

Las Posas Valley Groundwater Basin Technical Advisory Committee Regular Meeting

Meeting Minutes
for
April 21, 2026

A. Call to Order

Chair Taylor called the regular meeting of the Las Posas Valley Technical Advisory Committee (TAC) to order and welcomed all attendees at 2:01 pm.

B. Roll Call

One voting TAC members was absent (Dr. Bob Abrams):

- Vice Chair Tony Morgan – Present
- Chair Chad Taylor – Present

One non-voting TAC member was absent (Kimball Loeb):

- Bryan Bondy – Present
- Dr. Jill Weinberger – Sitting in for Kimball Loeb

Mr. Taylor reported the TAC had a quorum with two out of three voting members and representatives of both non-voting members present.

C. Agenda Review

Mr. Taylor indicated the agenda for the special meeting was published and notified by the Watermaster. He asked for comments on the agenda from TAC members or the public. No comments were presented.

D. Public Comments

Chair Taylor offered an opportunity for members of the public to raise items not on the agenda.

Dr. Farai Kaseke questioned whether the meeting was being recorded. Chair Taylor confirmed that the meeting is being recorded due to Dr. Bob Abrams' absence, so he can review the presentation at a later date.

E. TAC Member Comments

Mr. Taylor asked if TAC members had comments on items not on the agenda; none were raised.

F. Regular Agenda

1. Approve Minutes from Previous Meeting

Chair Taylor asked the TAC to discuss the draft minutes from the April 7, 2026 regular TAC meeting, which were included in the agenda packet.

Chair Taylor offered an opportunity for the TAC and public attendees to provide comments on the draft minutes; none were raised.

MOTION: Mr. Morgan moved to accept the minutes of the April 7, 2026 meeting

SECOND: Mr. Taylor seconded the motion

VOTE: Unanimously approved

2. Presentation from Calleguas Municipal Water District Consultants (Intera): East Las Posas Management Area Groundwater Model Update

The TAC received a presentation from Calleguas Mutual Water District's (CMWD's) groundwater consultant Intera. Dr. Trevor Jones led the presentation with assistance from Dr. Tyler Hatch. The presentation and subsequent discussion regarded recent updates and revisions to the East Las Posas Management Area (ELPMA) groundwater model, which is proposed to be used to evaluate operation of the Calleguas Aquifer Storage and Recovery (ASR) system. This work will be coordinated with the Calleguas ASR Study Group, which is led by Mr. Bondy. The Watermaster asked that the TAC consider the applicability of the revised ELPMA model for assessment of Calleguas ASR operations and broader basin management planning.

Dr. Jones explained that the original model was developed around 2015 and calibrated using data from 1970 through 2015. The first step in the model revision process was to extend the period and assess simulated conditions from 2015 through 2023 in comparison to observations from water level records, including data from high-frequency monitoring, new monitoring wells, and data collected during the 2022 CMWD emergency imported water recovery event when approximately 4,000 acre-feet of previously recharged water was recovered over a period of around 4.5 months.

This model validation effort, which did not include model modifications or recalibration, revealed the following:

- The model general overestimated groundwater levels in the northern ELPMA
- Temporal trends were well reproduced in the southern ELPMA, where aquifer conditions are more stable
- The model representation of drawdown responses during ASR recovery operations could be improved
- Model simulated heads biased approximately 15 feet high in some wells

The next step in the model revision was to perform a structural review of the model, focusing on the Fox Canyon and Grimes Canyon aquifers. This led to a conceptual revision, specifically: splitting the Fox Canyon aquifer into two model layers based on geophysical logs, well data, and regional hydrogeologic interpretation. Additional refinement included improved representation of the Fairview Fault and Moorpark Anticline conductance and hydraulic connectivity. The structural revisions were followed by recalibration of the model using a global optimization method (Iterative Ensemble Kalman Smoother) and geostatistical interpolation. Key outcomes of the revisions and recalibration included:

- The ELPMA model was extended through March 2023, using monthly and daily data
- The Fox and Grimes Canyon aquifer geometries were refined based on geophysical data
- Fox Canyon was split into two model layers as reflected in geophysical data
- Recalibration:
 - Addressed the higher-than-observed water level simulation

- Improved simulation of ASR operations
- Resulted in better statistical fit, with water level residuals generally within 2 to 4 percent of observed groundwater levels

Mr. Taylor asked for clarification that calibration adjustments were primarily focused on aquifer parameters and fault conductance, rather than recharge or discharge components. Dr. Jones confirmed that structural and parameter changes were mainly within the Fox Canyon and Grimes Canyon system, with shallow aquifers left largely unchanged.

Mr. Morgan asked what additional work Intera would pursue if given unlimited time and budget. Dr. Jones indicated they would focus on areas of weaker model performance, specifically revisiting certain monitoring well locations (notably clustered wells in the southern part of the ELPMA) and taking a closer look at hydrographs to refine how groundwater conditions are represented in those localized, structurally complex areas.

Chair Taylor asked whether the updated model is suitable not only for evaluating ASR operations but also for predictive simulations across the wider basin, particularly for long-term groundwater management decisions.

Dr. Jones indicated that the model improvements—particularly better calibration to observed groundwater levels and improved representation of ASR responses—support use of the model for both ASR evaluation and broader basin management planning.

Chair Taylor asked how the flux boundary conditions were defined for the portion of the model (Happy Camp Canyon area) that was removed from the active domain.

Mr. Bondy explained that the area was removed due to lack of available data to constrain groundwater conditions, which had previously led to unrealistic model behavior. The replacement flux boundary was defined using assumed average values supplemented by available information, with some calibration adjustment. Additional details are documented in supporting technical attachments (referenced as Attachment A), which will be provided to the TAC.

Chair Taylor asked for public comments:

Reddy Pakala (retired manager, Ventura County Water Works District; resident of Moorpark) provided comments and a question regarding the groundwater model and basin hydrogeology. Mr. Pakala noted that the basin benefits from a long historical dataset from approximately 1970 through the present and expressed support for the continued refinement of the groundwater model using more recent data. He stated that the updated modeling effort appears to be a valuable tool for future planning and ensuring reliable water supply. Mr. Pakala asked for clarification on:

- The degree of hydraulic connection between the East and West Las Posas Management Areas, and
- How the shallow aquifer system (alluvial/Epworth deposits) connects with the deeper Fox Canyon and Grimes Canyon aquifers.

Mr. Bondy responded that East and West Las Posas are treated as separate management areas, with limited hydraulic connectivity between them. He clarified that while terminology such as “South Las Posas Basin” is no longer commonly used in management discussions, the shallow

alluvial aquifer and Epworth gravel units are still explicitly represented in the model as separate layers.

Mr. Bondy explained that the strongest hydraulic connection between shallow and deeper aquifers occurs in localized areas where confining units thin or are absent. In these zones, the Fox Canyon aquifer is relatively shallow and may be in more direct communication with overlying units. He noted that historically productive well fields were located in these areas due to this natural connectivity.

Chair Taylor thanked Intera for their presentation and noted that the TAC would continue to discuss the ELPMA model revisions in future meetings when Dr. Abrams is available.

Intera's presentation is attached to these minutes.

3. Update on Upcoming Committee Consultation Review Requests

Chair Taylor offered an opportunity for an update on the schedule for upcoming committee consultations from the Watermaster representative. Dr. Weinberger was not aware of any new developments.

Chair Taylor offered an opportunity for the TAC and public attendees to provide comments on upcoming committee consultation review requests. No items were raised.

4. Schedule for Completing Current Committee Consultations and Recommendation Reports

Chair Taylor confirmed the Recommendation Report for the revised ELPMA model is the only active TAC consultation and that report is due on the Watermaster June 5, 2026.

Mr. Taylor asked for comments or questions from TAC members or the public; no comments were provided.

G. Items for Future Agenda

Chair Taylor offered an opportunity for TAC members and public attendees to bring up items to for future TAC meeting agendas. He asked for TAC and/or public comments and none were raised.

H. Adjourn

Chair Taylor noted that the TAC appreciated the attention of all those in attendance and motioned to adjourn the meeting at 3:02 pm.

MOTION: Chair Taylor moved to adjourn the meeting at 3:02 pm

SECOND: Mr. Morgan seconded the motion

VOTE: Unanimously approved

Attachment 1

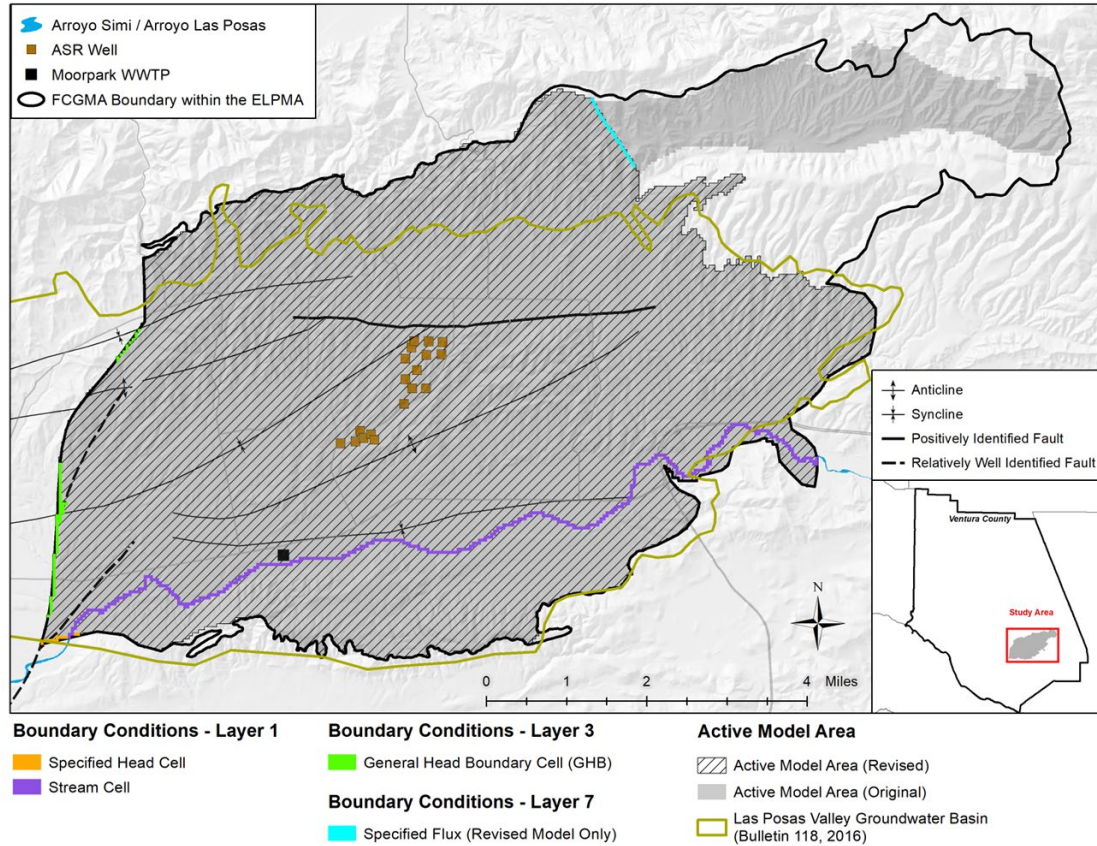
Intera Presentation, *East Las Posas Model, 2026 Model Update*, presented to Las Posas Valley Basin Technical Advisory Committee, dated April 21, 2026

East Las Posas Model 2026 Model Update

Presented to

Las Posas Valley Basin
Technical Advisory Committee

April 21, 2026



Agenda

- 1 History of Model Development and Use
- 2 New Data and Information Collected Since Model Development
- 3 Model Extension and Validation
- 4 Structural Refinements
- 5 Recalibration

