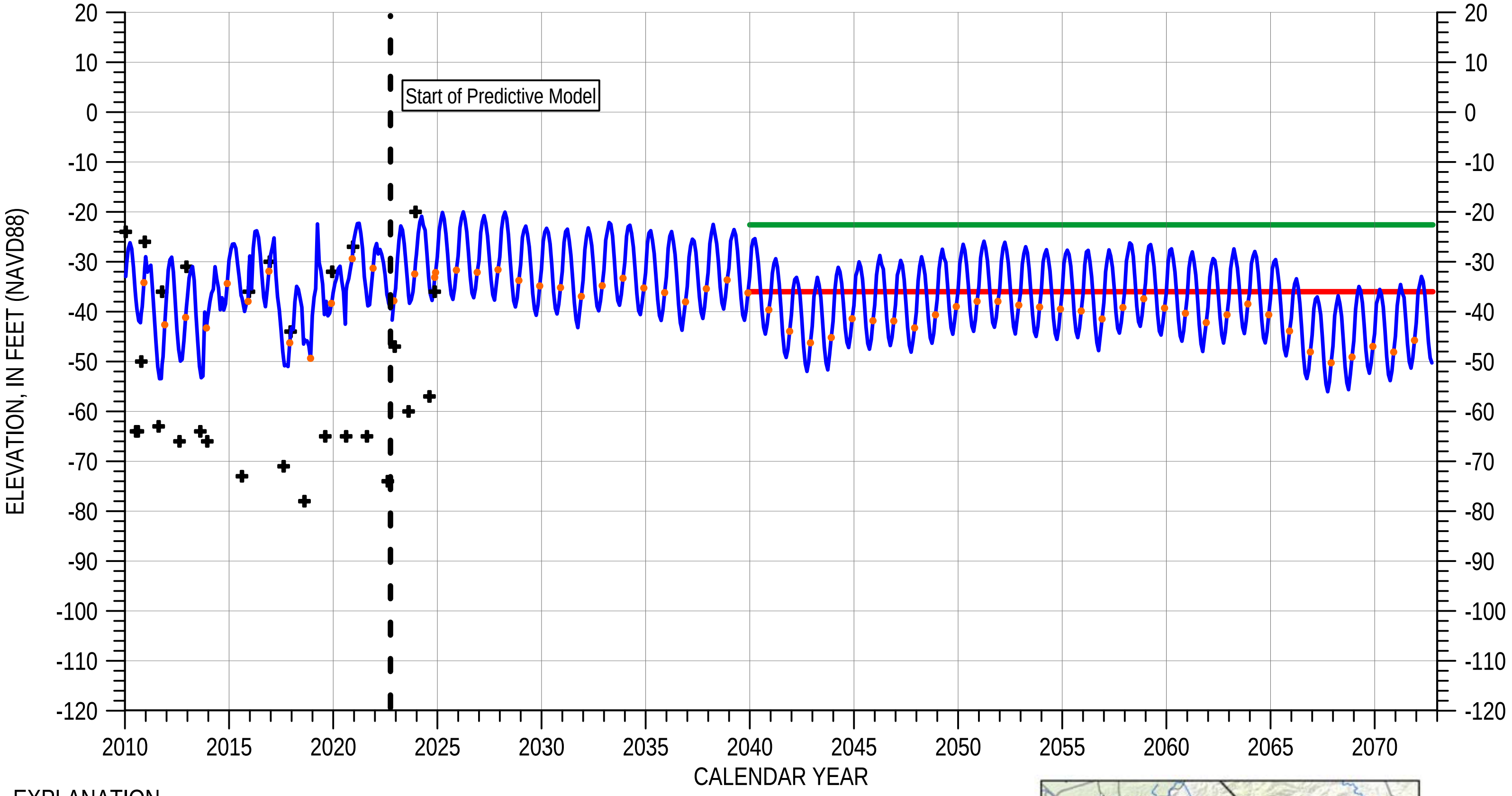
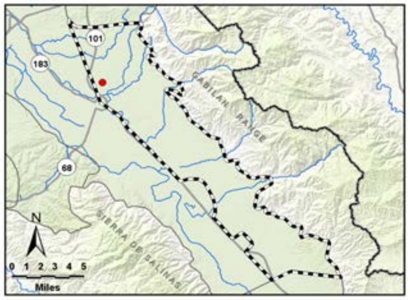
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 14S/03E-21L01

Eastside Aquifer Subbasin



EXPLANATION



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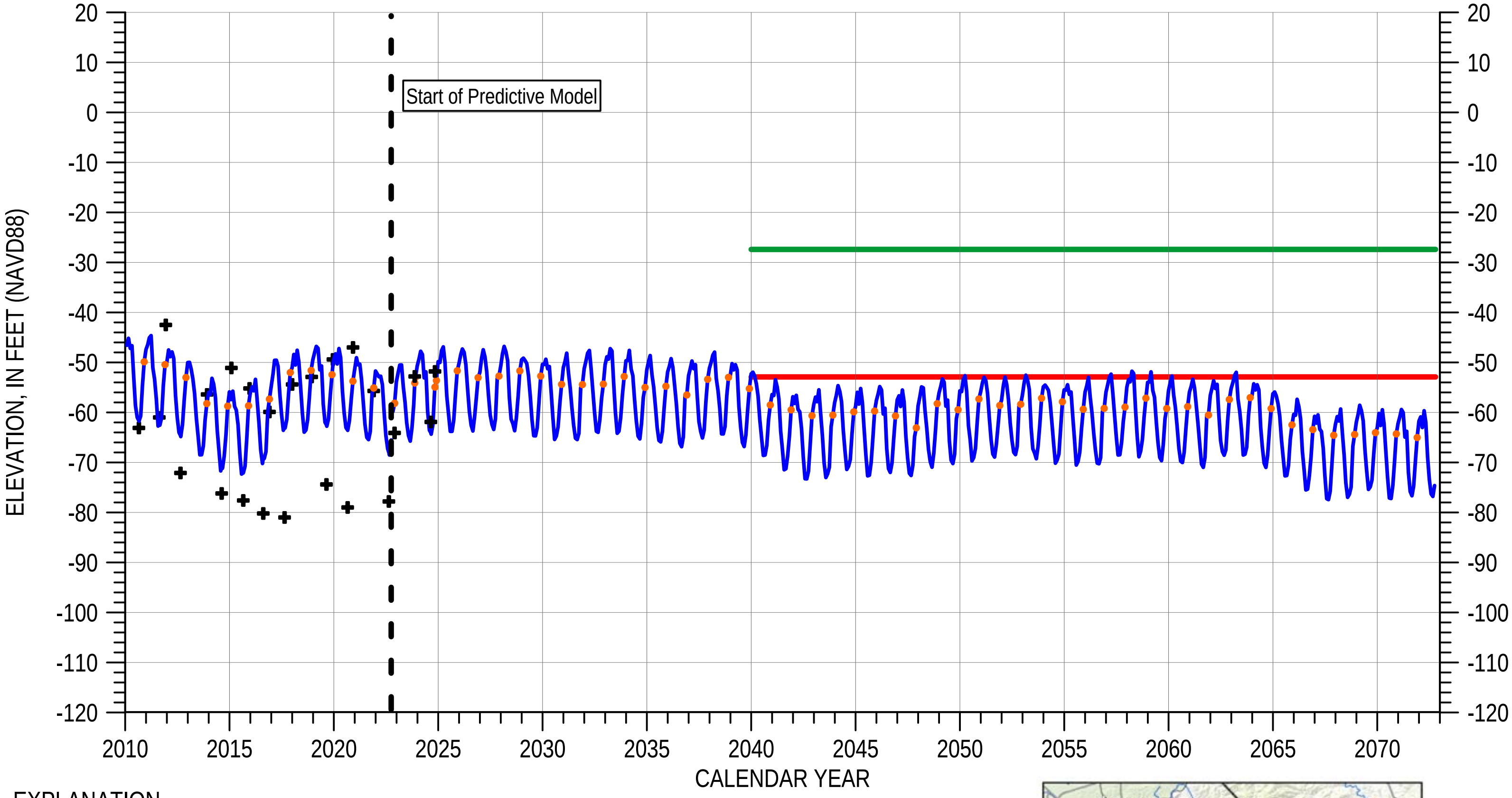
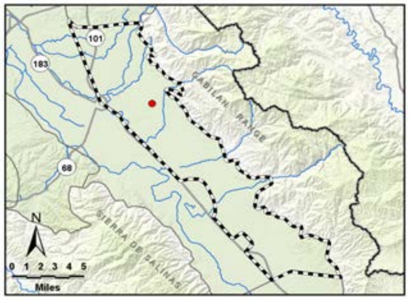
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 14S/03E-36A01

Eastside Aquifer Subbasin



EXPLANATION

Simulated	Observed
Minimum Threshold	Simulated - November
Measurable Objective	



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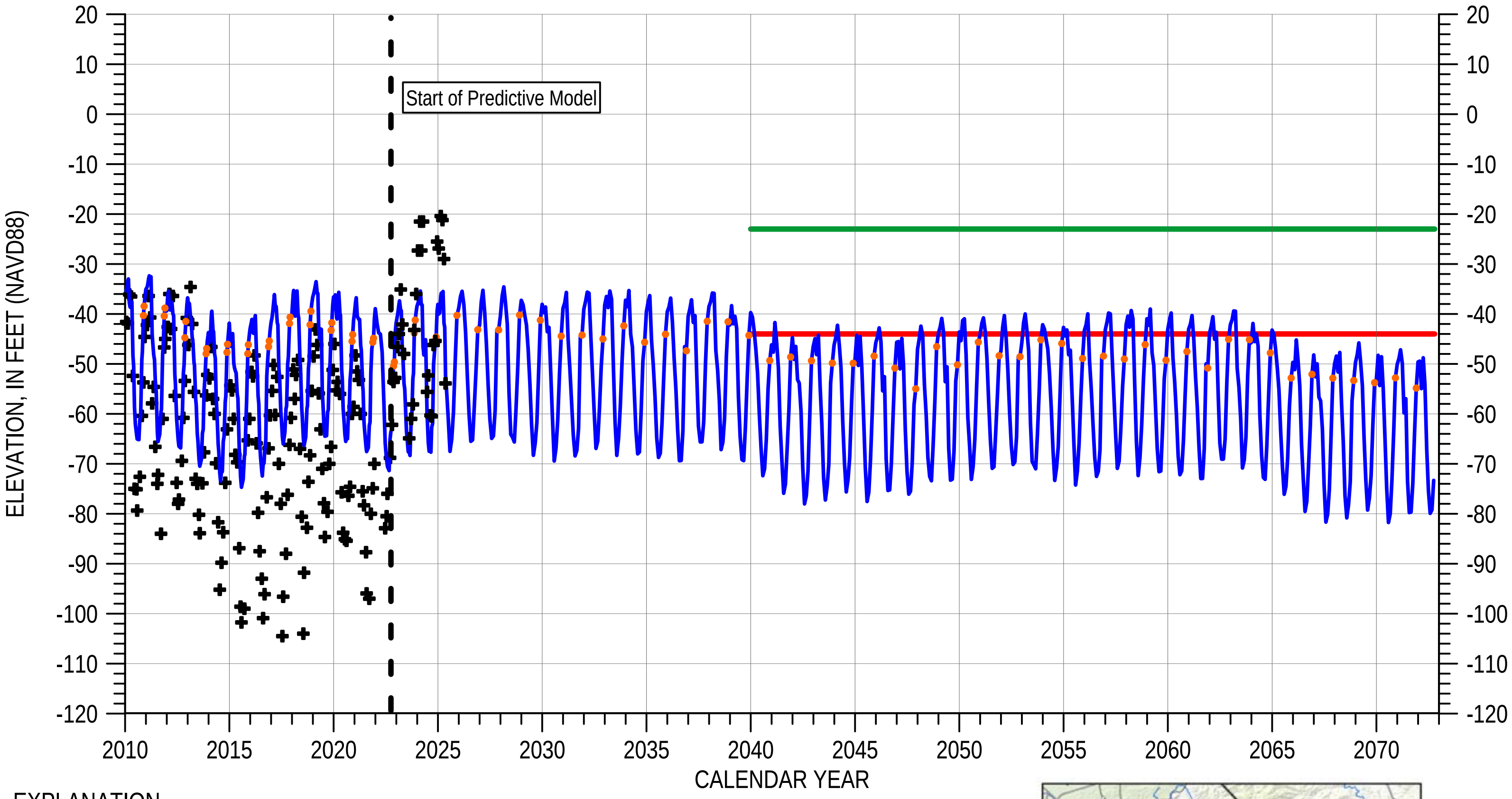
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