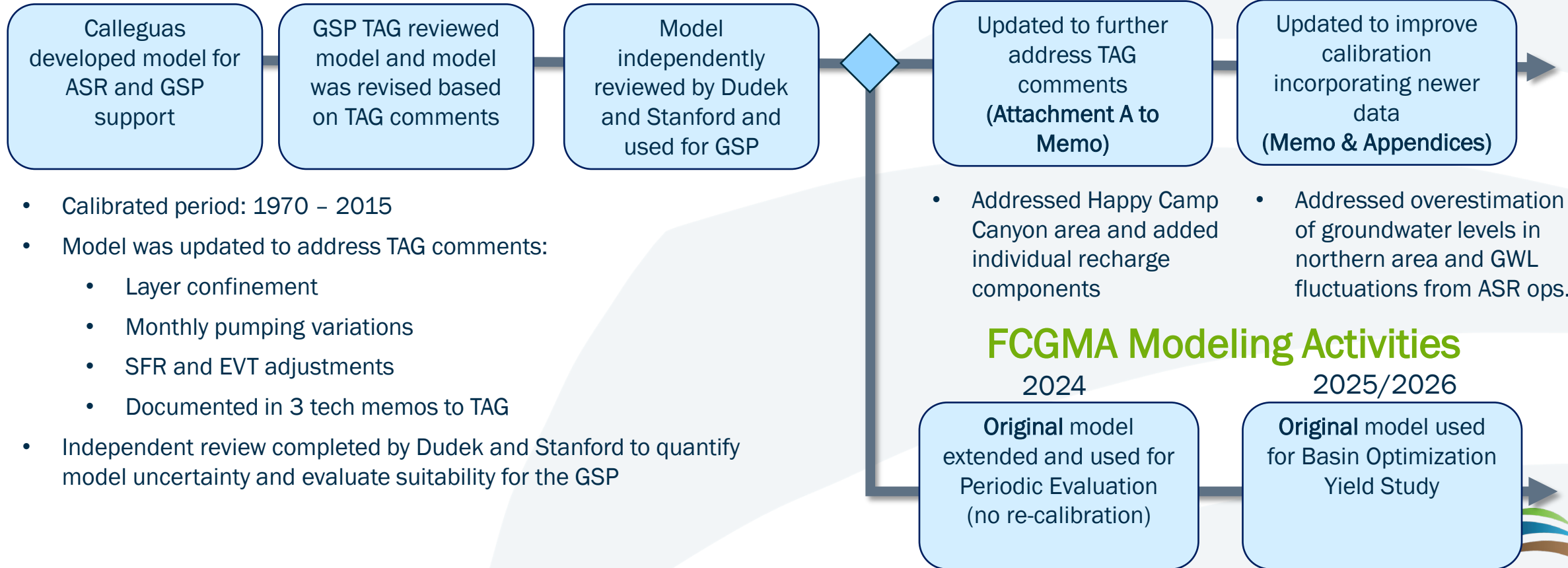
Key Takeaways

- Improved representation of Fox Canyon aquifer and Grimes Canyon aquifer
- Improved simulation of groundwater elevations across the ELPMA
- Improved simulation of Aquifer Storage and Recovery Operation responses across the ELPMA

History of Model Development and Use

Calleguas Model Development and Maintenance Activities

Original East Las Posas Model (2015 - 2019)



- Calibrated period: 1970 – 2015
- Model was updated to address TAG comments:
 - Layer confinement
 - Monthly pumping variations
 - SFR and EVT adjustments
 - Documented in 3 tech memos to TAG
- Independent review completed by Dudek and Stanford to quantify model uncertainty and evaluate suitability for the GSP

- Addressed Happy Camp Canyon area and added individual recharge components

- Addressed overestimation of groundwater levels in northern area and GWL fluctuations from ASR ops.

Phase 1 Model Updates

(Interim Updates; see Attachment A)

Happy Camp Canyon Area

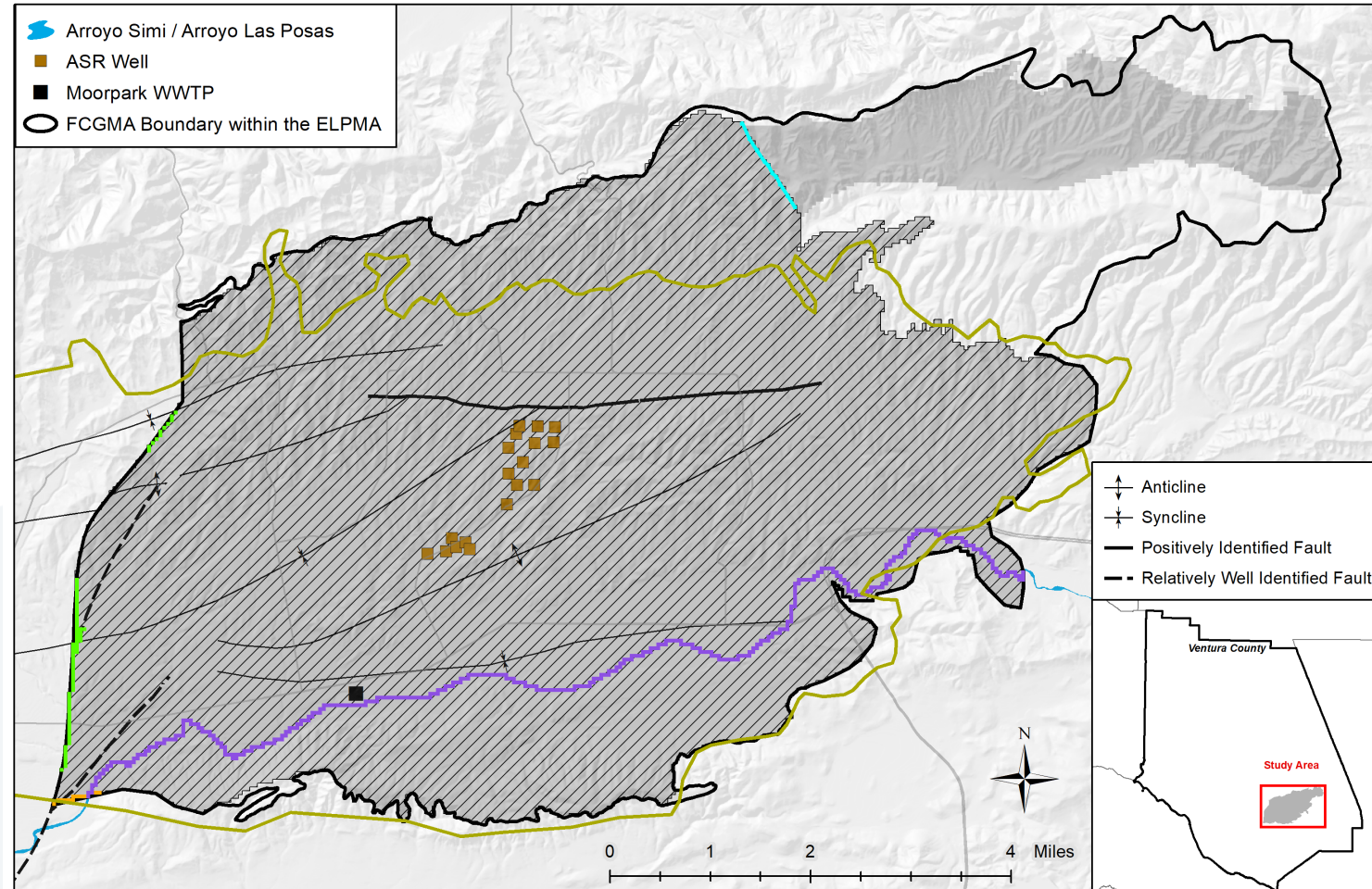
- Outcrop area removed from the active model domain and replaced with specified flux (WEL) cells
 - Implemented to address flooding in the north and east
 - No data in HCC area to support modeling

Return Flows

- Septic system return flows added to Shallow Alluvial and Epworth Gravels aquifers
- M&I return flows added to Shallow Alluvial and Epworth Gravels aquifer
- These were minor additions for completeness

Calibration

- Commensurate with the model used for GSP development



Boundary Conditions - Layer 1

- Specified Head Cell
- Stream Cell

Boundary Conditions - Layer 3

- General Head Boundary Cell (GHB)

Boundary Conditions - Layer 7

- Specified Flux (Revised Model Only)

Active Model Area

- Active Model Area (Revised)
- Active Model Area (Original)
- Las Posas Valley Groundwater Basin (Bulletin 118, 2016)

East Las Posas Model Update

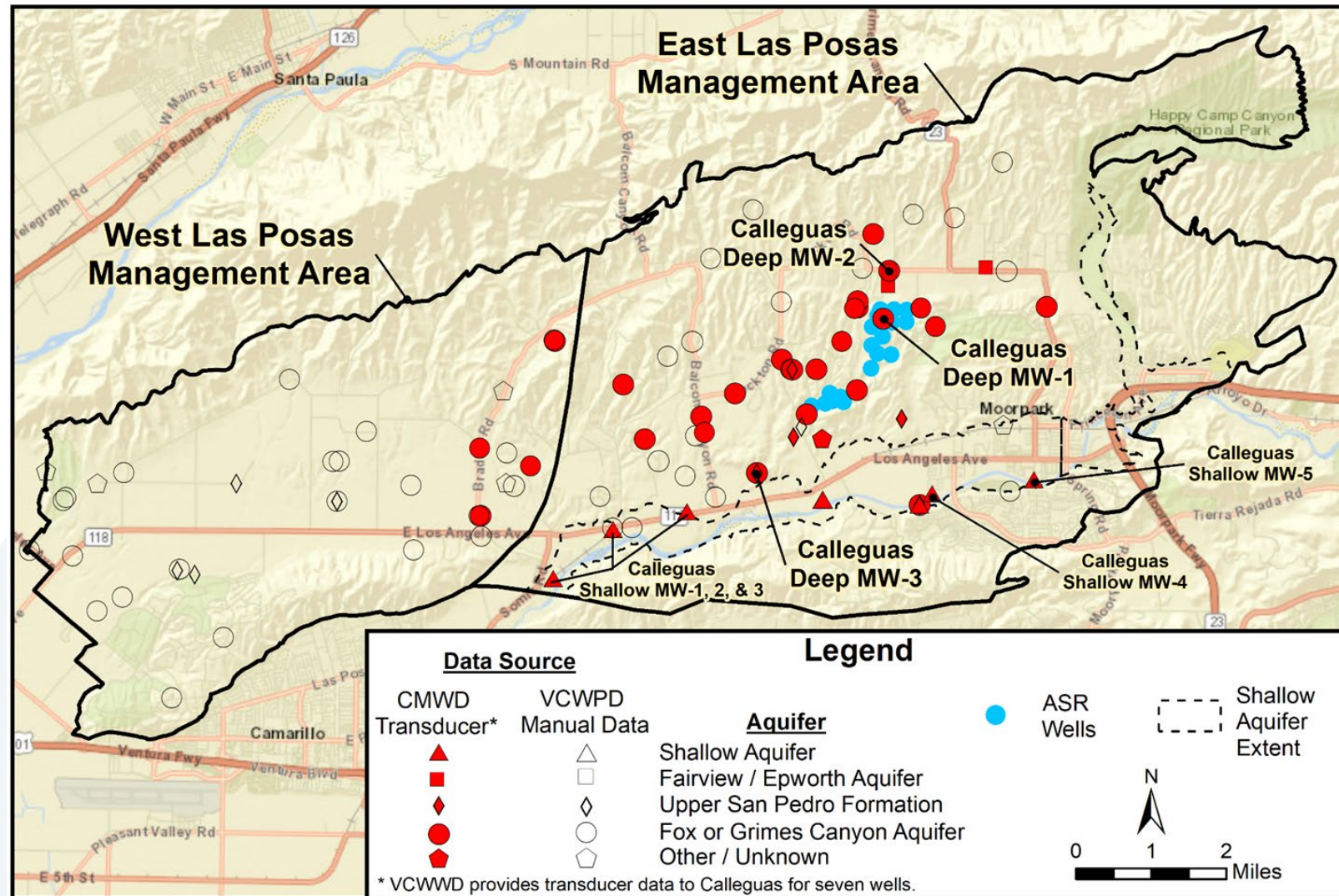
- New data and information
- Model extension and validation
- Decision to update model calibration based on validation results
- Model Recalibration

New Data and Information

(see Section 5.2)

- CMWD built out its groundwater monitoring network starting in 2010:
 - Installed transducers in numerous non-ASR wells throughout the LPVB
 - Five shallow monitoring wells along Arroyo Simi/Las Posas
 - Three new depth-discrete monitoring wells in the ELPMA (two nested and one clustered)

A significant amount of groundwater level data became available after original model construction to support updates