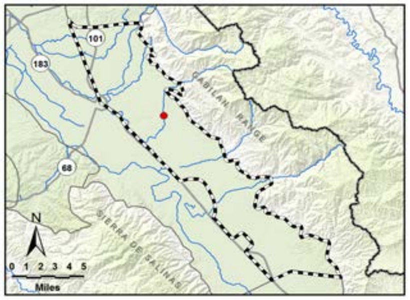
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 14S/04E-31Q02

Eastside Aquifer Subbasin



EXPLANATION

🟦	Simulated	✚	Observed
🟥	Minimum Threshold	●	Simulated - November
🟩	Measurable Objective		



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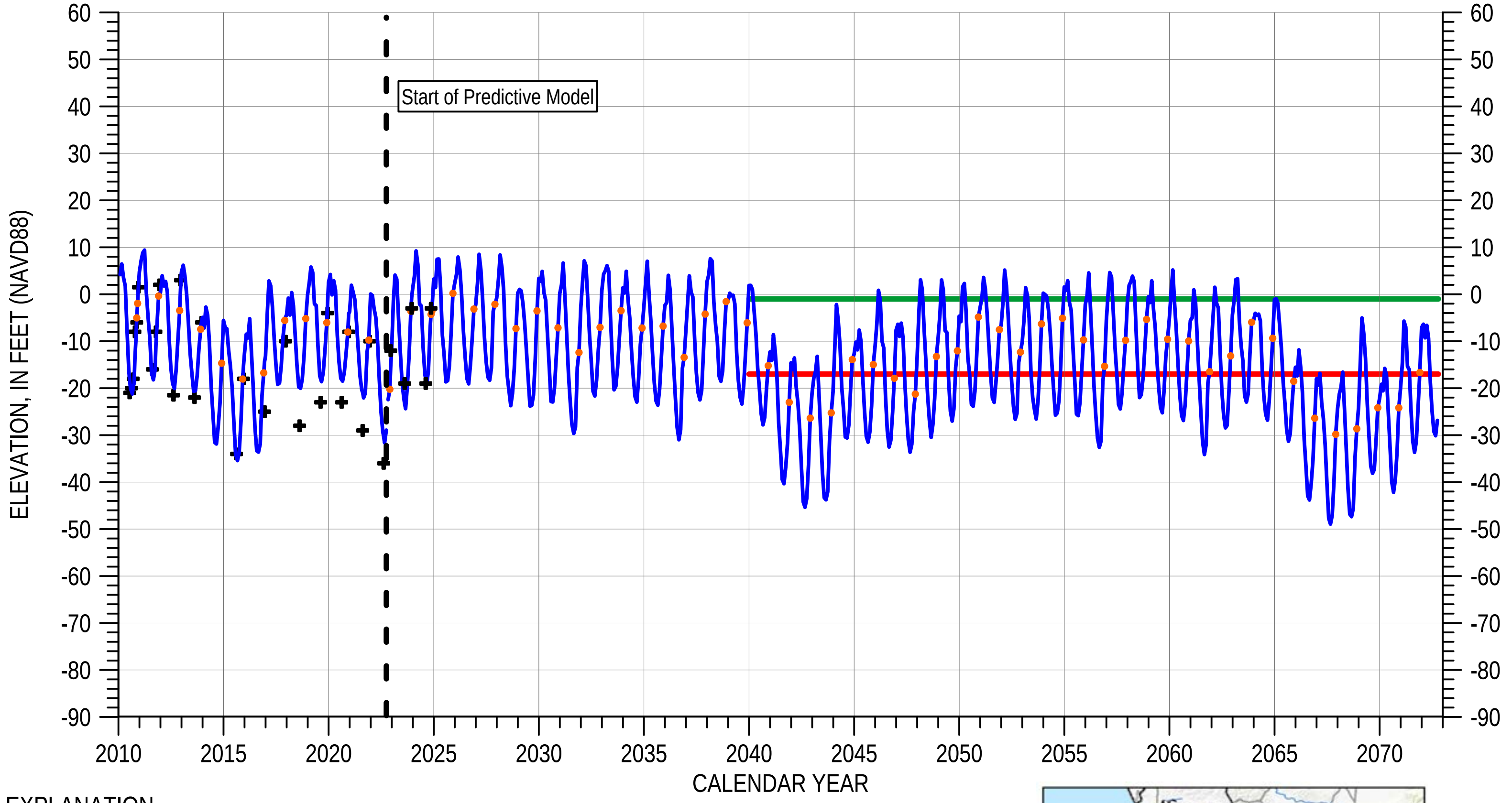
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

HYDROGRAPH OF GROUNDWATER ELEVATION FOR 15S/03E-03R02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



EXPLANATION

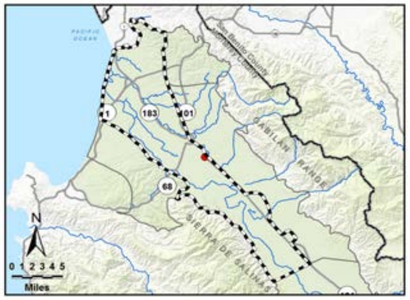
Simulated

Minimum Threshold

Measurable Objective

✚ Observed

● Simulated - November



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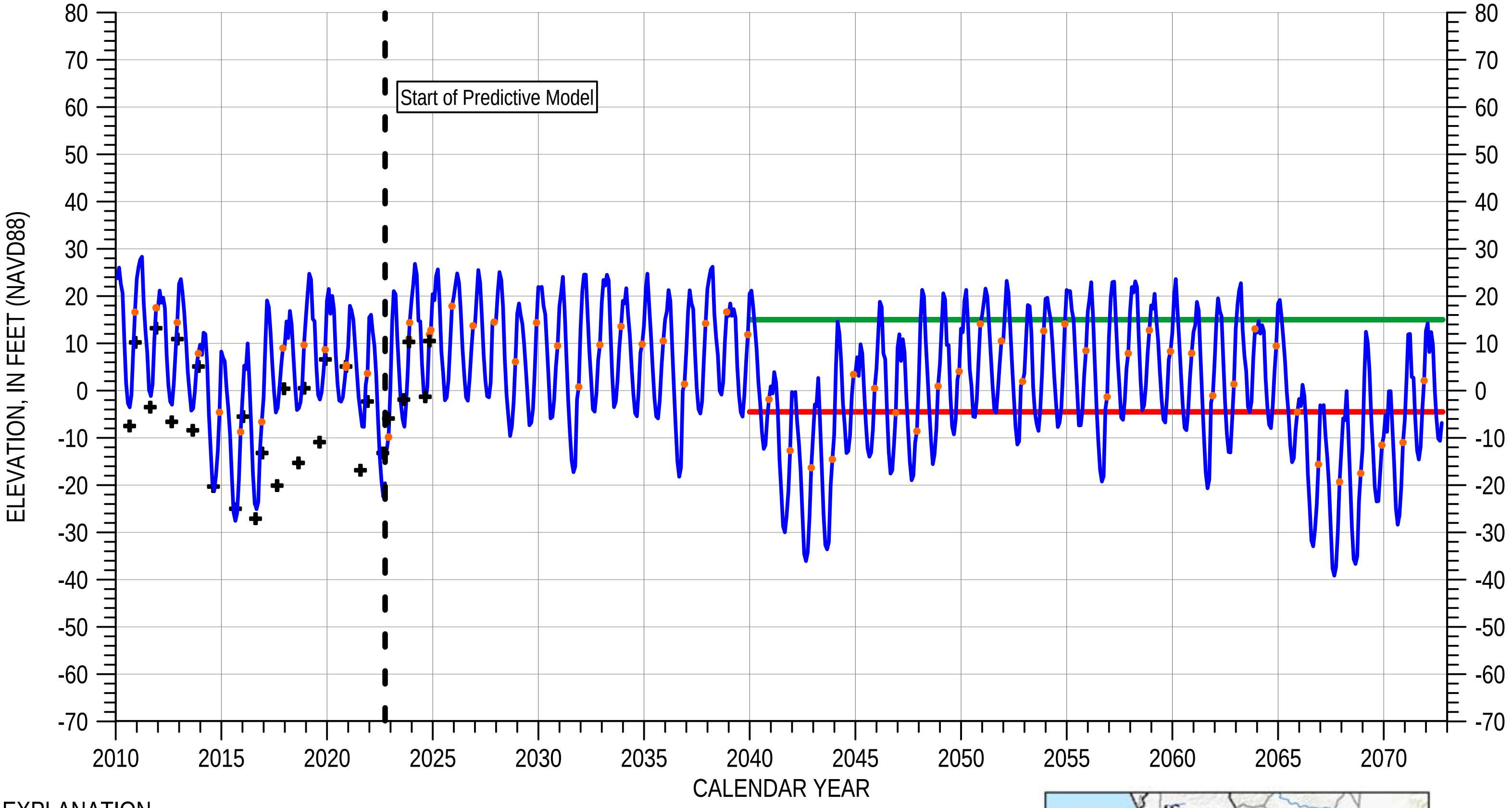
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 15S/03E-26A01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



EXPLANATION

- 🟦 Simulated
- 🟥 Minimum Threshold
- 🟩 Measurable Objective
- ✚ Observed
- ● Simulated - November

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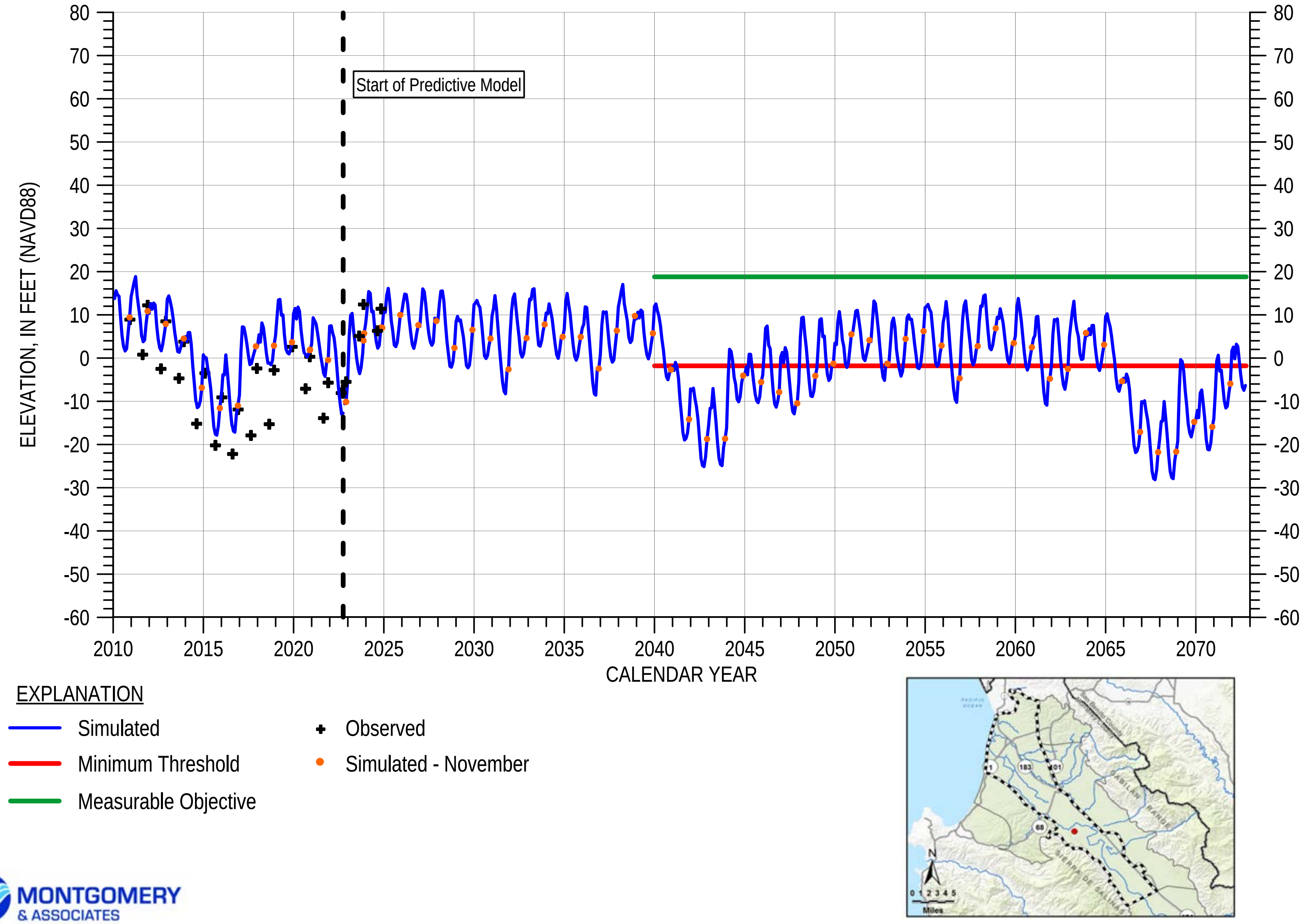
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