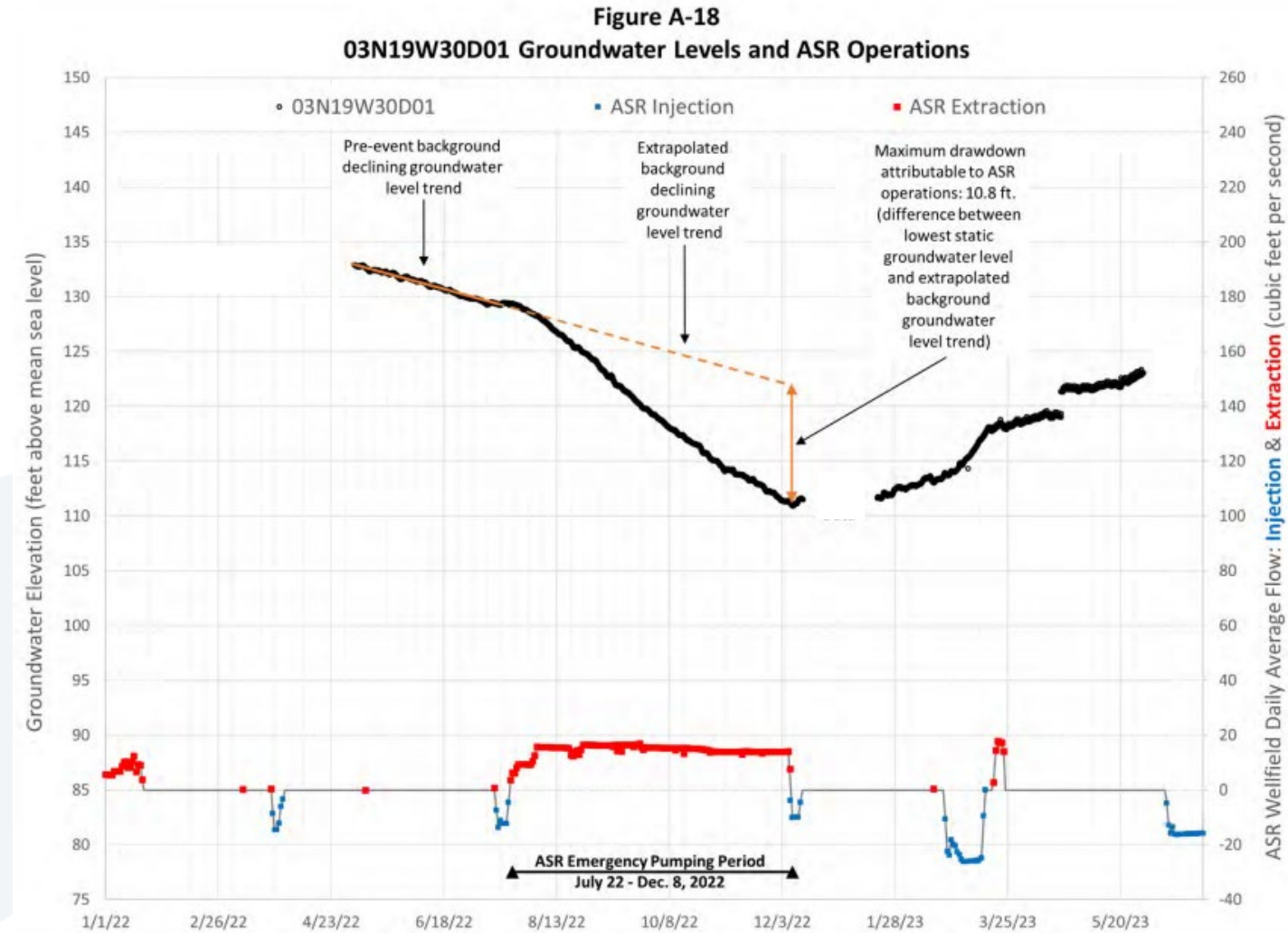


New Data and Information

(see Sections 3.5.1 and 5.2)

- In 2022, CMWD implemented their Emergency Imported Water Recovery Operational event:
 - Recovered approximately 4,000 AF of water in a 4.5-month period (July 21 – Dec 7)¹
 - High-frequency water level data collected during this event provide improved characterization of groundwater level responses to ASR operations than previously included in the model

With the monitoring network in-place, a robust dataset became available to calibrate groundwater level fluctuations near the ASR



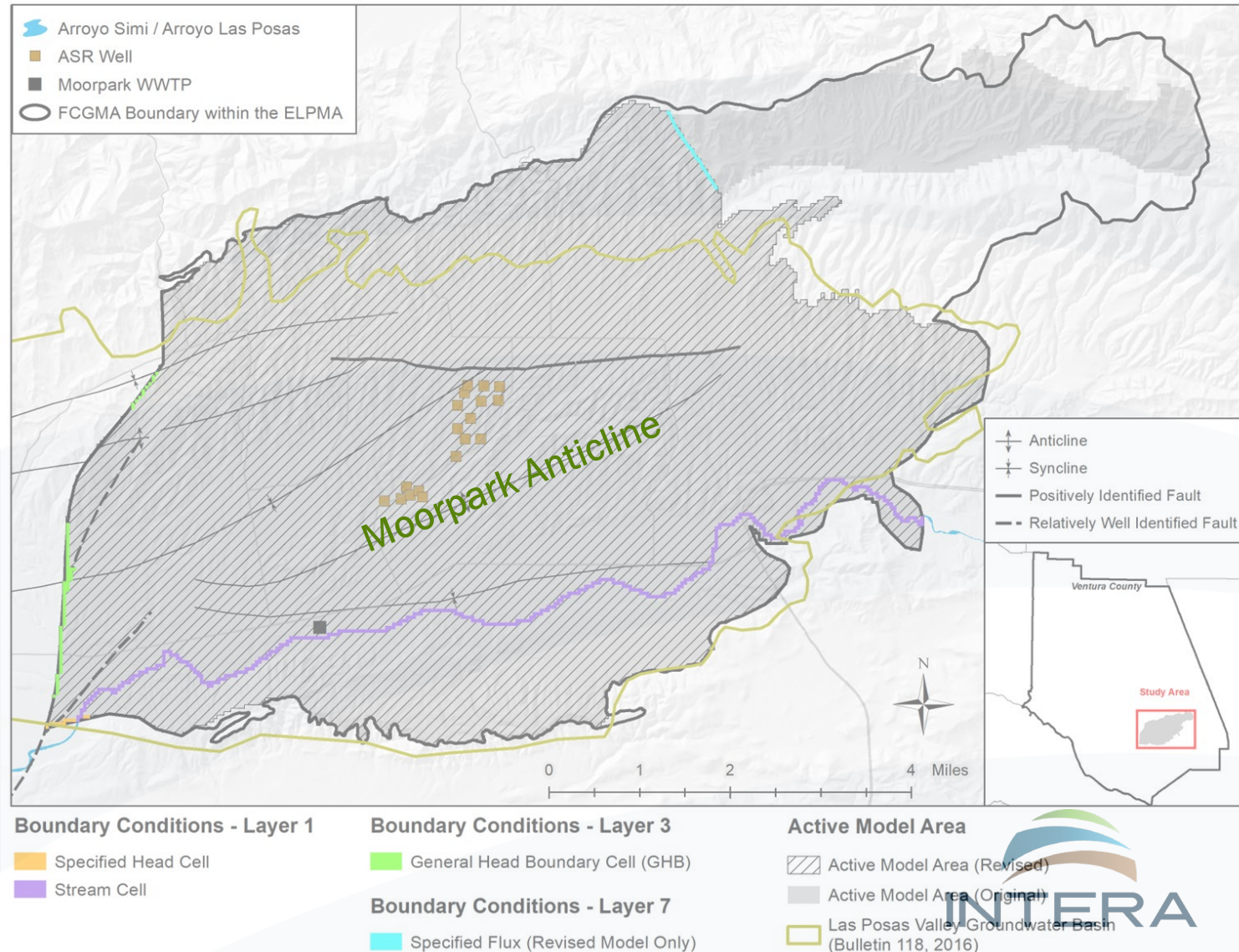
Model Extension

(see Section 3)

- **Simulation Time Period:**
 - Extended through March 31, 2023 (previously 1/1/1970 – 12/31/2015)
- **Stress Period Development:**
 - Monthly through December 31, 2021 (consistent with original model design)
 - Daily from January 1, 2022, through March 31, 2023
 - Allows for direct integration of high-frequency ASR well field operations and groundwater level measurements
- **Boundary Condition Packages**
 - RCH, SFR, EVT, GHB, CHD use constant monthly flux terms (consistent with original model design)
 - WEL pkg:
 - FCGMA reporting separated into monthly pumping estimates to match semi-annual reporting
 - ASR wells allowed to vary daily to better represent emergency recovery operations

Model Validation Evaluated Geographically

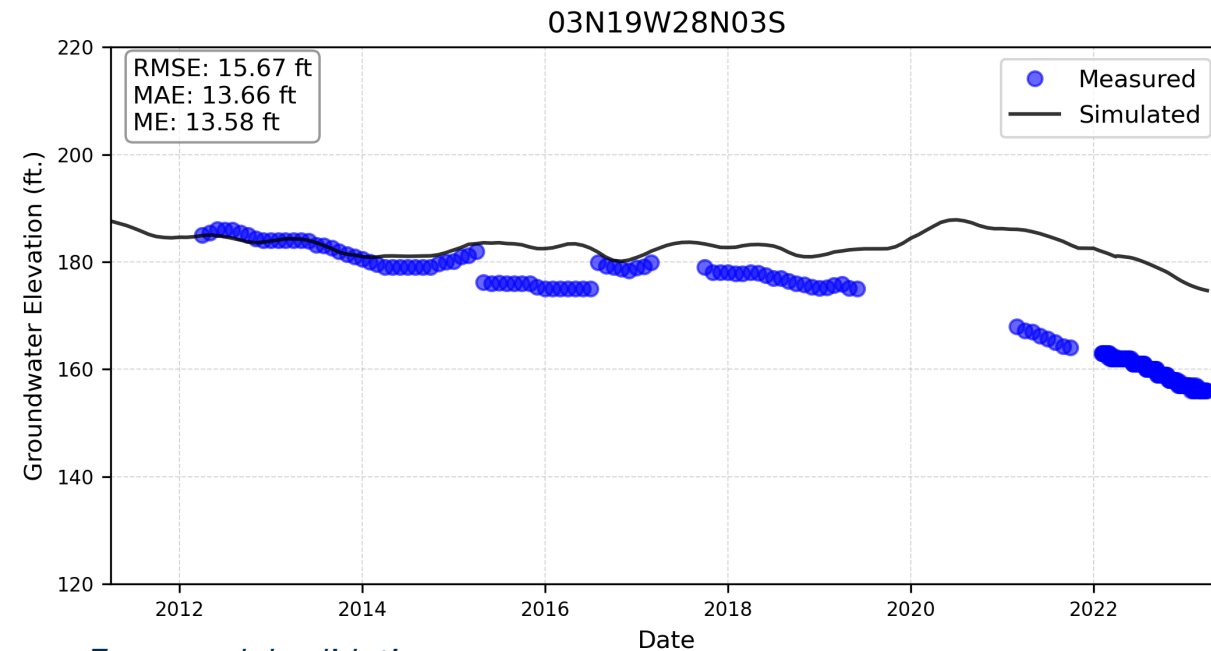
- Moorpark Anticline is the primary structural feature that limits flow from south to north
 - Contributed to observed groundwater level declines in northern ELPMA
- Southern ELPMA has progressively filled since the late-1970s and maintained high groundwater elevations



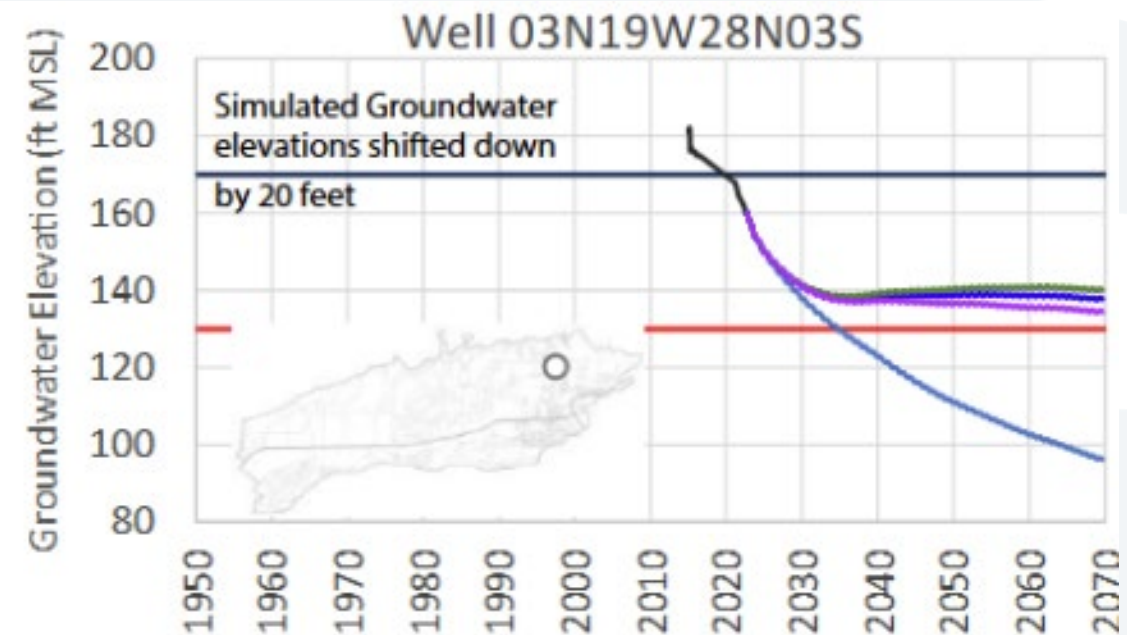
Summary of Validation

(see Section 4)

- Extension period used for model validation
- Regional heads in northern ELPMA high
 - Recognized during use for the GSP
- Opportunity to improve simulation of groundwater level fluctuations from ASR operations
 - Conclusion based on comparison of model output with previously unavailable monitoring data

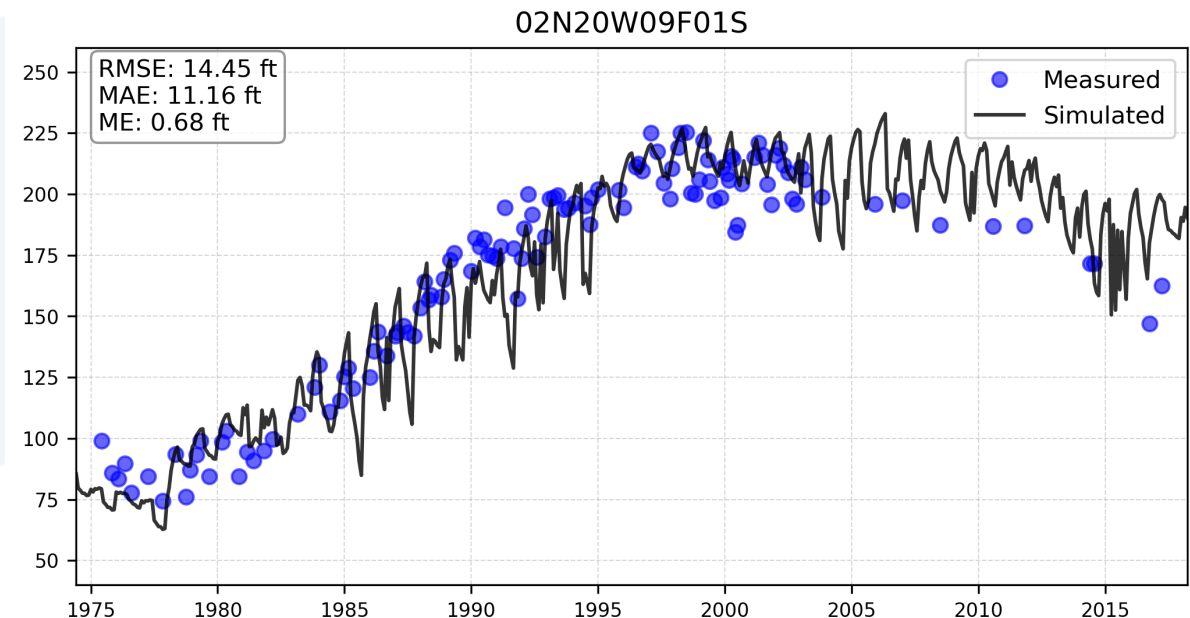
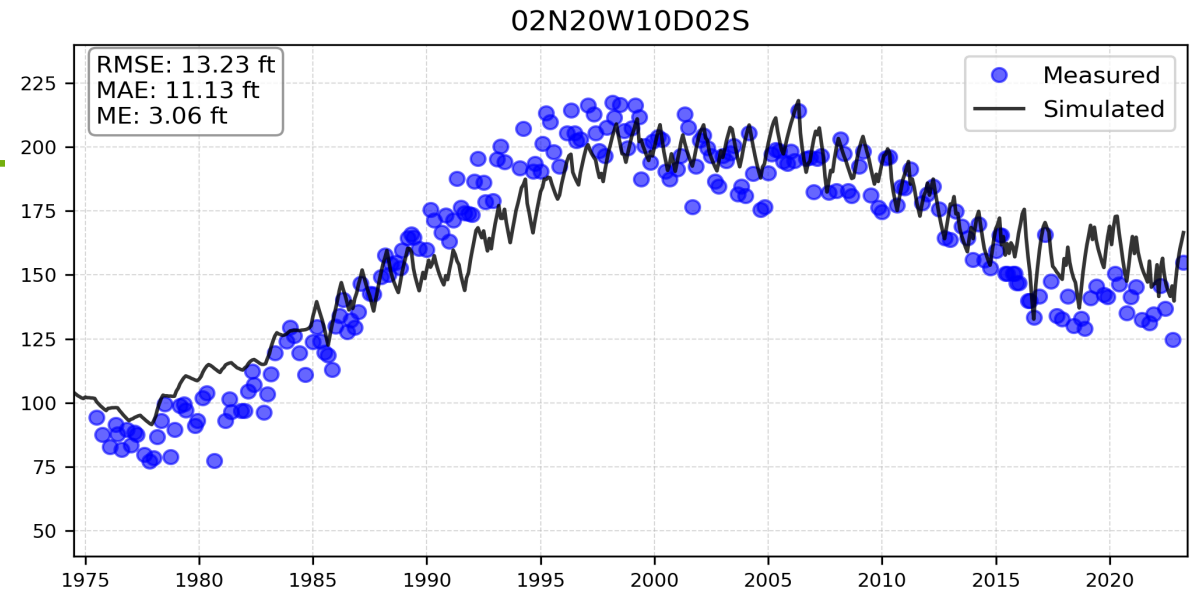


From model validation



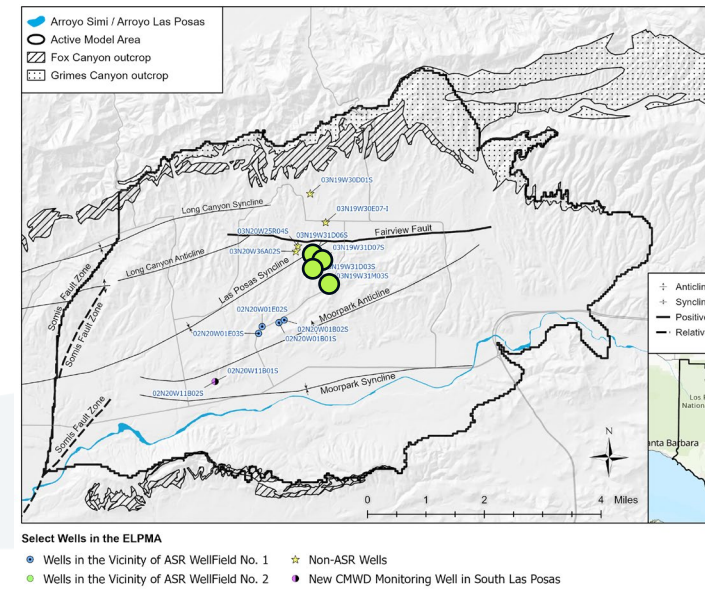
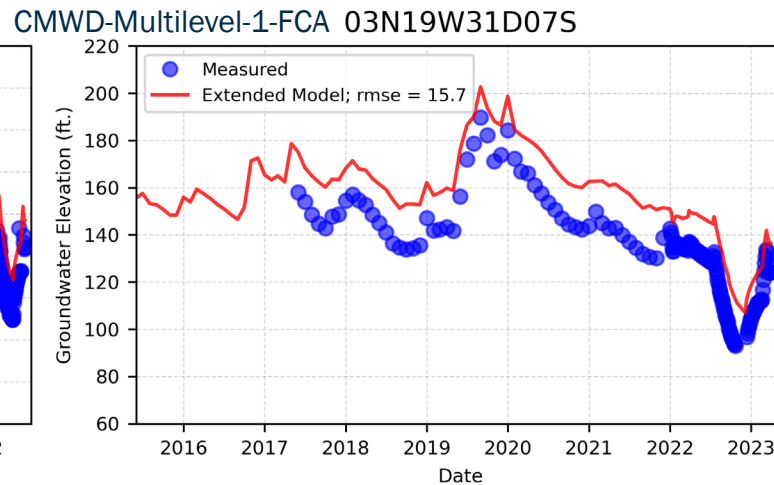
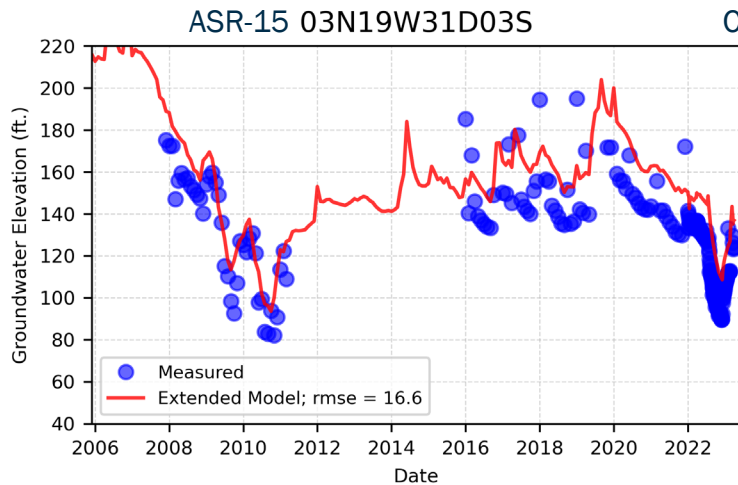
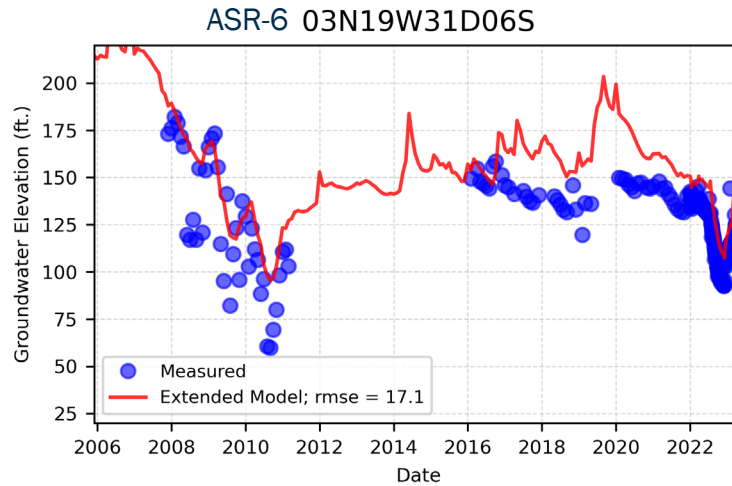
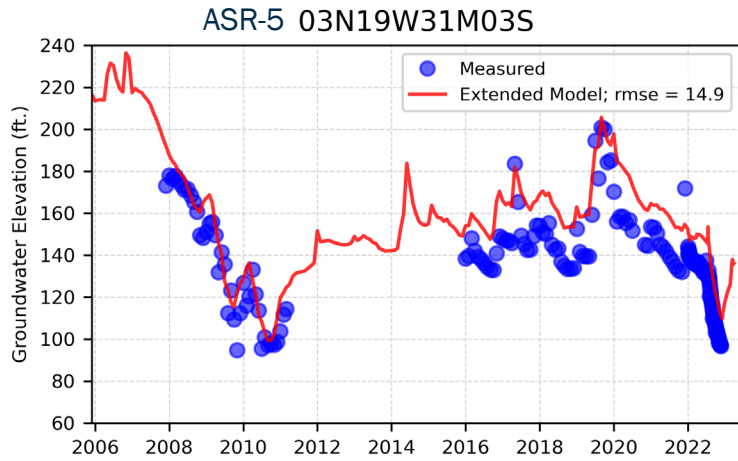
Model Validation Southern ELPMA

- The extended model reproduced groundwater level measurements in the southern ELPMA well
- Both the original and extended model have historically performed well in this area