HYDROGRAPH OF GROUNDWATER ELEVATION FOR 15S/03E-26F01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)



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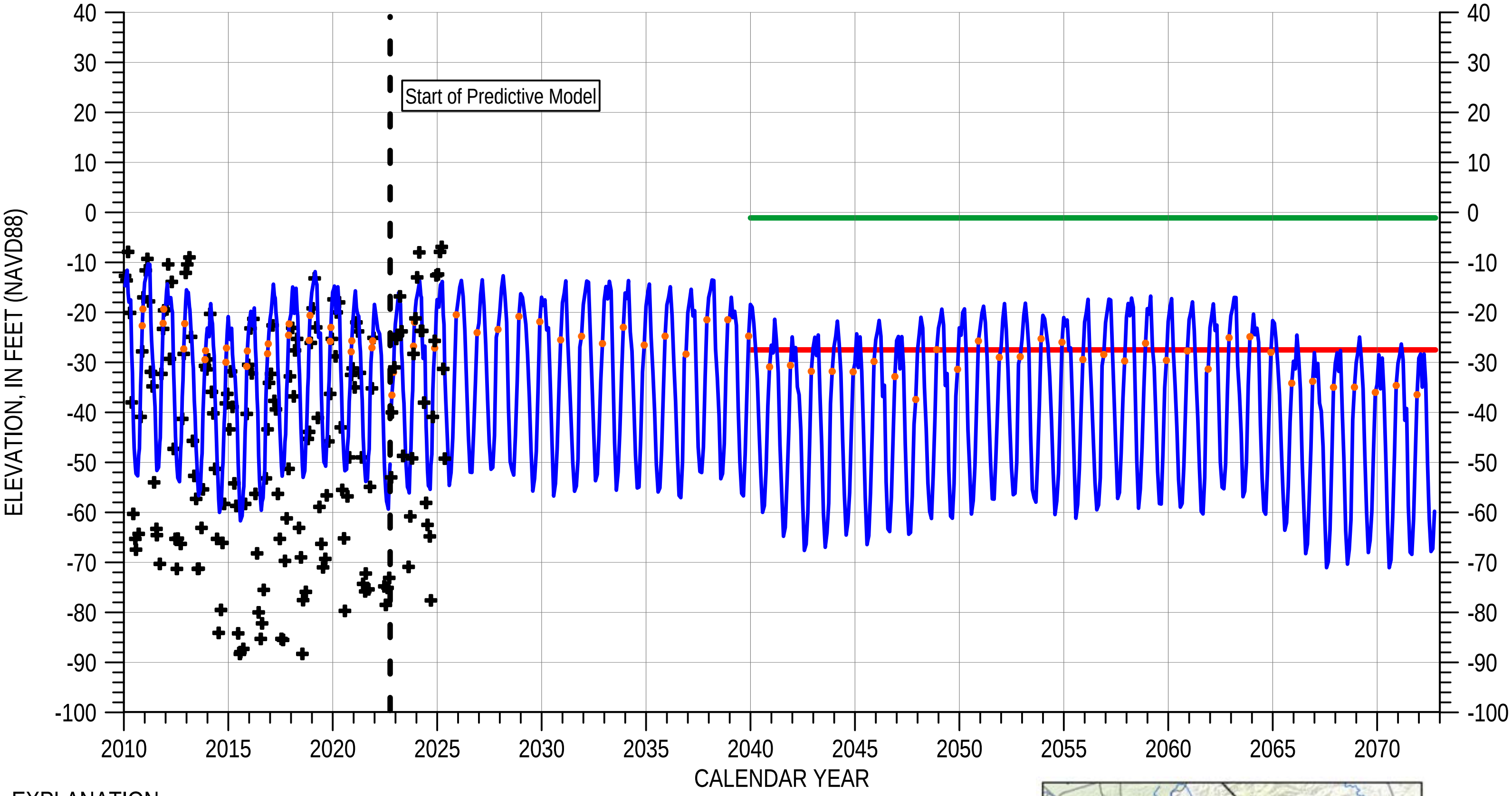
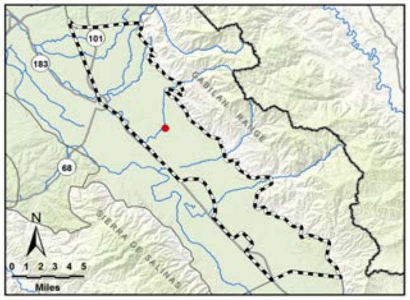
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 15S/04E-06R01

Eastside Aquifer Subbasin



EXPLANATION

🟦	Simulated	✚	Observed
🟥	Minimum Threshold	●	Simulated - November
🟩	Measurable Objective		



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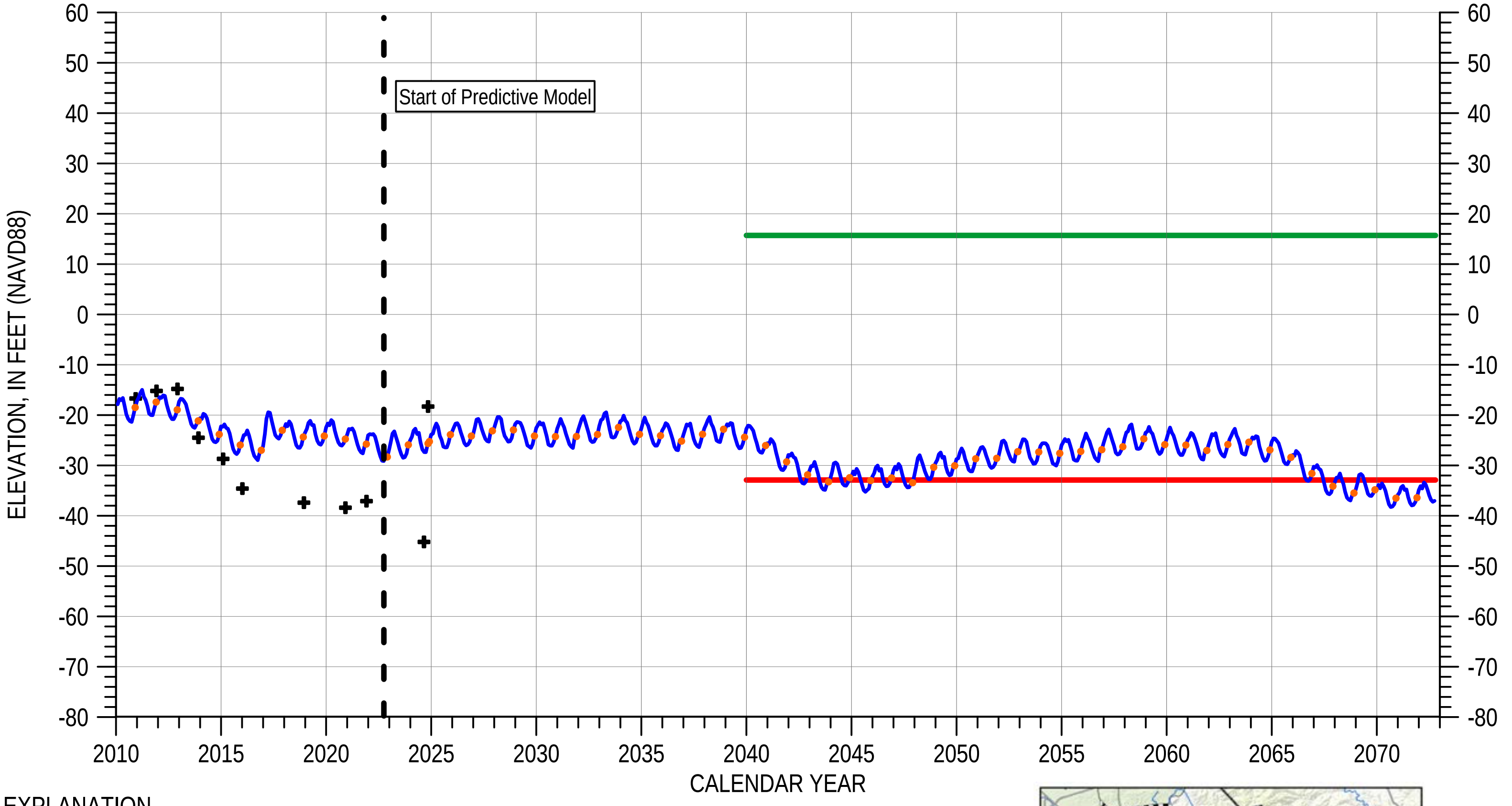
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 15S/04E-14N01

Eastside Aquifer Subbasin



EXPLANATION

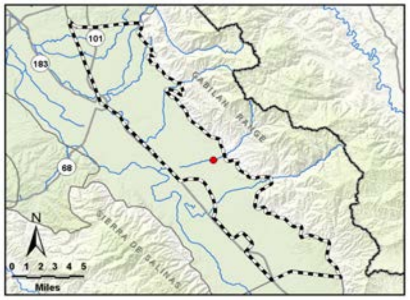
▬ Simulated

▬ Minimum Threshold

▬ Measurable Objective

✚ Observed

● Simulated - November



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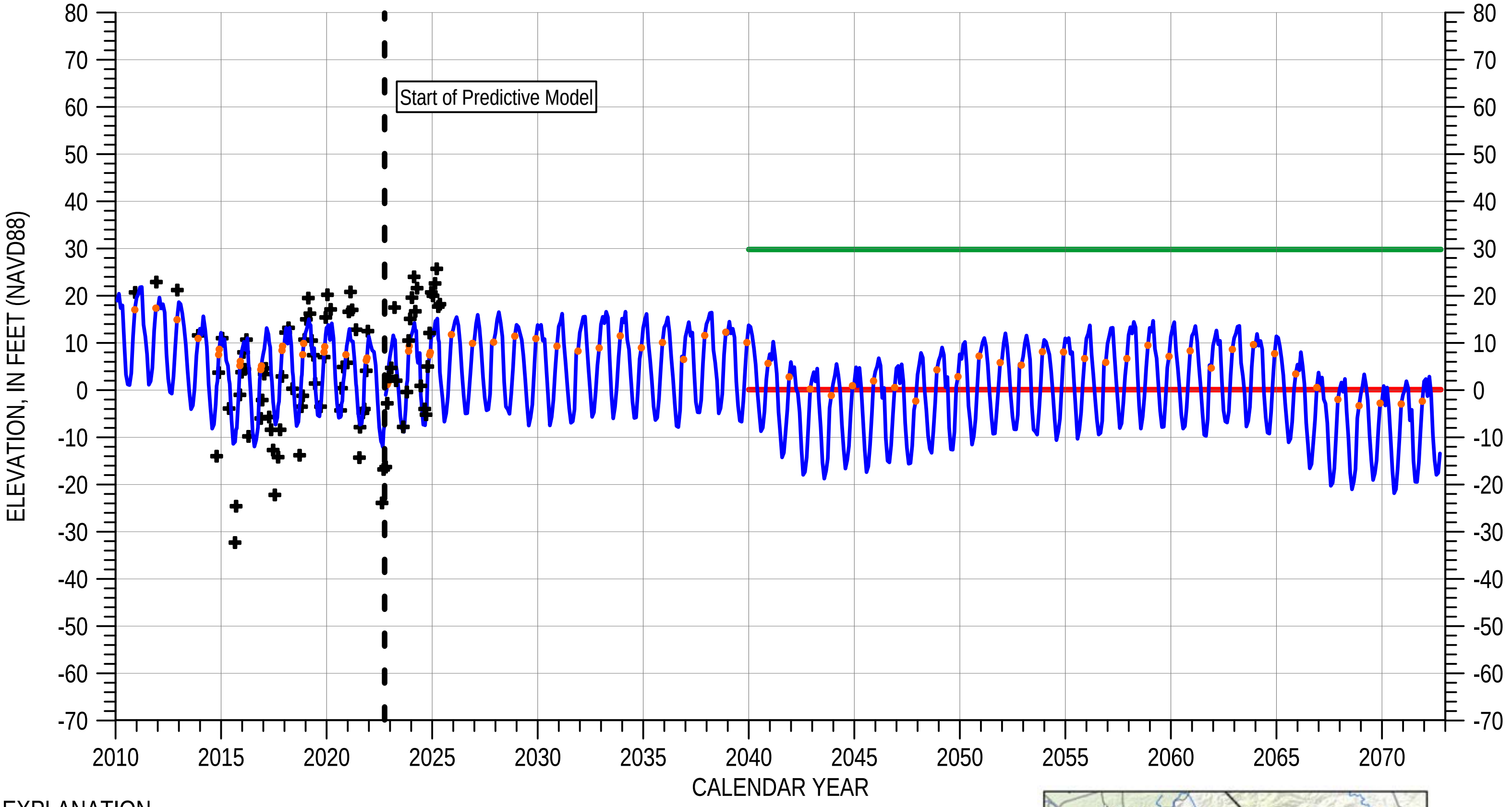
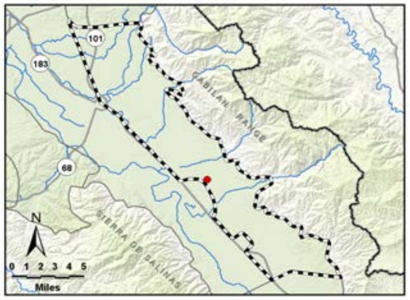
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 15S/04E-27G01