Model Validation – ASR Wellfield

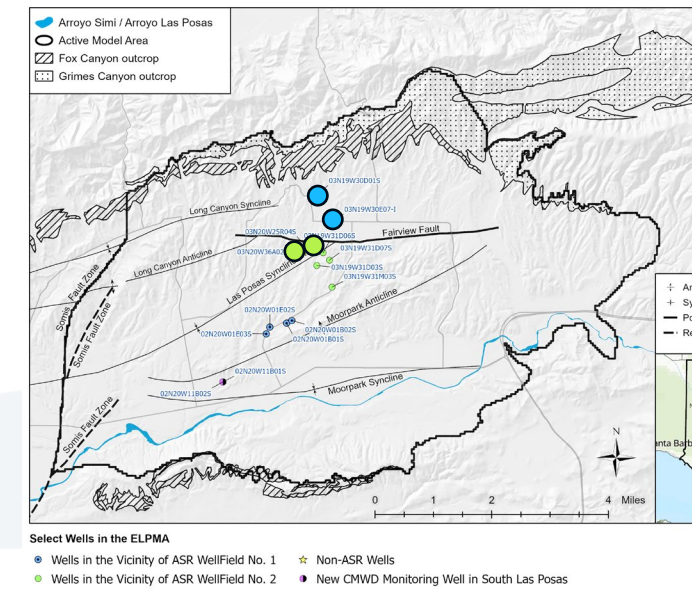
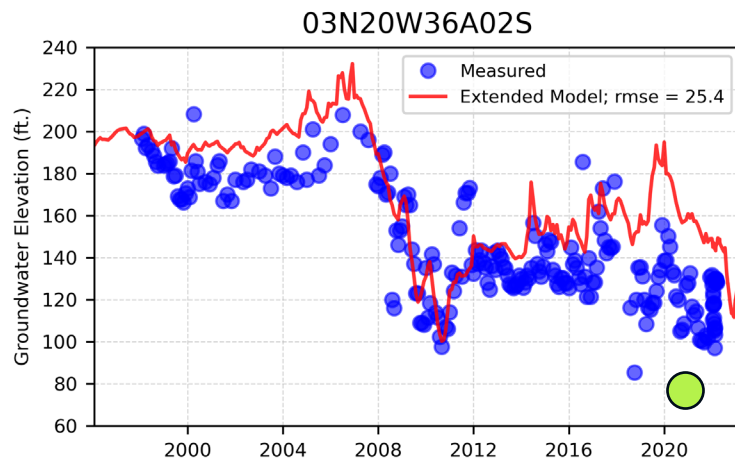
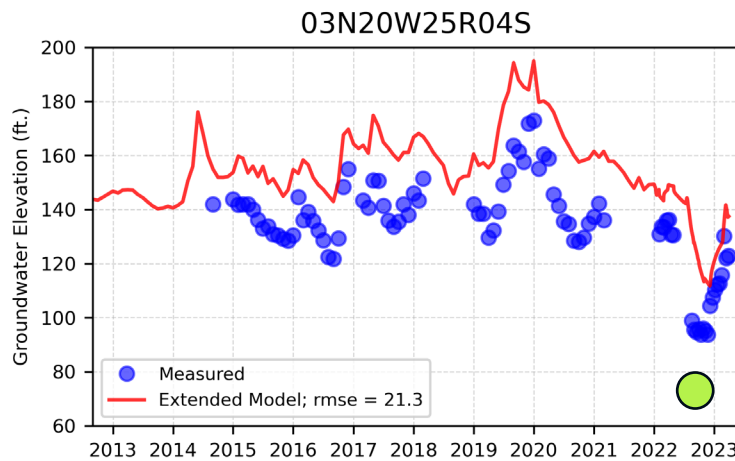
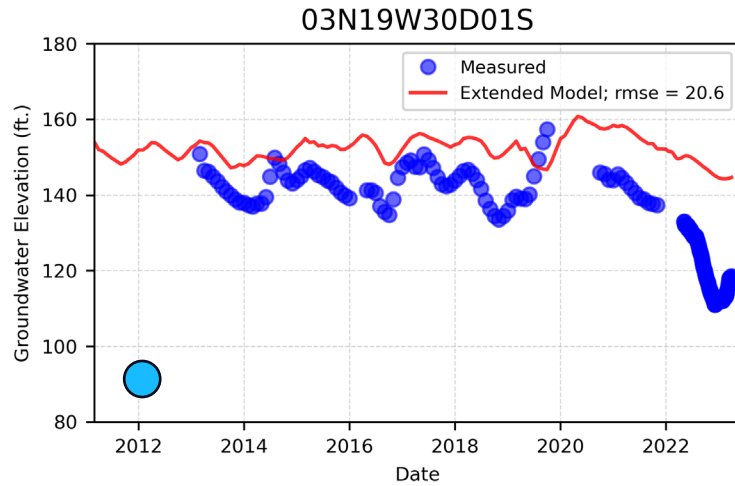
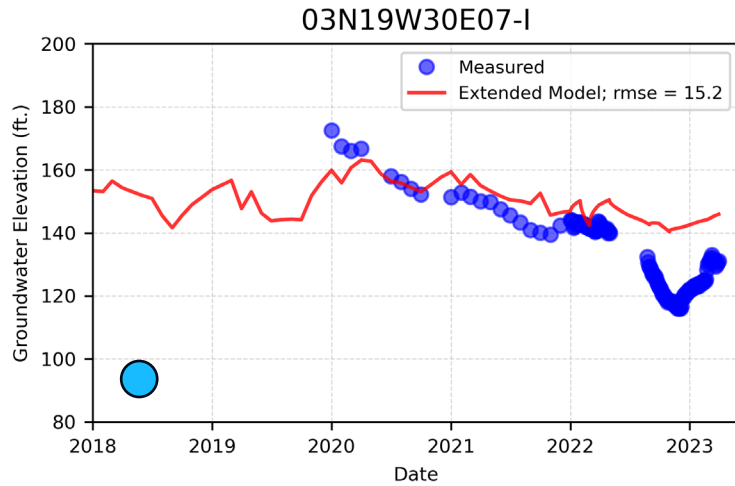
(see Section 4.0)



- Temporal patterns are well represented in the extended model
- Extended model tends to overestimate groundwater levels

Model Validation – North of ASR Wellfield

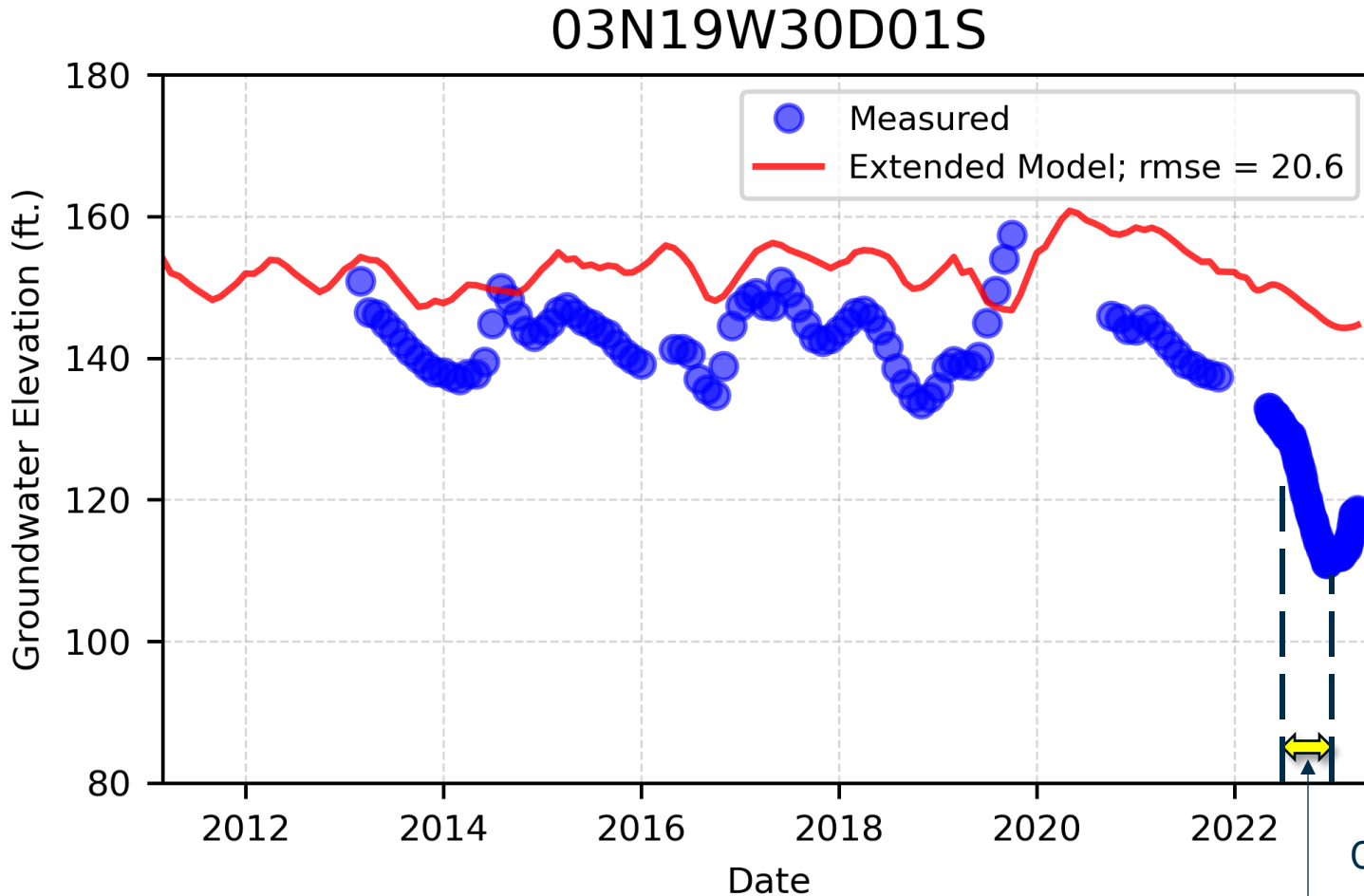
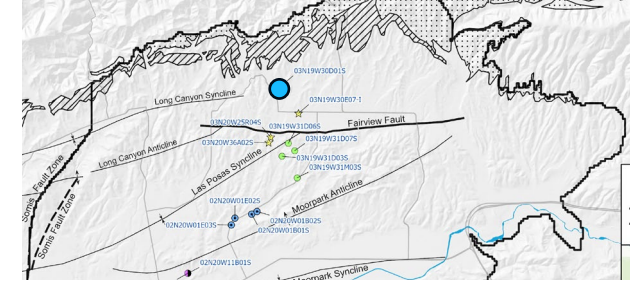
(see Section 4.0)



- Temporal patterns are not well represented north of the Fairview fault
- Temporal patterns are well represented south of the Fairview Fault

Model Validation - Simulated Drawdowns

(see Section 4.0)



In addition, the extended model under-represents ASR responses north of the Fairview fault during Calleguas' Emergency Imported Water Recovery Operational Event

Calleguas Emergency
Imported Water
Recovery Operational
Event

Manual Calibration Attempts

(see Section 4.0)

- After reviewing the extended model results, INTERA implemented some localized parameter changes to try to improve performance.
- Local parameter adjustments required to match heads were inconsistent with the hydrogeologic conceptual model.
- Led Calleguas to re-evaluate the HCM

Structural Refinements

(see Section 4.0)

North of Fairview Fault:

- Incorporated new lithologic and geophysical data from CWMD's new monitoring well (MW-2) and reevaluated logs for other wells in this area
- Measured groundwater level data indicate the FCA is semi-confined to confined, but the model represents the FCA as a single convertible model layer
- Identified the need to split the FCA into two model layers

Moorpark Anticline:

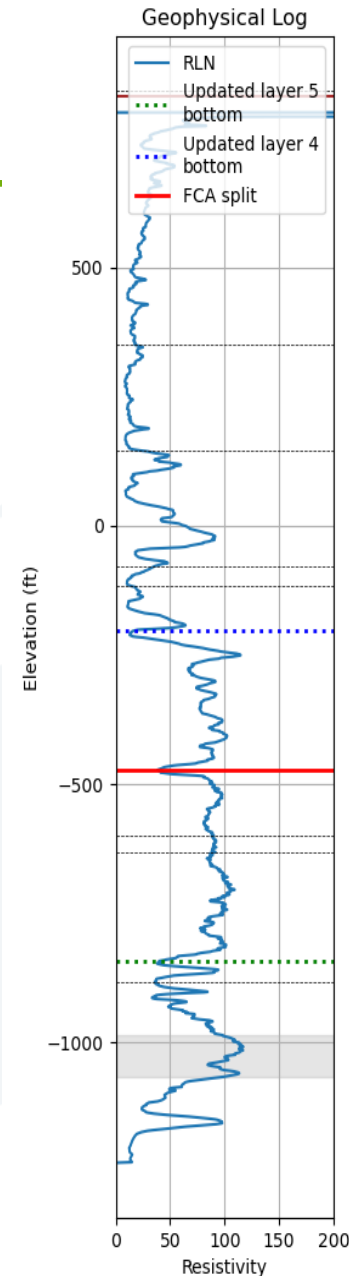
- Incorporated new lithologic and geophysical data from CMWD's new monitoring well (MW-3) and reevaluated logs for other wells in this area

Structural Revisions

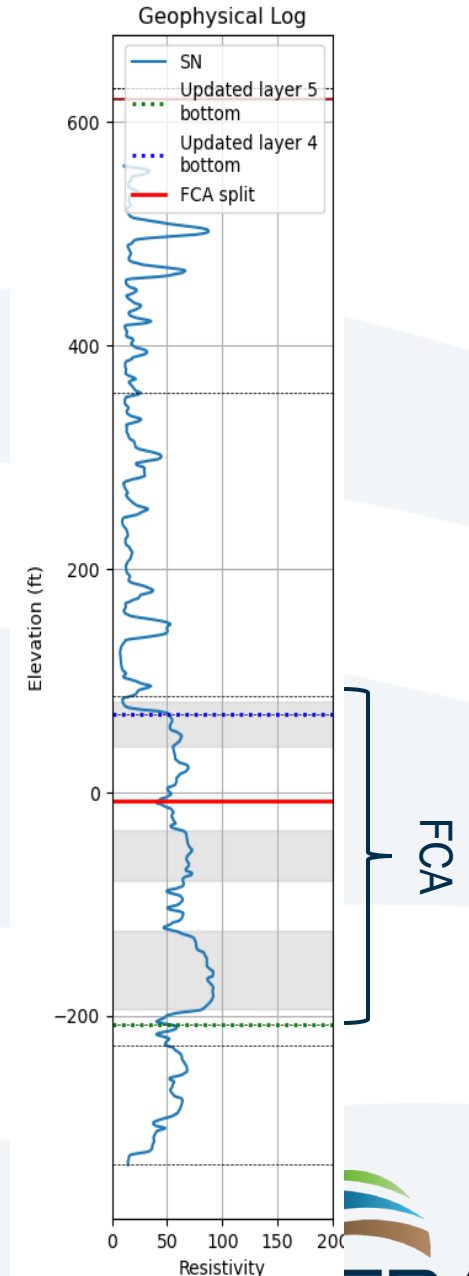
(see Section 4.1)

- Data Reviewed:
 - Geophysical logs, well construction, and groundwater level data from 80 wells
- Reinterpreted top and bottoms of the FCA
- Split the FCA into two model layers (upper and lower)
 - Consistent with UWCD's observation of distinct units with FCA in OPV basins

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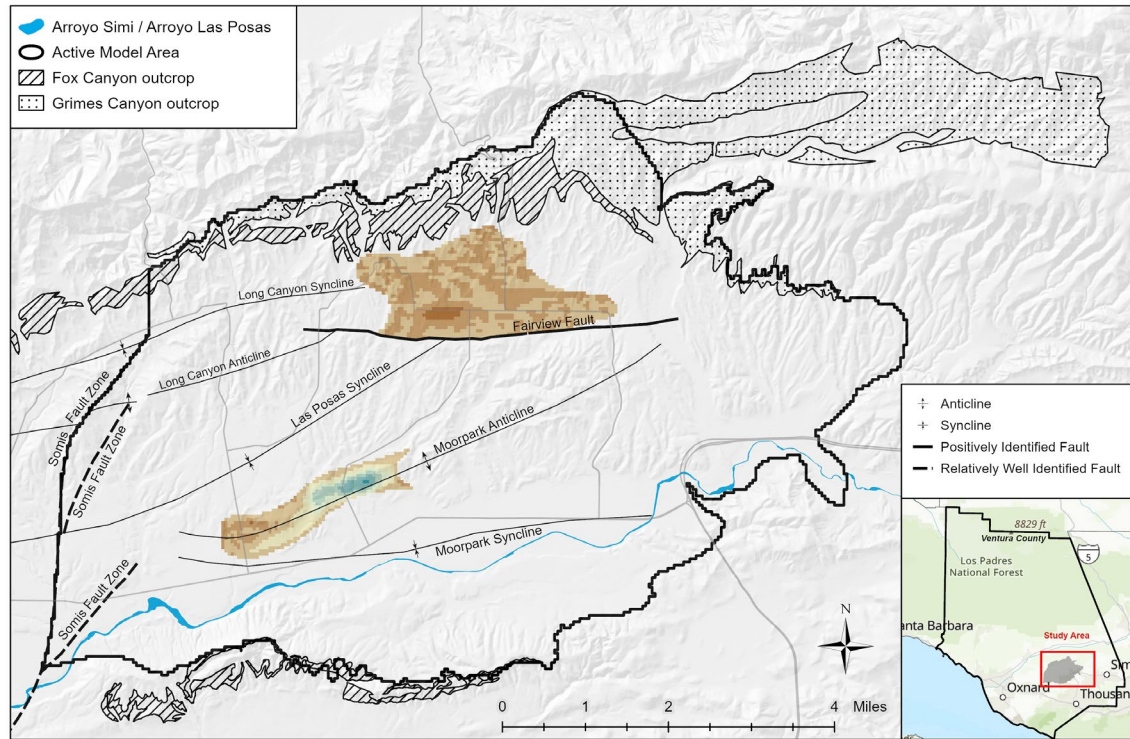


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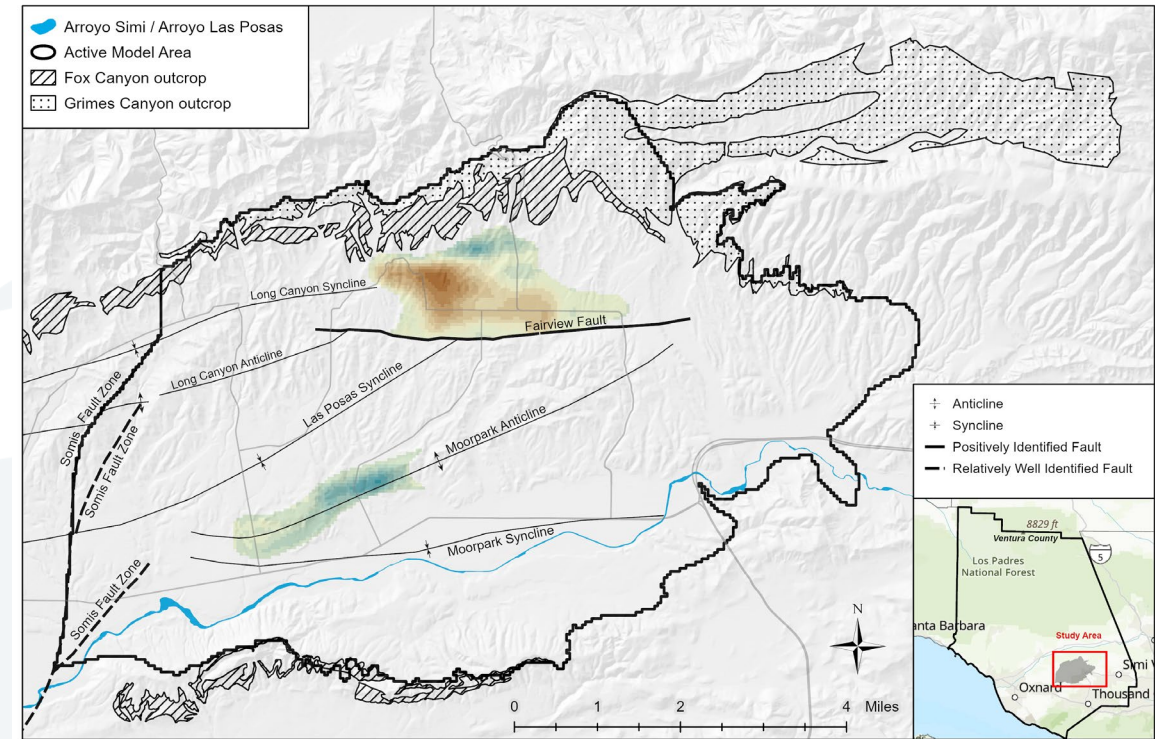


Structural Revisions

(see Section 4.2)



Change in Top Elevation of the Fox Canyon Aquifer (feet)



Change in Bottom Elevation of the Fox Canyon Aquifer (feet)



- Northern ELPMA – FCA is deeper and thicker than previously interpreted
- Along Moorpark Anticline – FCA is shallower than previously interpreted

Model Recalibration

(see Section 5.0)

Recalibration Goals

- Reduce the model’s tendency to overestimate heads across the ELPMA
- Better represent groundwater elevation changes associated with ASR operations
- Account for improvements to the conceptual model
- Integrate data collected since the model was last updated
 - More than 2x increase in groundwater level data available to constrain the model

Table 5. Summary of Model Calibration Targets (Groundwater Elevations)

Aquifer	1970 to 2015		2016 to 2021		2022 to 2023	
	Stress Period Duration	Number of Obs.	Stress Period Duration	Number of Obs.	Stress Period Duration	Number of Obs.
EGA/SAA	Monthly	951	Monthly	396	Daily	916
Upper San Pedro	Monthly	1,280	Monthly	447	Daily	722
Fox Canyon	Monthly	3,948	Monthly	2,329	Daily	4,278
Grimes Canyon	Monthly	762	Monthly	248	Daily	557
Total	Monthly	6,941	Monthly	3,420	Daily	6,473

Model Recalibration

(see Section 5.1)

Recalibration Strategy

- Global optimization method – Iterative Ensemble Kalman Smoother – implemented in the Parameter ESTimation software (PESTPP-IES)
- Re-parameterization of the aquifer properties of the Fox and Grimes Canyon aquifers
- Utilize geostatistical interpolation (i.e. pilot points vs. zoned parameterization)
- Re-parameterization of structural features in the model (HFBs)

Evaluation Metrics

Qualitative:

- Groundwater level trends and responses to ASR operations qualitatively match observations

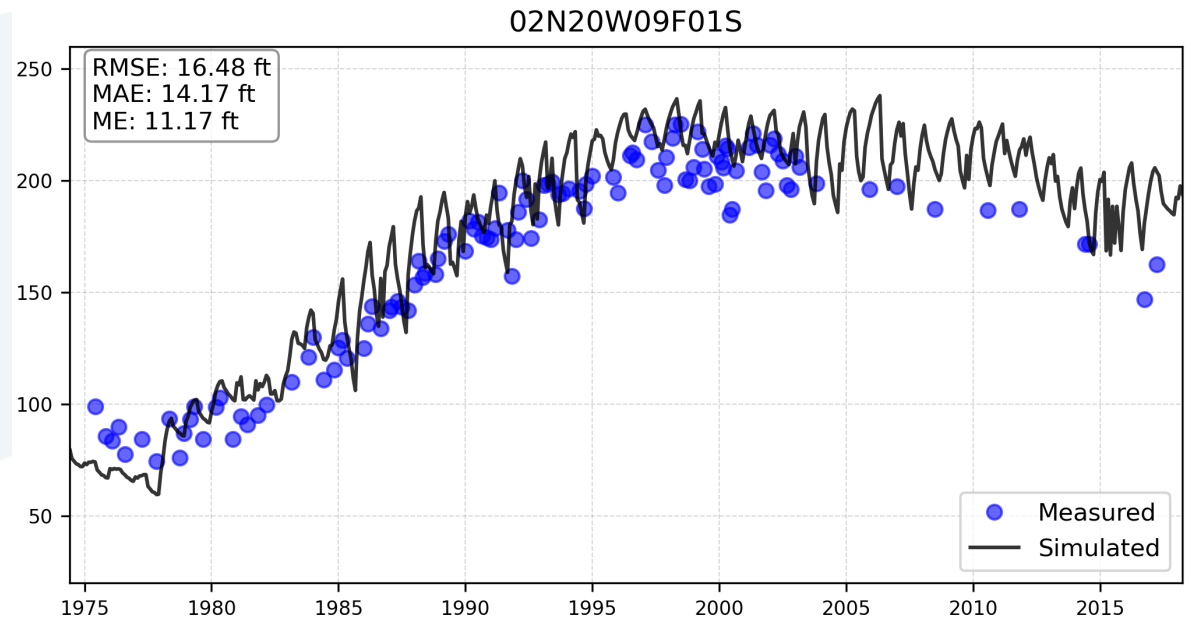
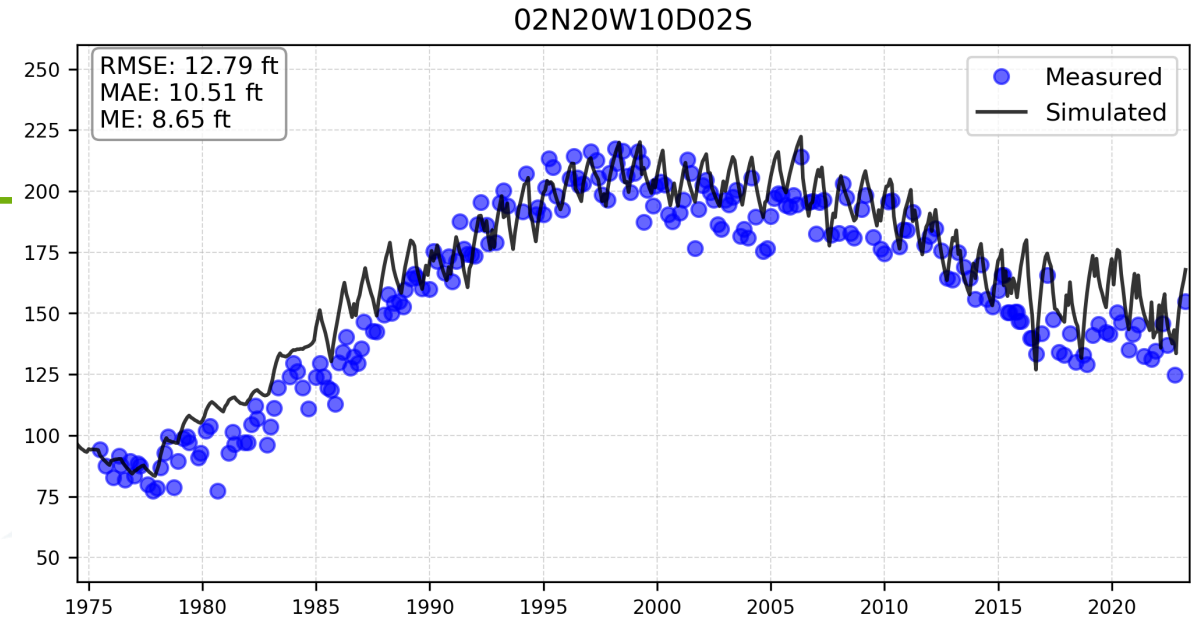
Quantitative:

- Modeled groundwater levels are strongly correlated to measurements
- Global residuals commensurate with previous model performance