Eastside Aquifer Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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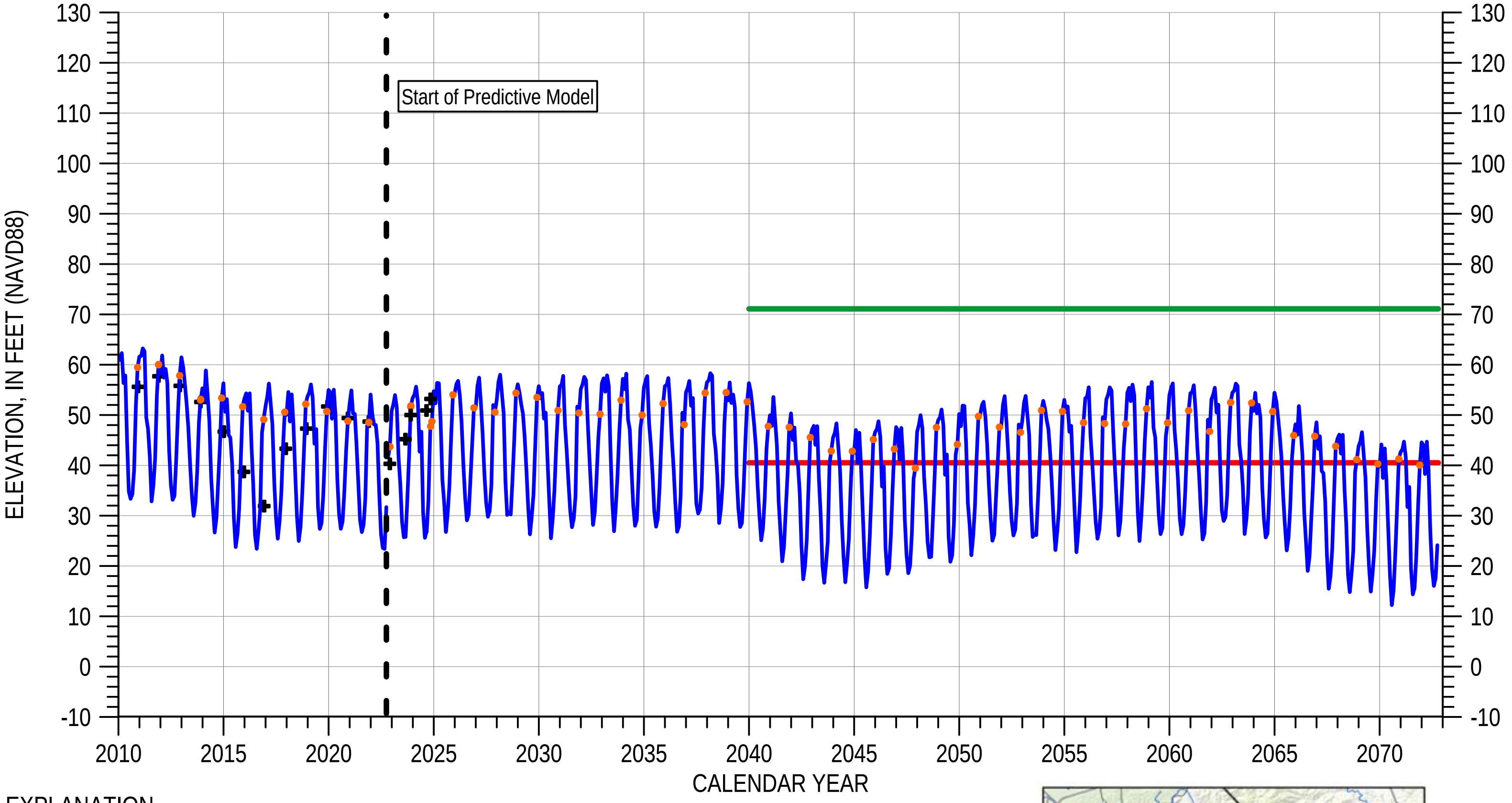
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 16S/05E-07G01

Eastside Aquifer Subbasin



EXPLANATION

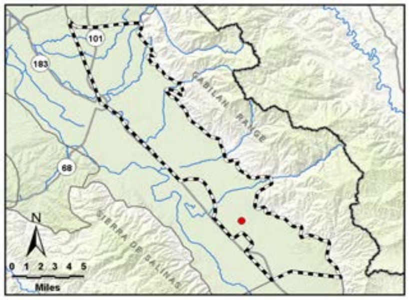
Simulated

Minimum Threshold

Measurable Objective

✚ Observed

● Simulated - November



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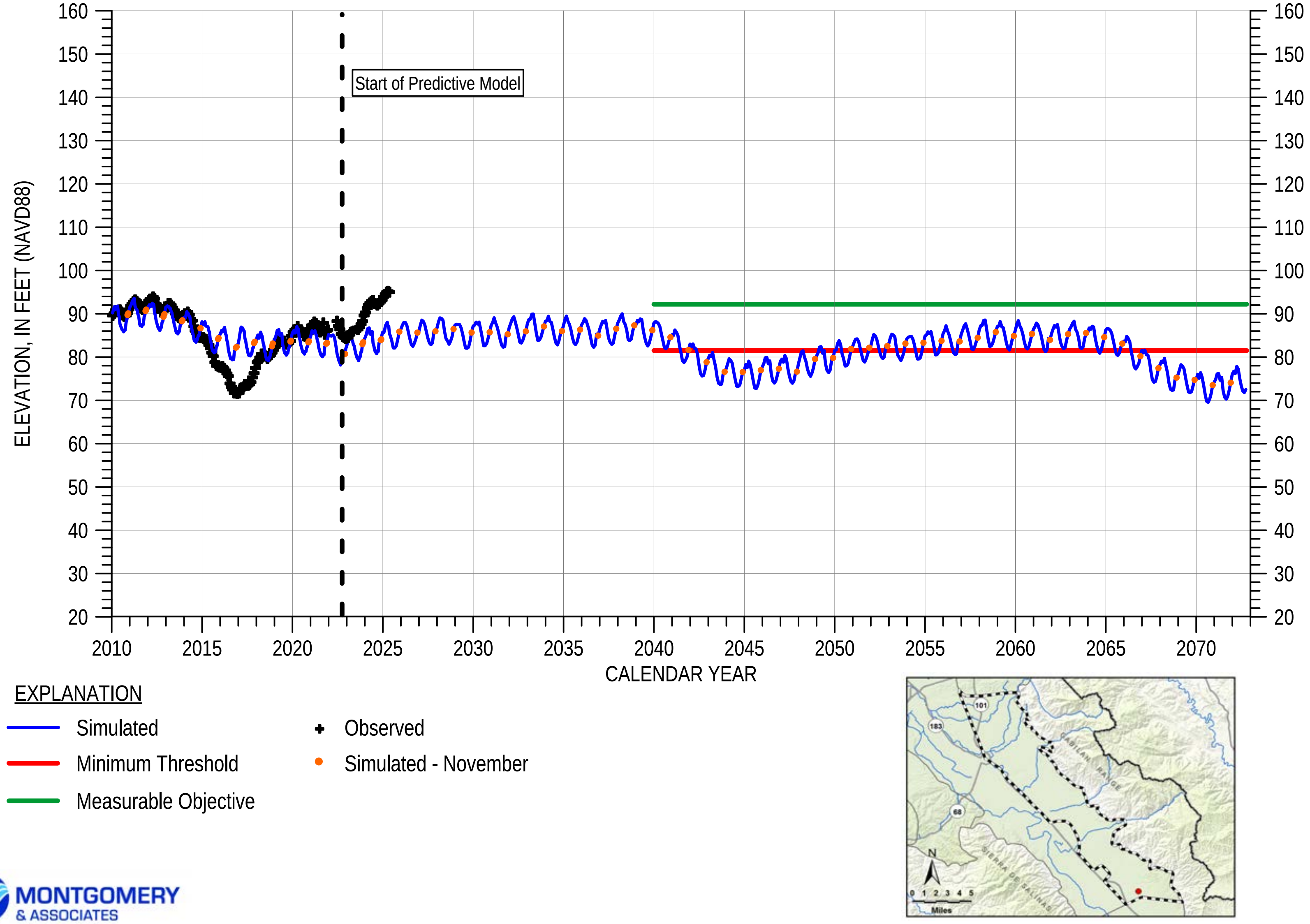
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

HYDROGRAPH OF GROUNDWATER ELEVATION FOR 16S/05E-27G01

Eastside Aquifer Subbasin



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& ASSOCIATES

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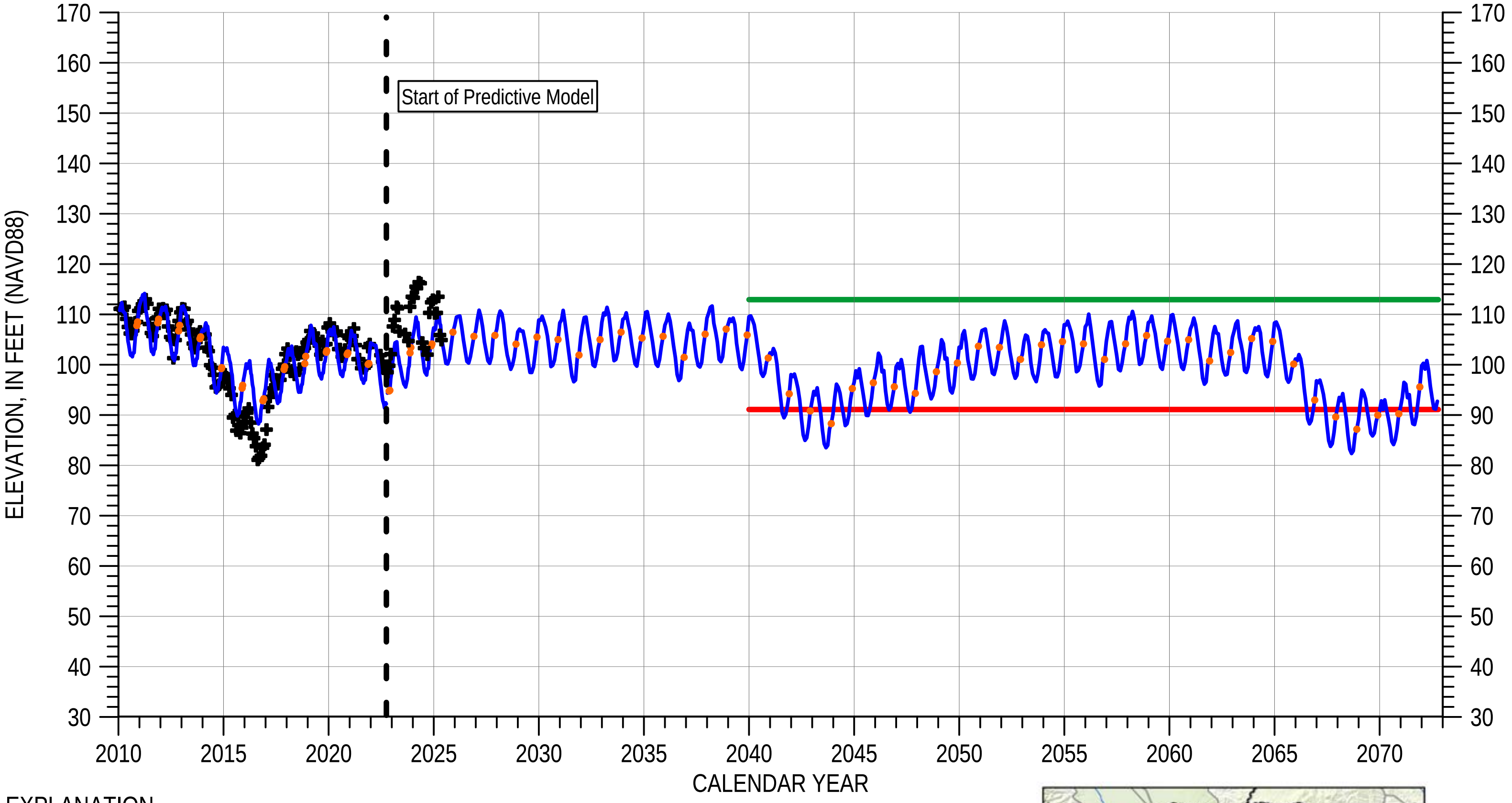
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 17S/05E-03R50

Forebay Aquifer Subbasin



EXPLANATION

Simulated	✚ Observed
Minimum Threshold	● Simulated - November
Measurable Objective	

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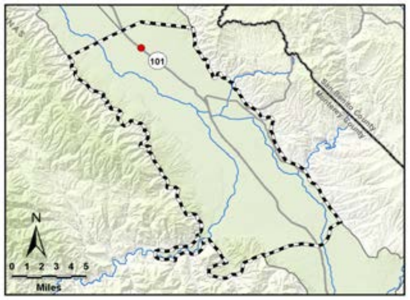
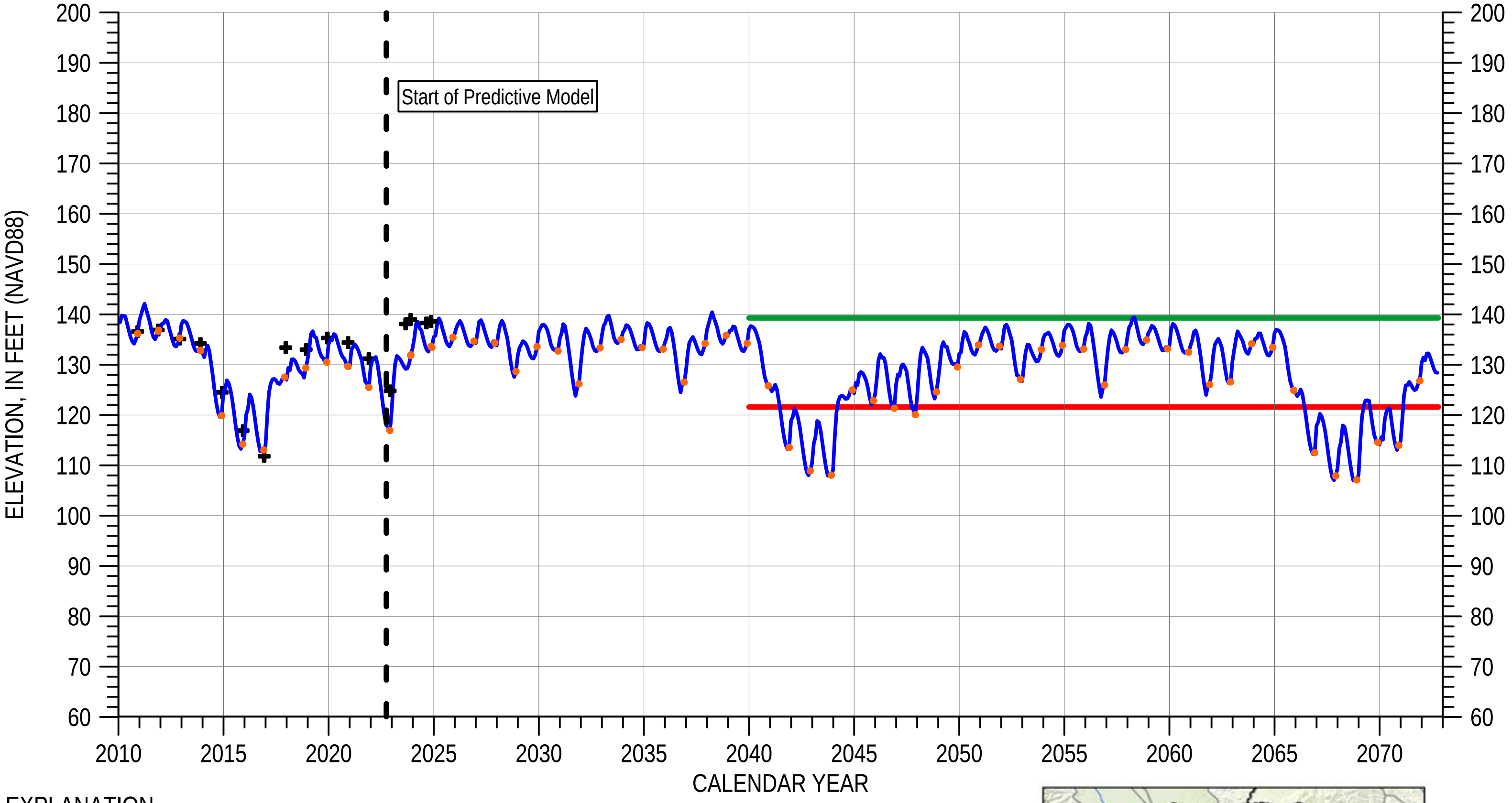


S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

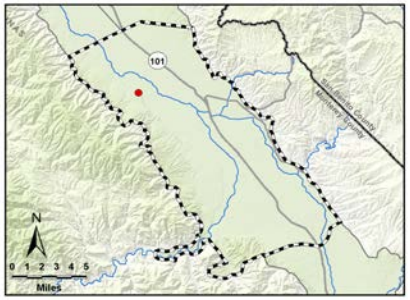
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 17S/05E-27A01

Forebay Aquifer Subbasin



EXPLANATION

- ▬ Simulated
- ▬ Minimum Threshold
- ▬ Measurable Objective
- ✚ Observed
- ● Simulated - November



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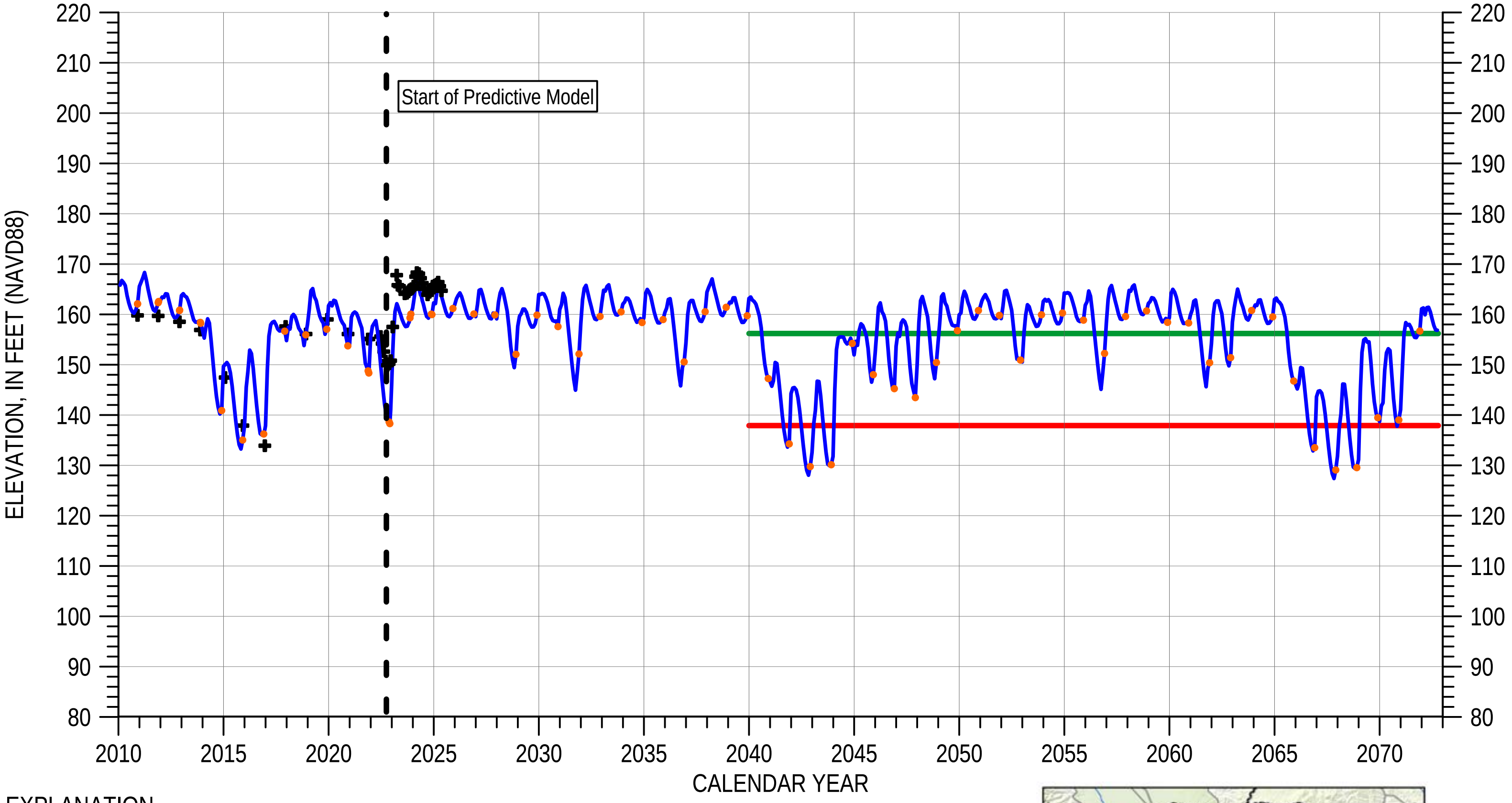
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 17S/06E-27K01

Forebay Aquifer Subbasin



EXPLANATION

- ▬ Simulated
- ▬ Minimum Threshold
- ▬ Measurable Objective
- ✚ Observed
- ● Simulated - November

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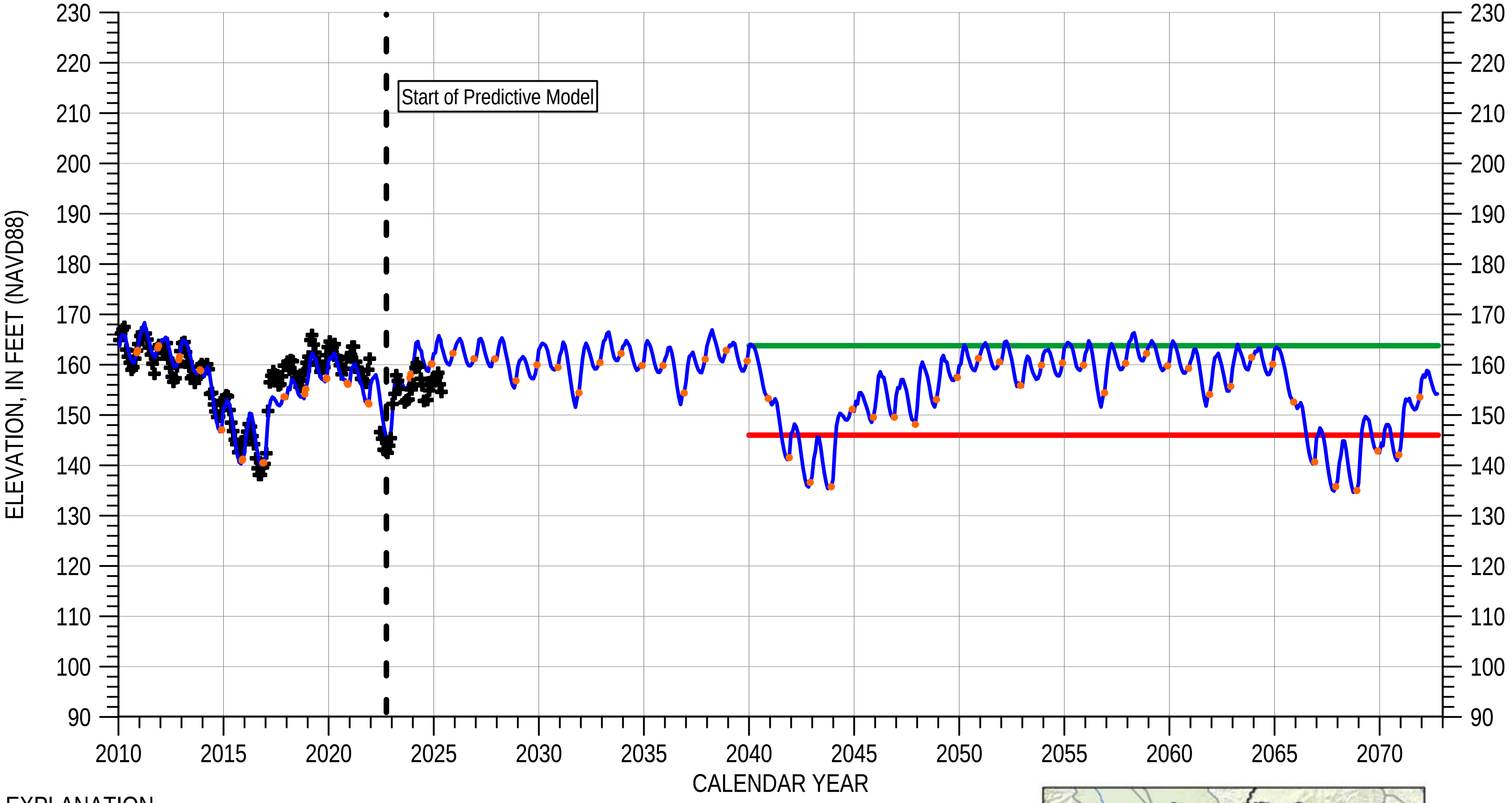
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