Model Calibration Results Southern ELPMA

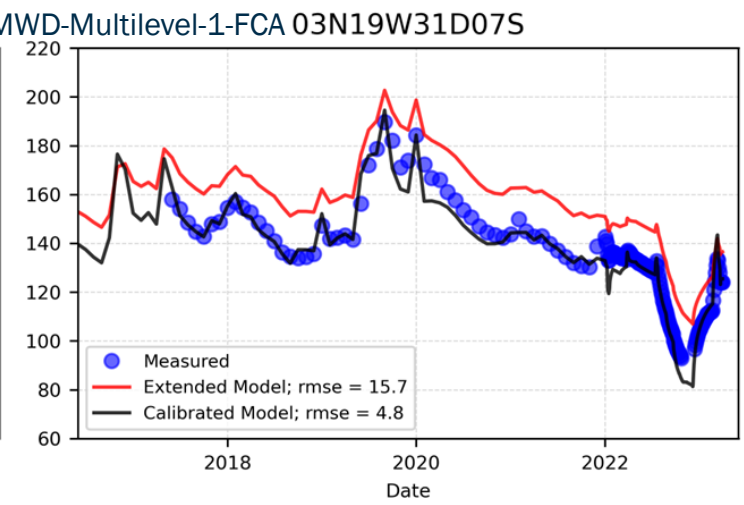
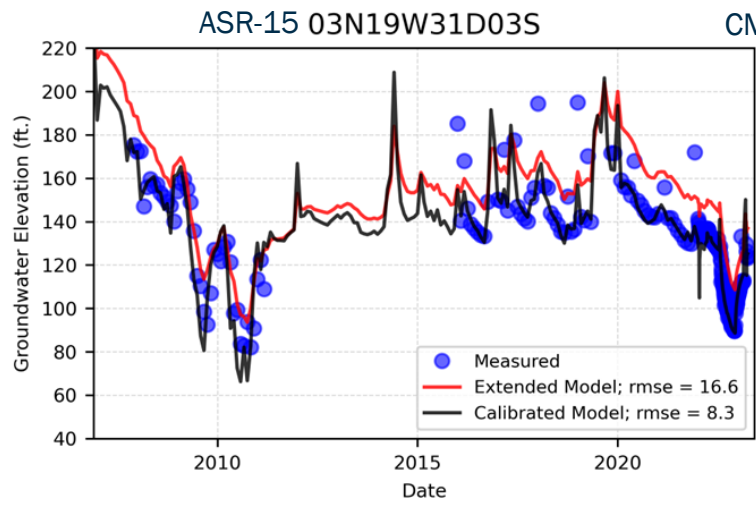
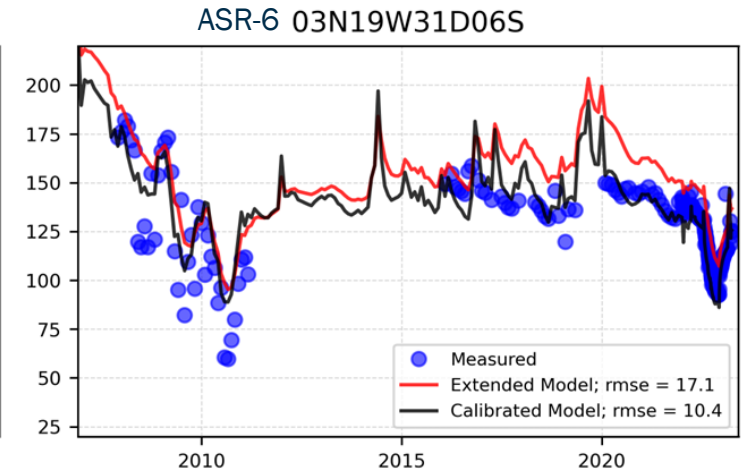
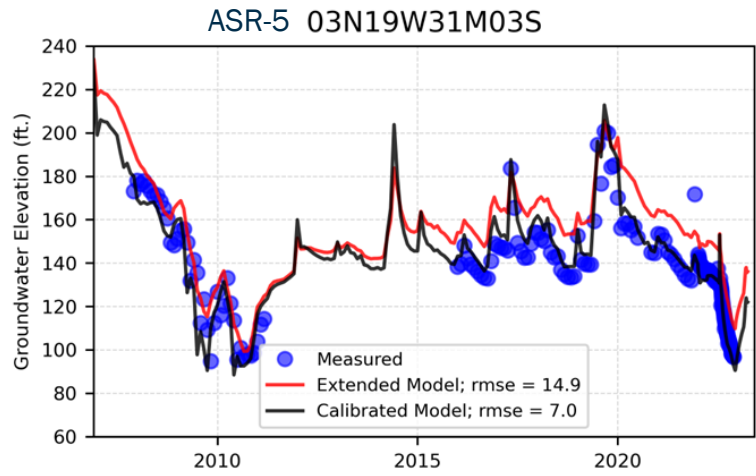
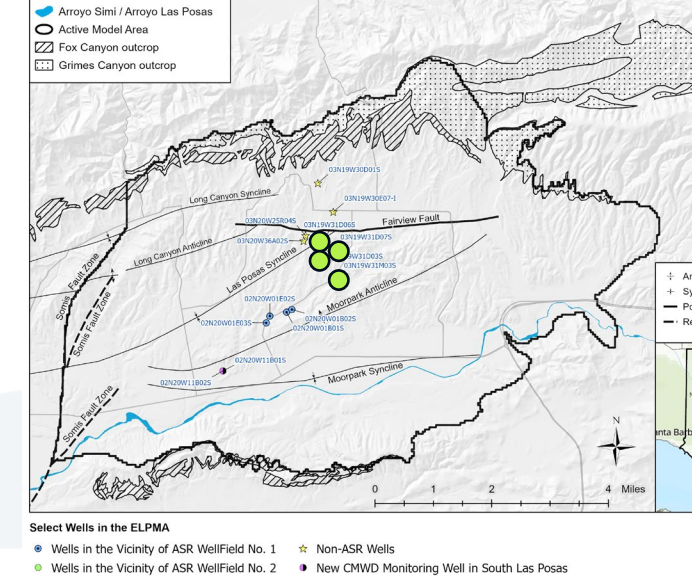
(see Section 5.4.1)

- The recalibrated model improved performance in southern ELPMA
- Better represents timing of filling in the southern ELPMA



Model Calibration Results

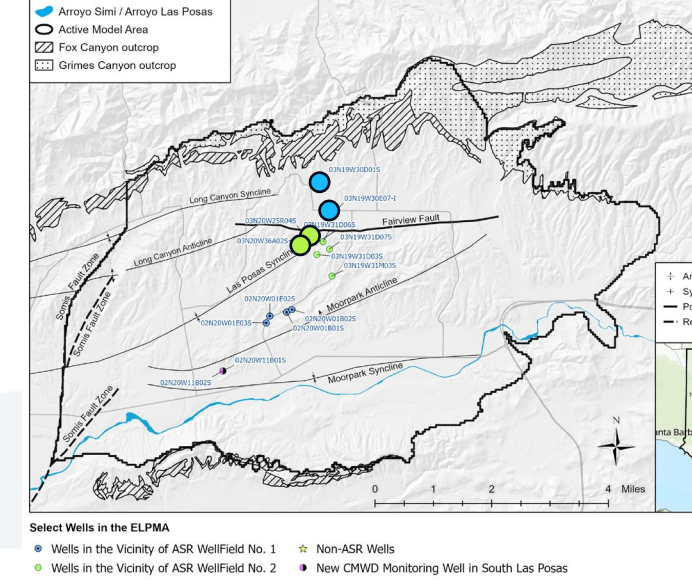
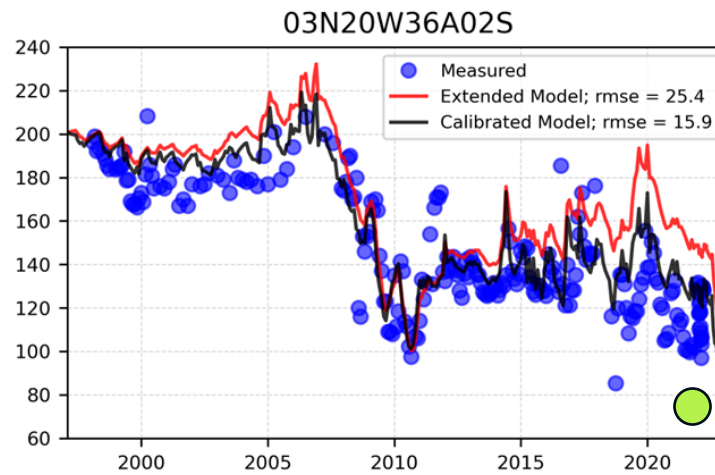
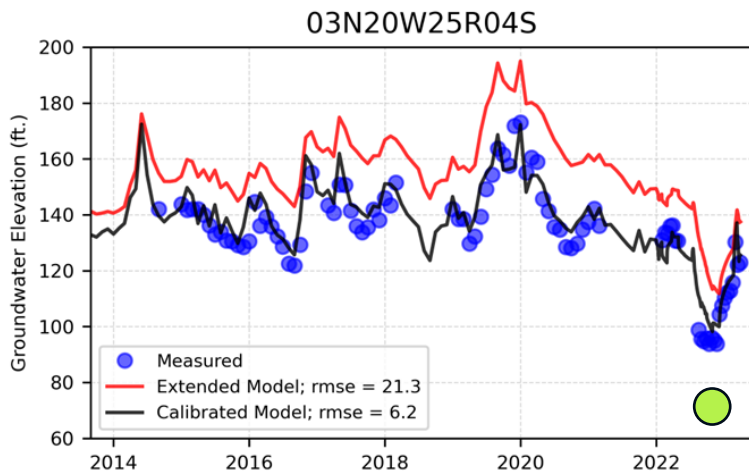
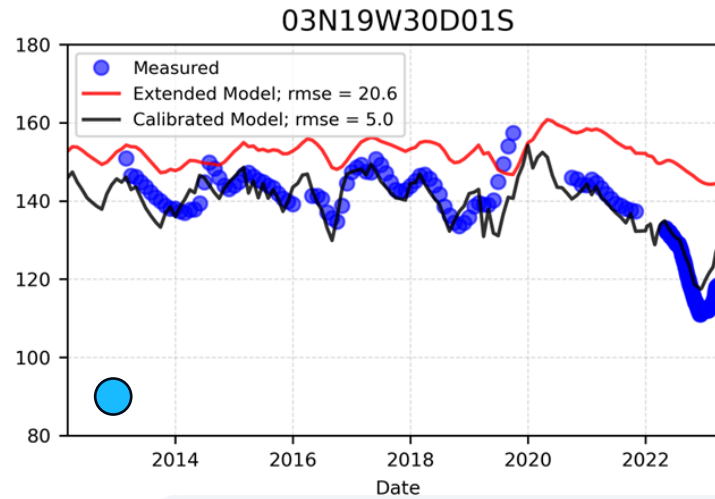
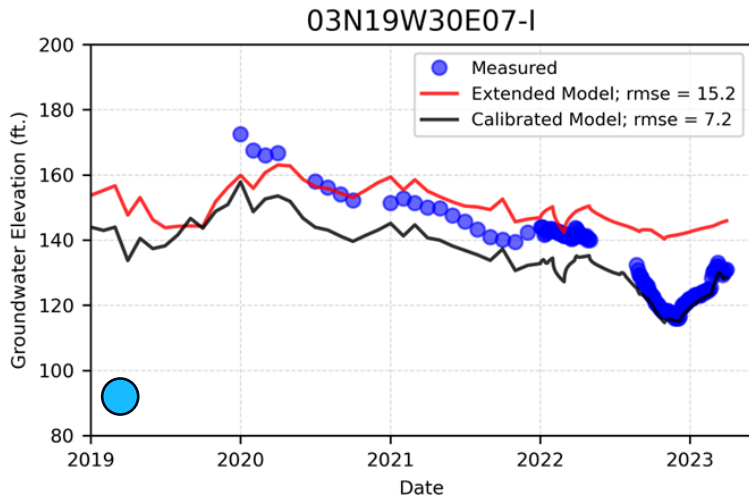
(see section 5.4.2)



- Ability to reproduce groundwater level trends is improved
- Model's tendency to overestimate heads is reduced

Model Calibration Results

(see section 5.4.2)