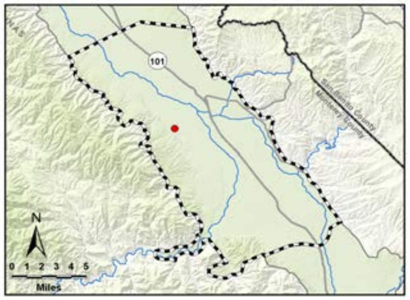
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 18S/06E-06M01

Forebay Aquifer Subbasin



EXPLANATION

Simulated	✚ Observed
Minimum Threshold	● Simulated - November
Measurable Objective	



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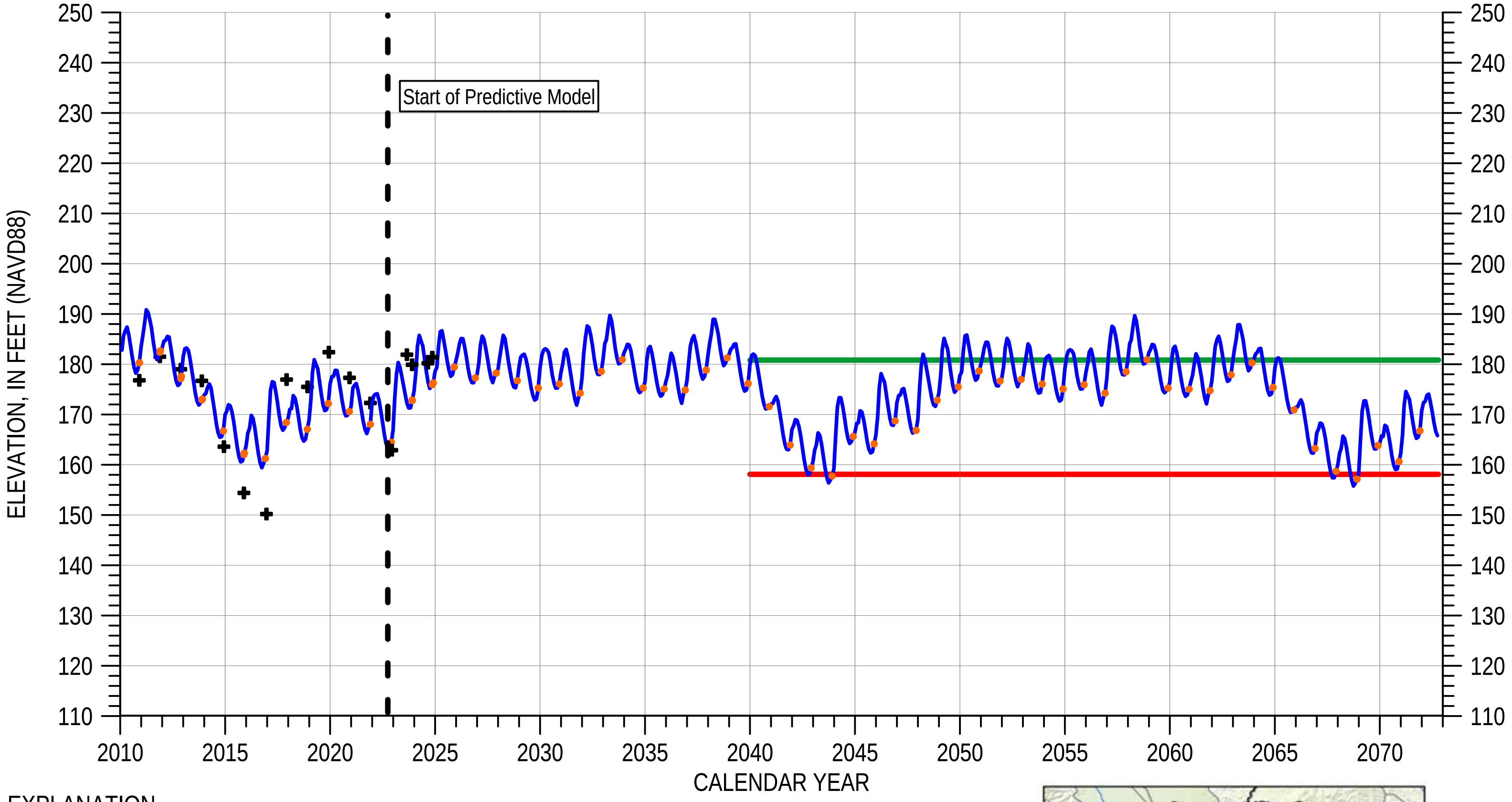
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

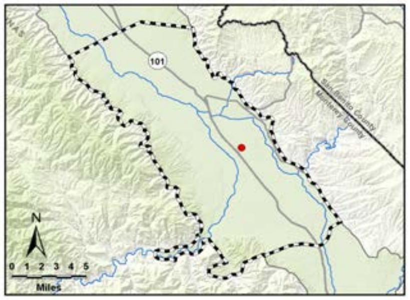
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 18S/06E-11J01

Forebay Aquifer Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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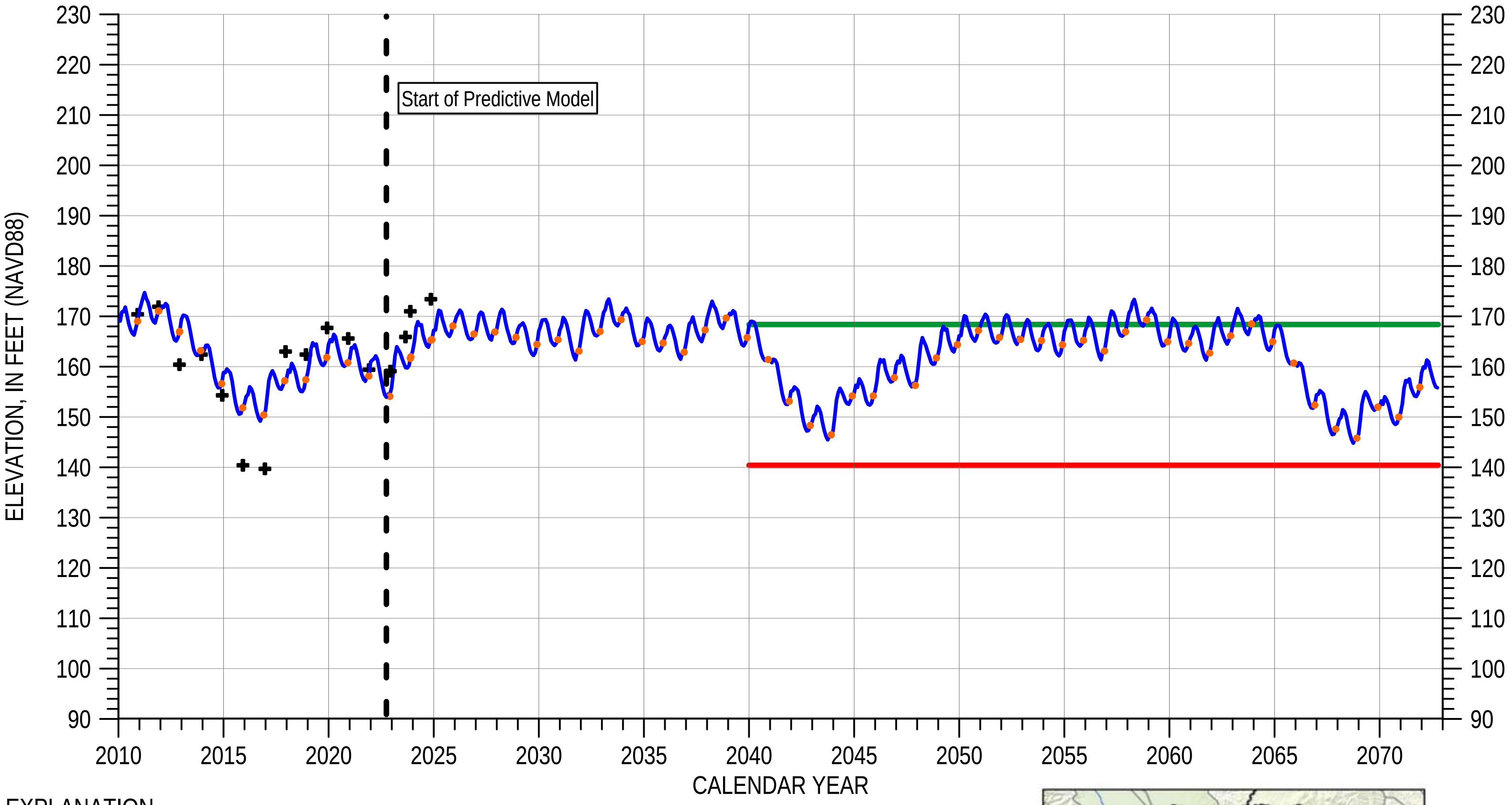
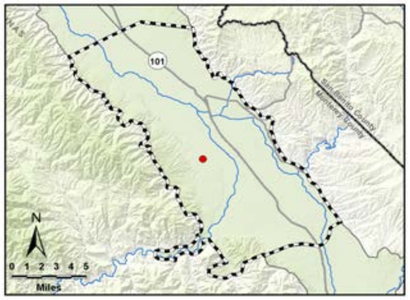
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 18S/06E-16L01

Forebay Aquifer Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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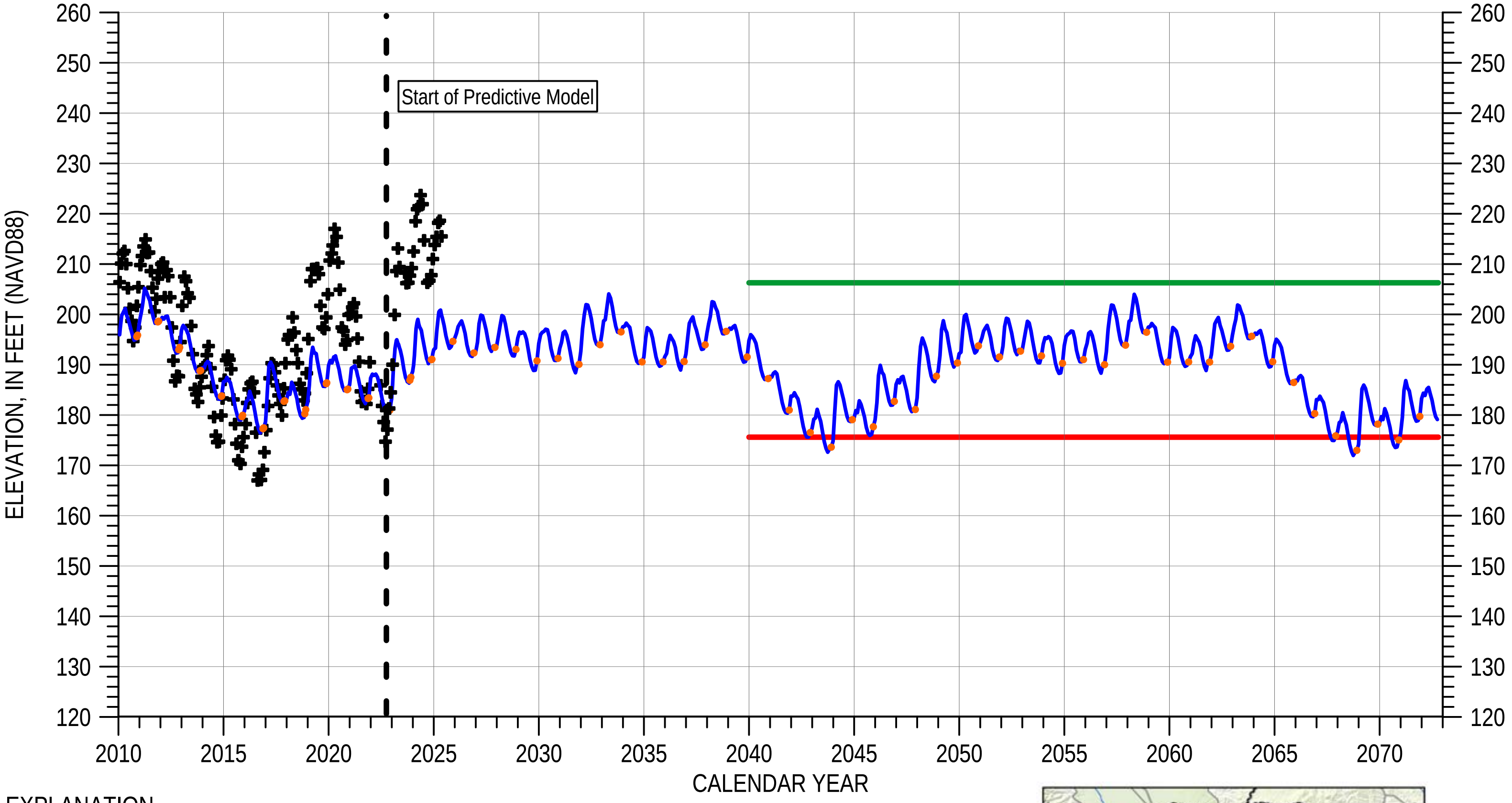
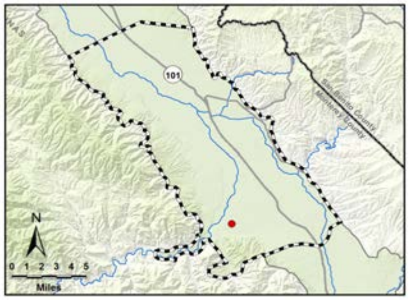
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 19S/06E-11C01

Forebay Aquifer Subbasin



EXPLANATION

🟦 Simulated	✚ Observed
🟥 Minimum Threshold	● Simulated - November
🟩 Measurable Objective	



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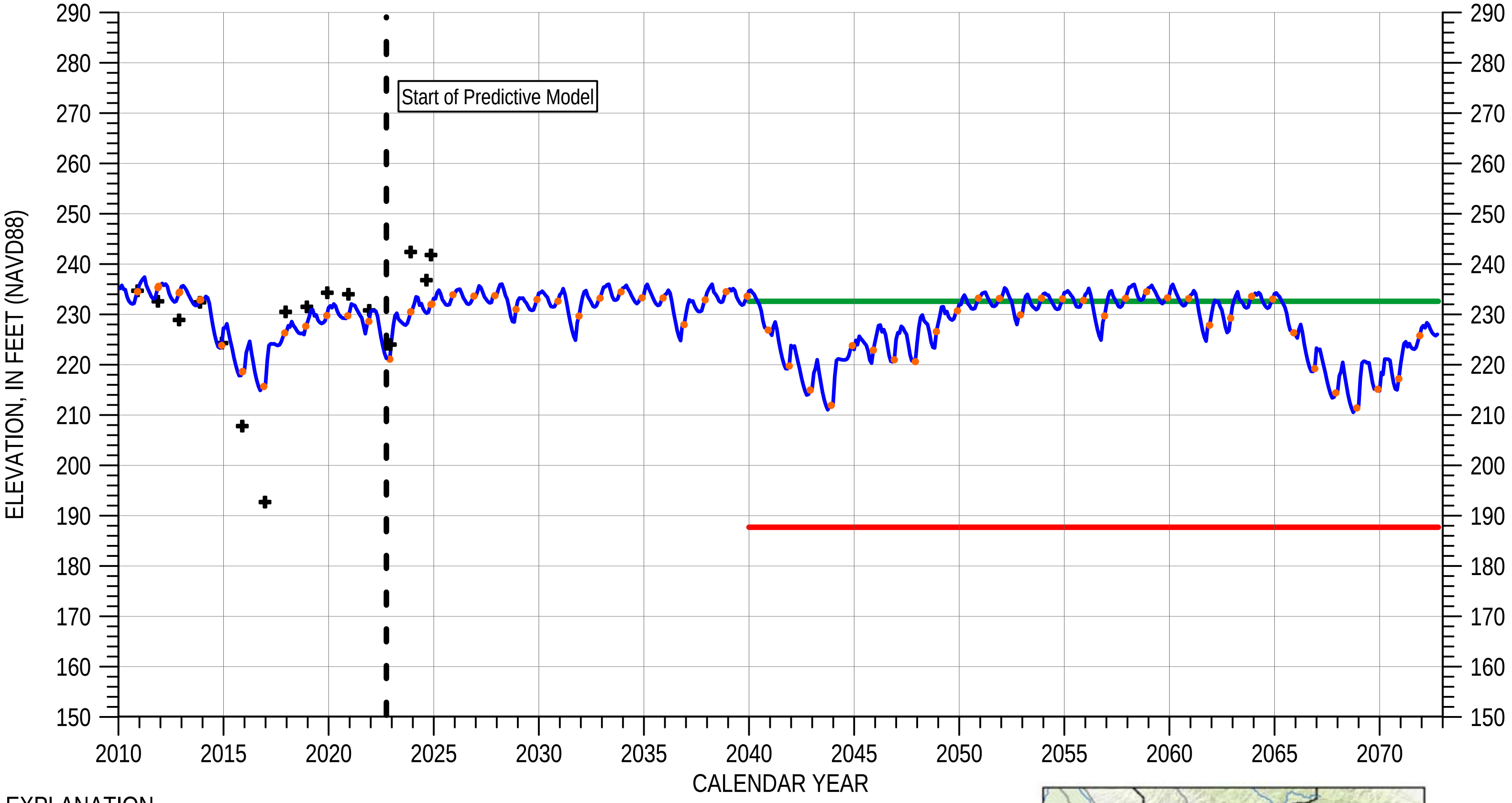
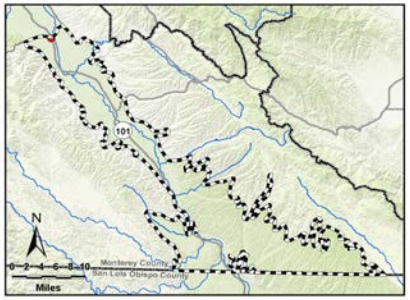
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 19S/07E-14N02

Upper Valley Aquifer Subbasin



EXPLANATION

━	Simulated	✚	Observed
━	Minimum Threshold	●	Simulated - November
━	Measurable Objective		



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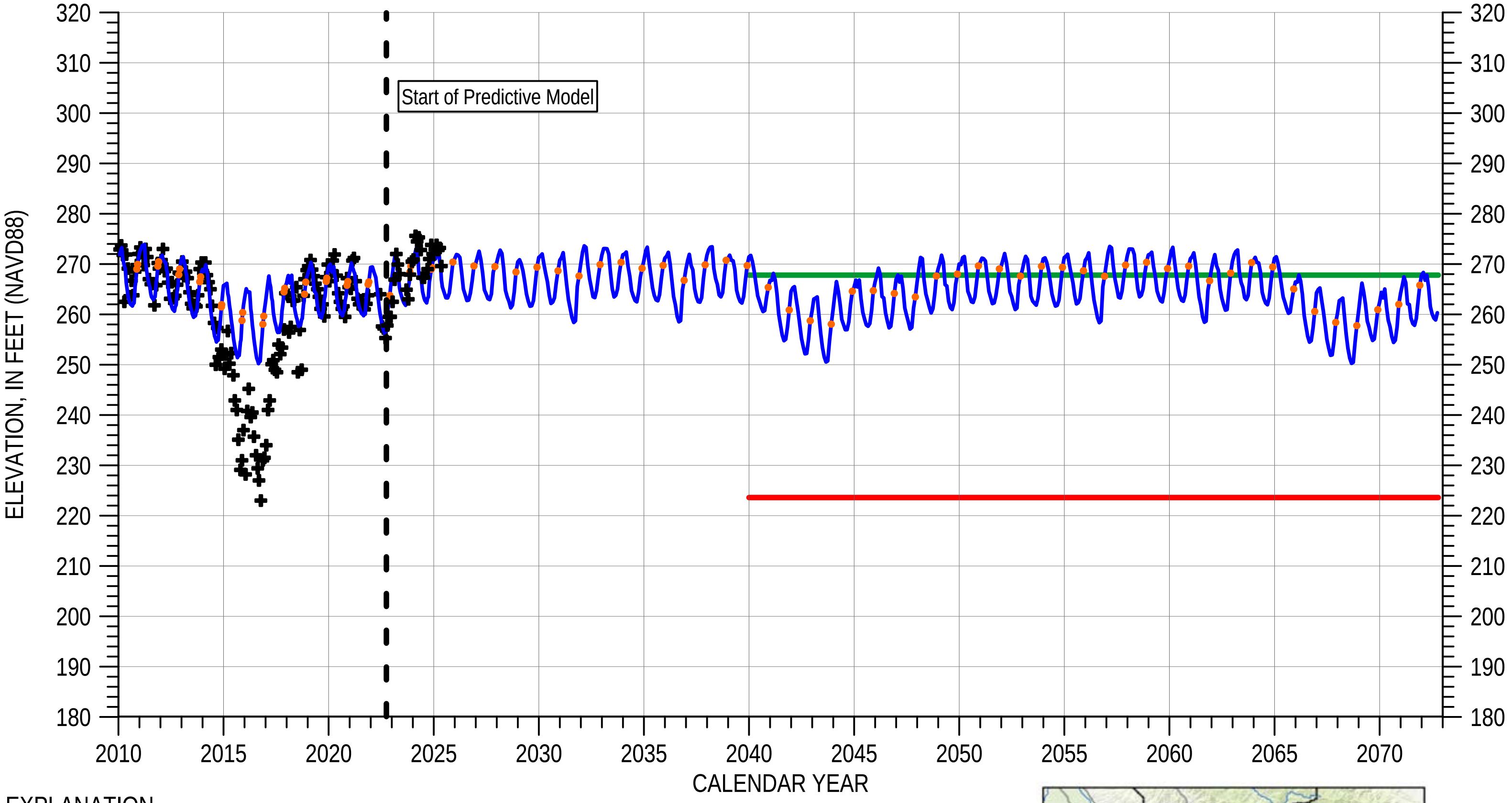
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

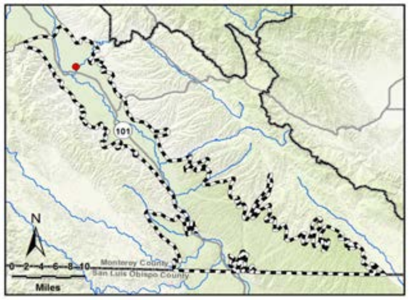
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 20S/08E-05R03

Upper Valley Aquifer Subbasin



EXPLANATION

- Simulated
- Minimum Threshold
- Measurable Objective
- ✚ Observed
- ● Simulated - November