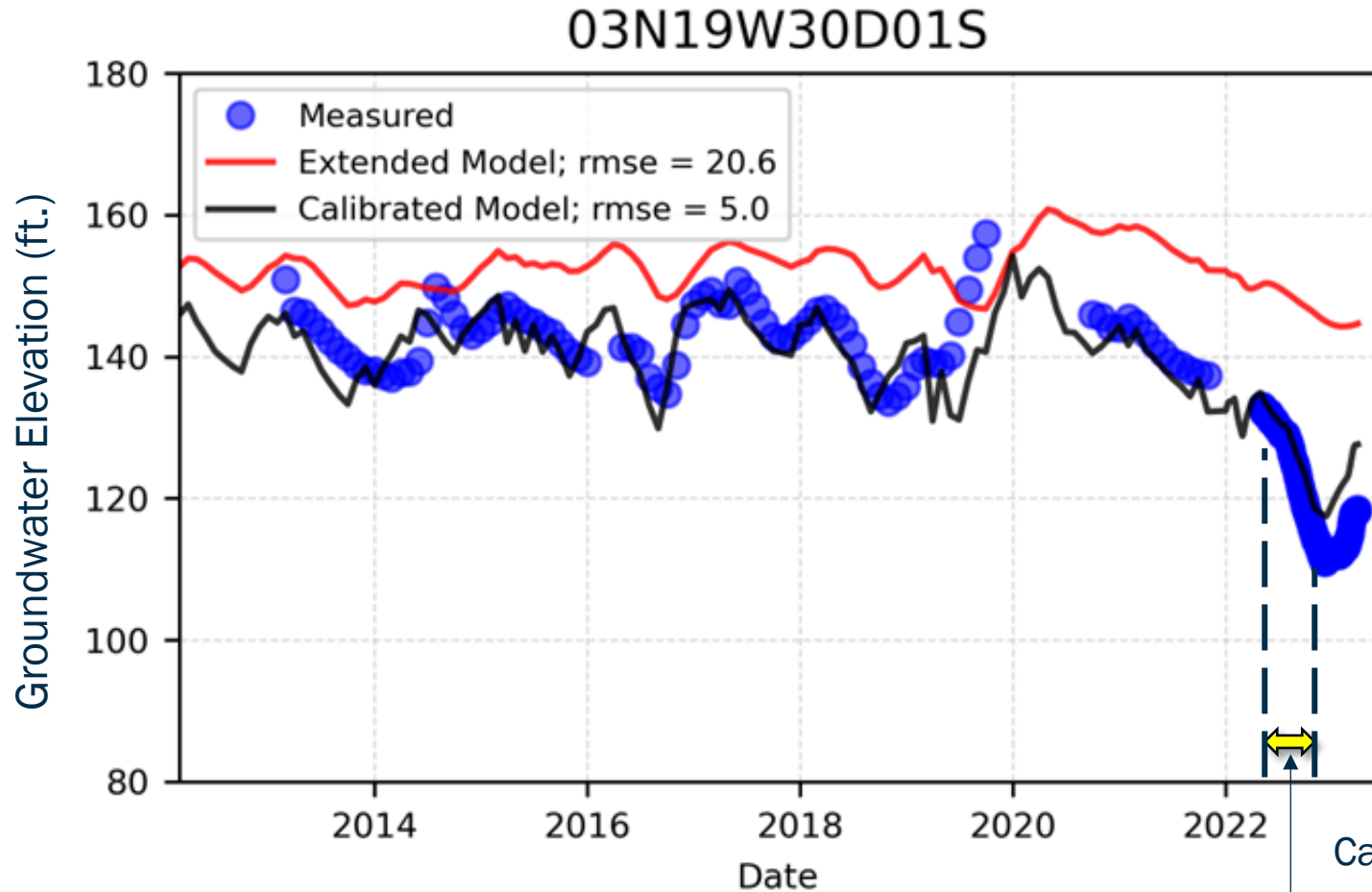
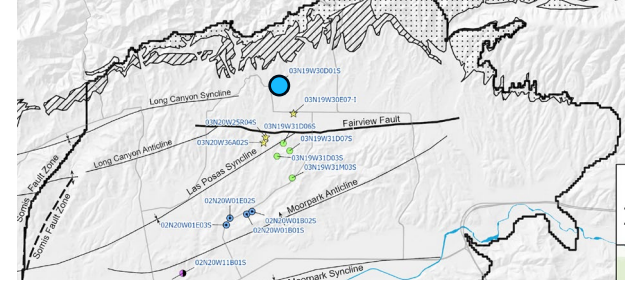
Select Wells in the ELPMA

- Wells in the Vicinity of ASR WellField No. 1
- Wells in the Vicinity of ASR WellField No. 2
- Non-ASR Wells
- New CMWD Monitoring Well in South Las Posas

- Temporal patterns are well represented north of the Fairview fault
- Simulations south of Fairview fault are improved

Model Calibration Results Drawdowns

(see section 5.4.3)

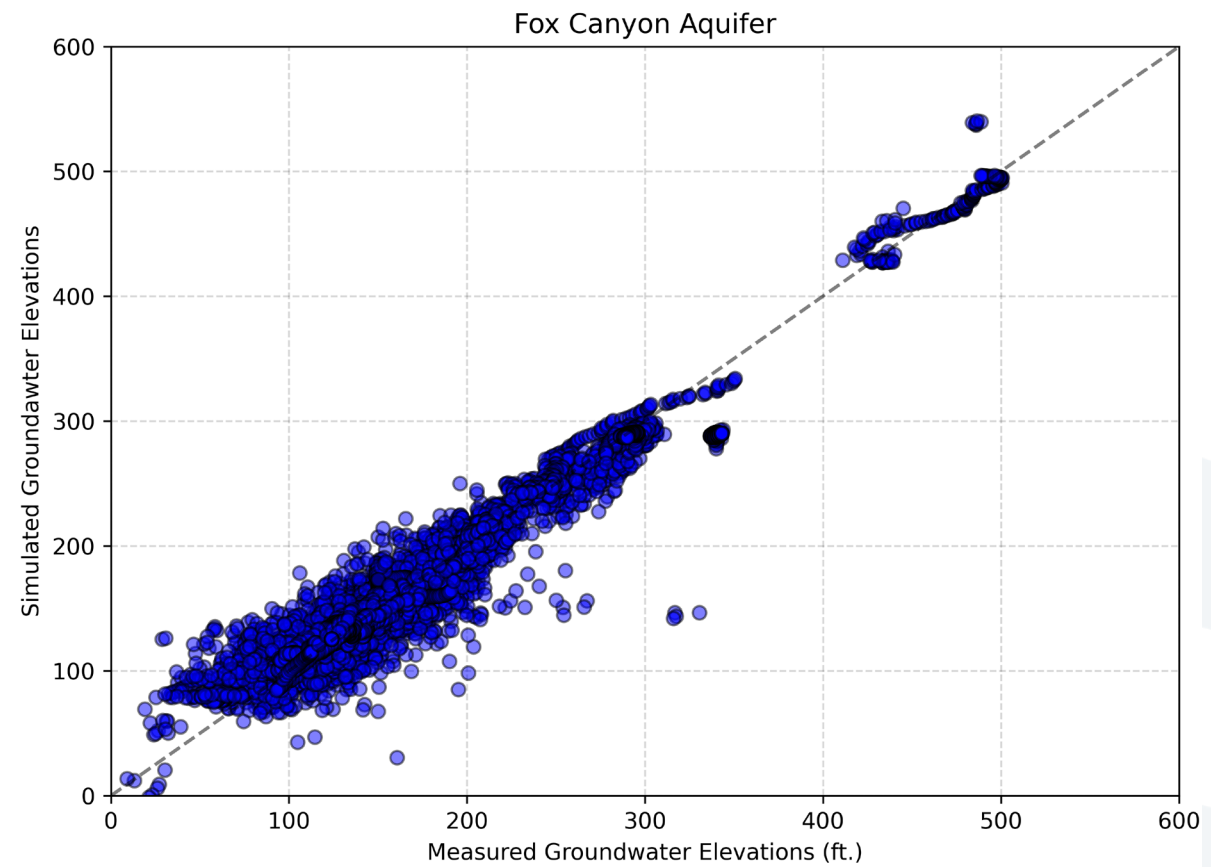


The re-calibrated model better represents ASR responses north of the Fairview fault during Calleguas's Emergency Imported Water Recovery Operational Event

Model Recalibration Results

(see section 5.4.1)

Aquifer / Formation	Period	Range of Observed Water Levels (ft.)	Root Mean Square Error (ft.)
EGA / SAA	1970 to 2015	575	11.4
	2016 to 2023	380	10.9
	1970 to 2023	585	11.1
Upper San Pedro	1970 to 2015	345	14.4
	2016 to 2023	395	19.0
	1970 to 2023	395	16.8
FCA	1970 to 2015	491	17.7
	2016 to 2023	318	15.8
	1970 to 2023	491	16.6
GCA	1970 to 2015	284	12.2
	2016 to 2023	277	9.4
	1970 to 2023	286	10.8
Entire Model	1970 to 2015	620	15.8
	2016 to 2023	614	15.3
	1970 to 2023	630	15.5



- Normalized residuals for all aquifers range from ~2% to 4% of the observed range in groundwater elevations
- Modeled groundwater levels are strongly correlated (1:1) with the observations indicating limited systematic bias in the model simulation

Parameter Revisions

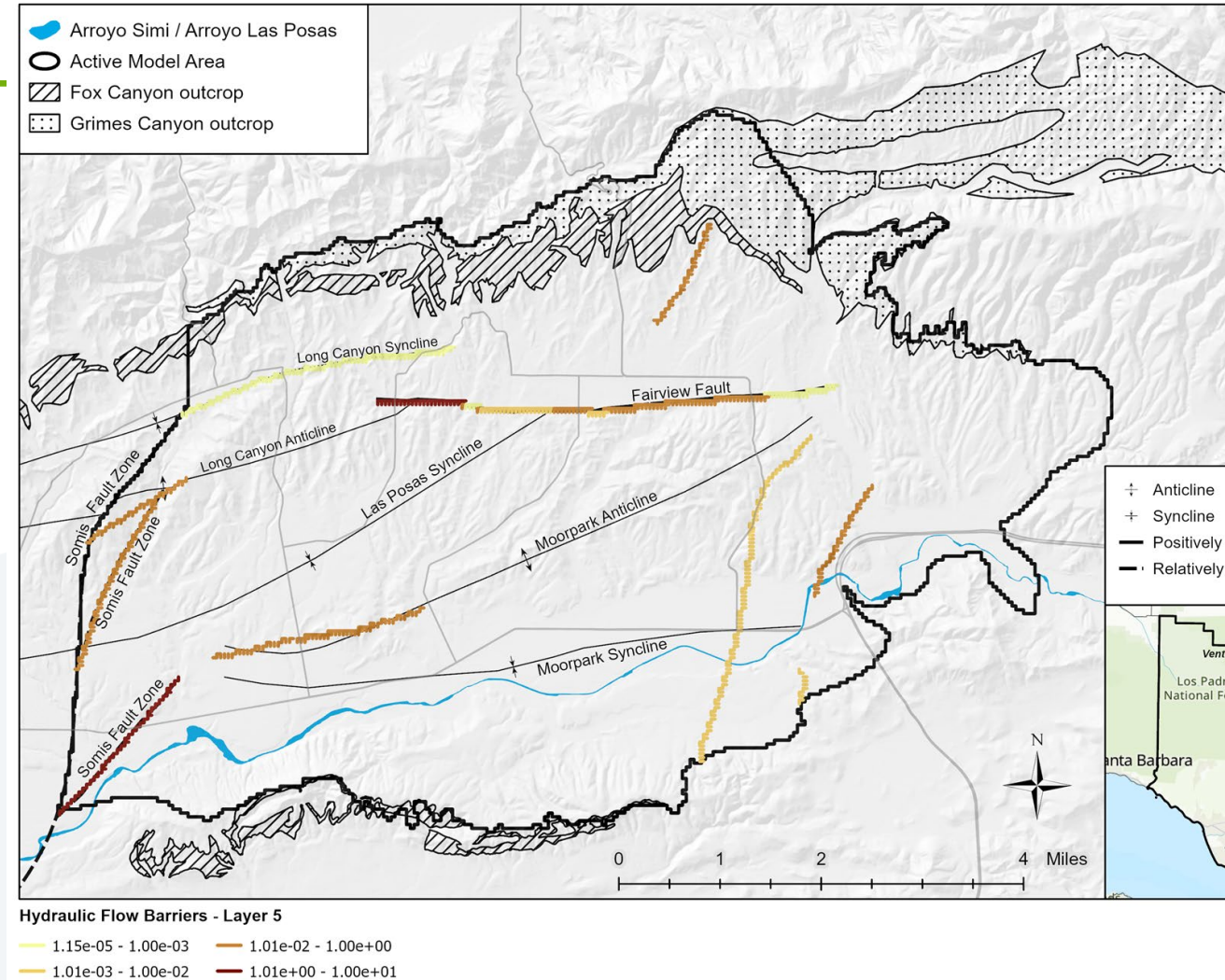
(see Appendix C)

Aquifer Properties

- Hydraulic conductivity is higher north of the Fairview fault
- Storativity is similar between models, but is now much more heterogenous

Hydraulic Flow Barriers

- Conductance of the Fairview fault and Moorpark anticline were increased to better represent ASR responses across the ELPMA



Summary

Extension & Verification

- East Las Posas Model was extended through March 2023, utilizing a combination of monthly and daily stress periods
- Verification of extension period reviewed and opportunities to improve model identified

Structural Refinement

- The Fox Canyon and Grimes Canyon aquifer geometries were refined based on new geophysical data
- The Fox Canyon aquifer was split into two model layers to better reflect signatures in the geophysical data.

Model Performance

- The East Las Posas Model was recalibrated using PESTPP-IES.
- Recalibration reduced the model's tendency to overestimate heads across the ELPMA.
- Recalibration significantly improved the model's ability to capture ASR responses.