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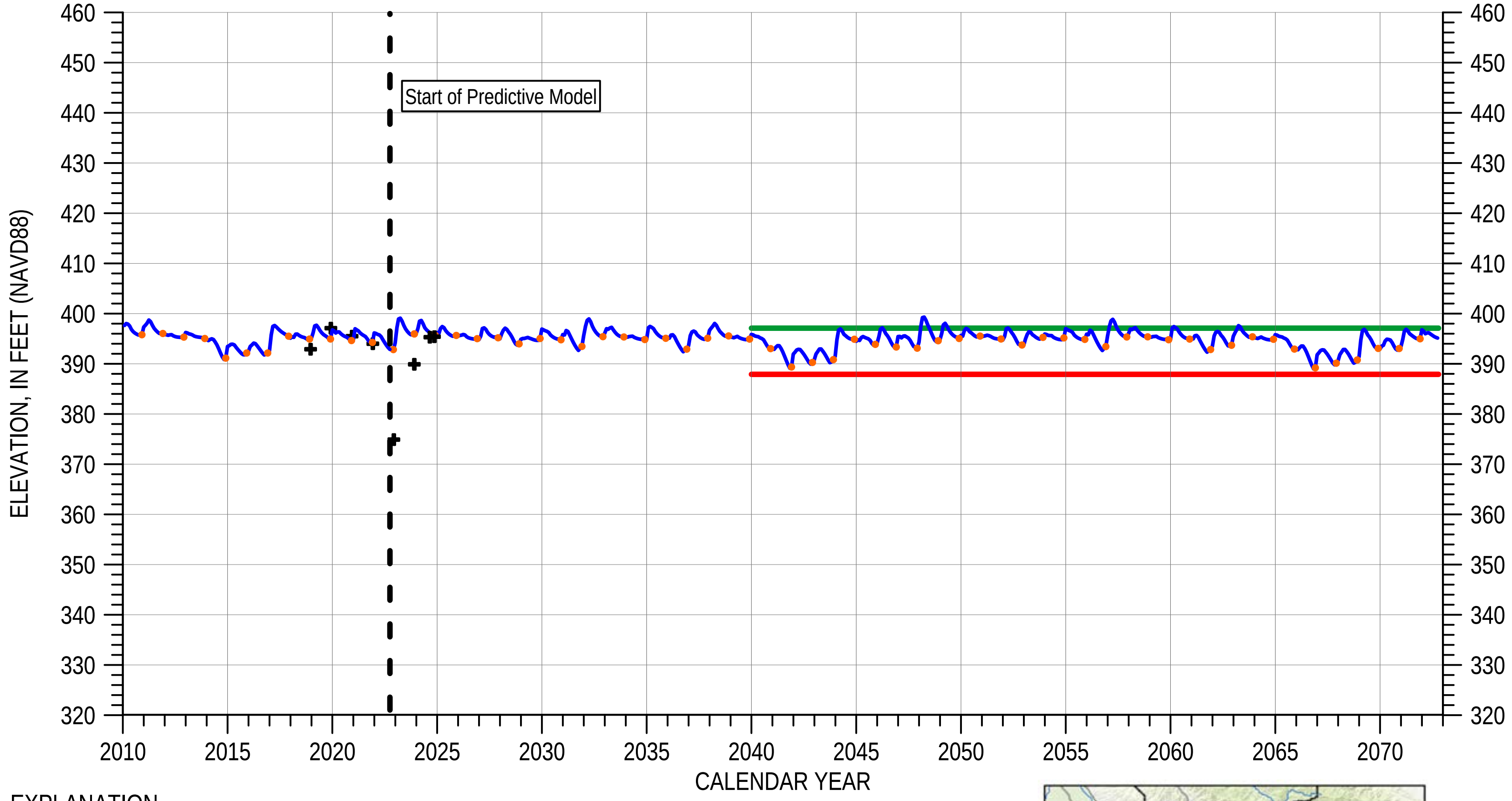
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

HYDROGRAPH OF GROUNDWATER ELEVATION FOR 21S/08E-13H01

Upper Valley Aquifer Subbasin



EXPLANATION

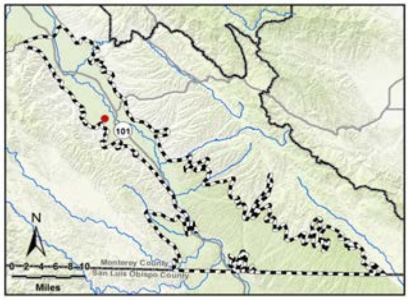
Simulated

Minimum Threshold

Measurable Objective

✚ Observed

● Simulated - November



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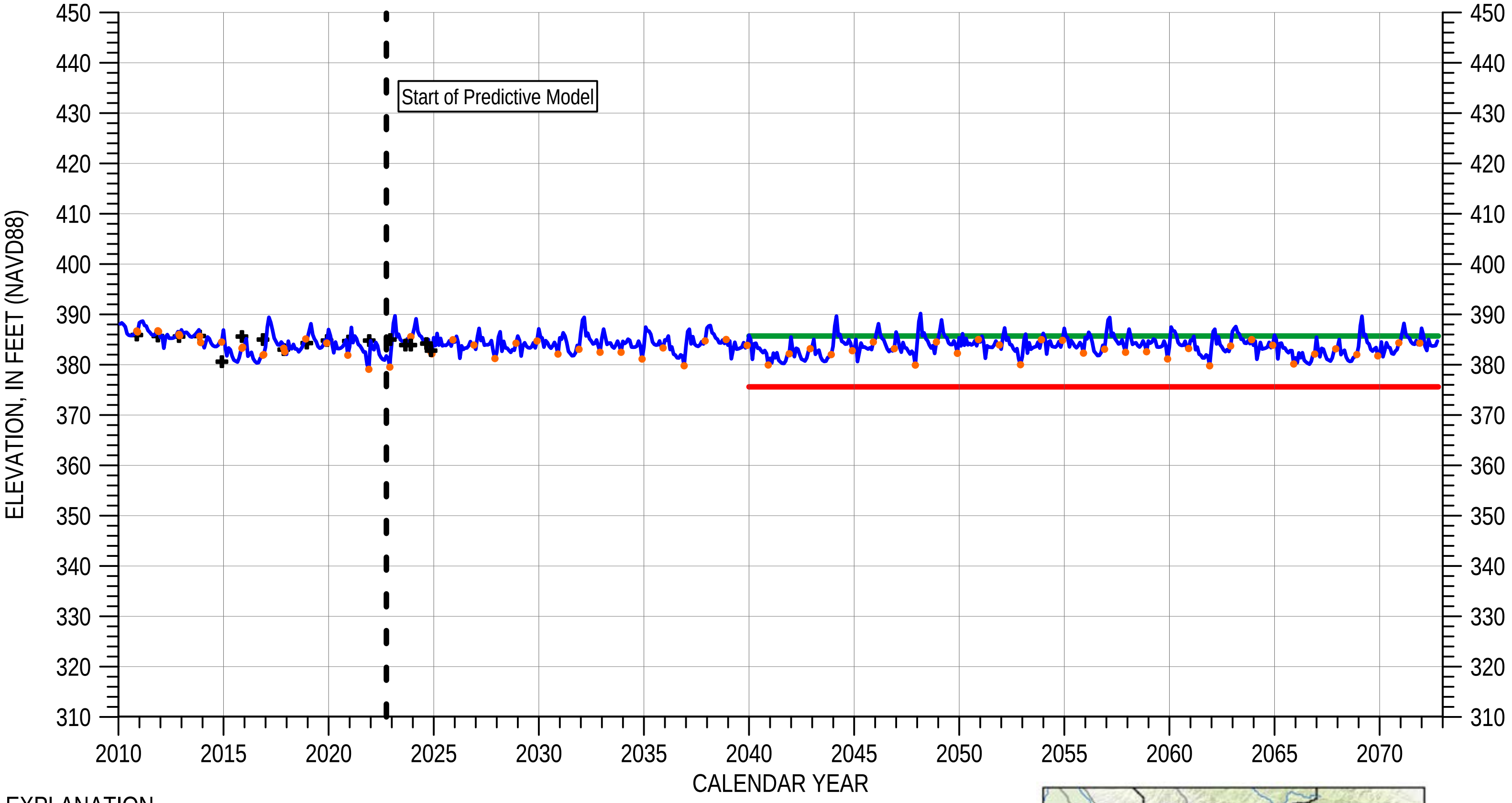
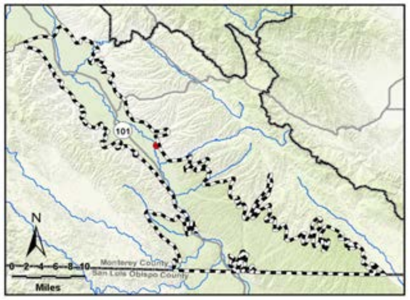
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 21S/10E-32N01

Upper Valley Aquifer Subbasin



EXPLANATION

- 🟦 Simulated
- 🟥 Minimum Threshold
- 🟩 Measurable Objective
- ✚ Observed
- ● Simulated - November



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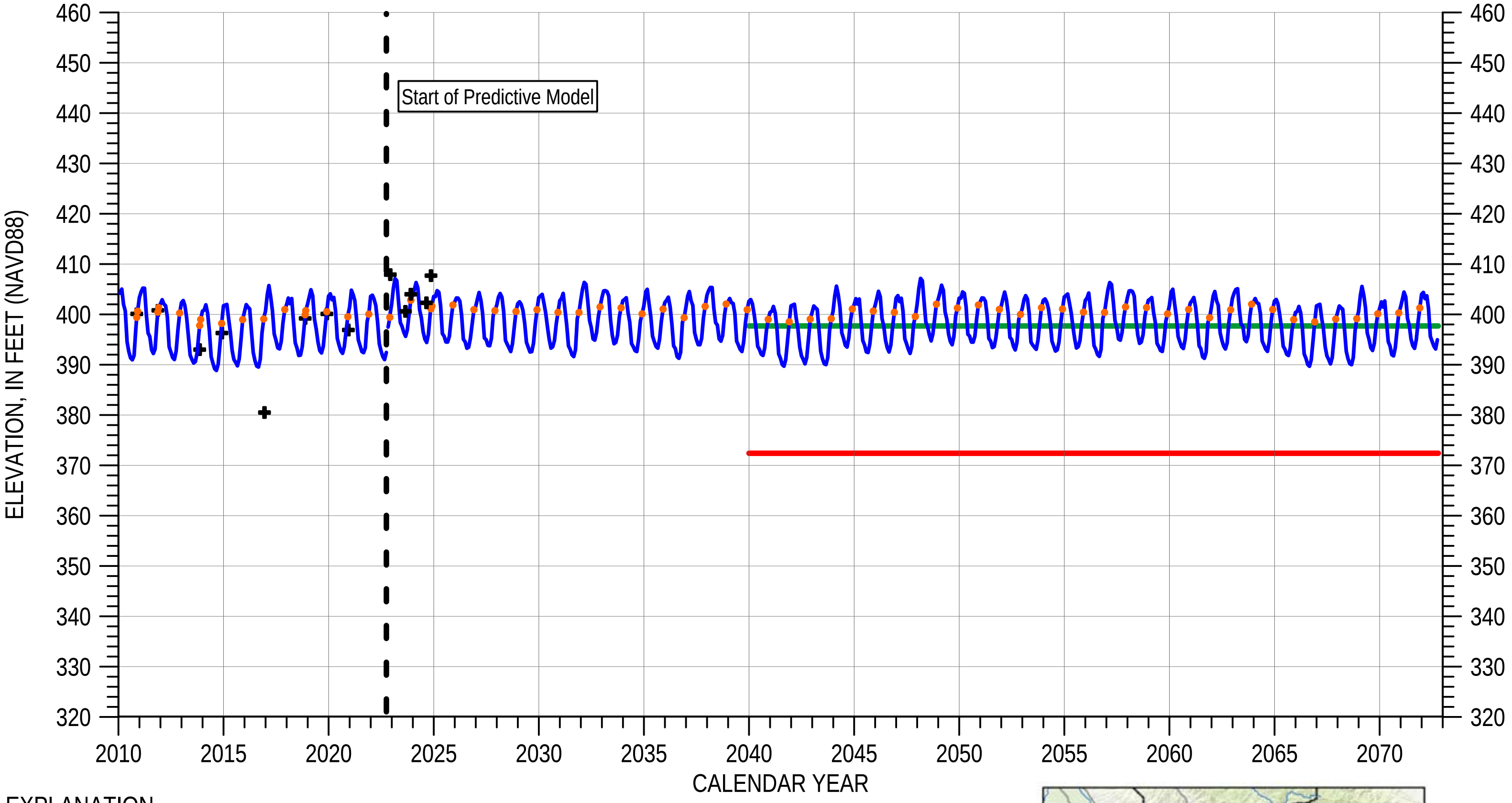
S:\projects\9100_Salinas_GSP\Model Input Output\Docs and Memos\SVOM\SVOM_BaselineModel_Addendum\Figures\Baseline_sim_obs_hydrographs\grf\withNov_points

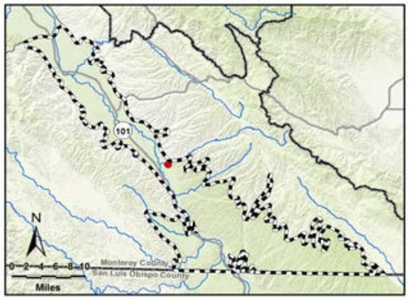
HYDROGRAPH OF GROUNDWATER ELEVATION FOR 22S/10E-16K01

Upper Valley Aquifer Subbasin



EXPLANATION

- 🟦 Simulated
- 🟥 Minimum Threshold
- 🟩 Measurable Objective
- ✚ Observed
- ● Simulated - November



MONTGOMERY & ASSOCIATES

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