Fox Canyon Groundwater Management Agency

5-Year GSP Evaluation for the LPVB: Numerical Modeling and Projects

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APRIL 2024

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5-Year Evaluation Timeline

- Plan Area and Background Review
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- Current Groundwater Conditions
- Monitoring Network Review
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- GSP Implementation Progress

- Finalize Modeling
- Assess Minimum Thresholds (MTs)
- Assess Measurable Objectives (MOs)
- Re-evaluate Sustainable Yield
- Draft Reports

Stakeholder Involvement

5-Year Evaluation Timeline

May 2024 - January 2025

August 2023
Kickoff Meeting

Modeling Approach Presented to FCGMA Board

September 2023

October 2023

- Plan Area and Background Review
- Model Scenario Development
- Current Groundwater Conditions
- Monitoring Network Review
- Actions Taken by FCGMA
- GSP Implementation Progress

April 2024
Public Workshop

LPVB PAC and TAC Consultation

- Finalize Modeling
- Assess Minimum Thresholds (MTs)
- Assess Measurable Objectives (MOs)
- Re-evaluate Sustainable Yield
- Draft Reports

Public Workshop
(GSP Amendments)

Public Workshop

Submittal to DWR

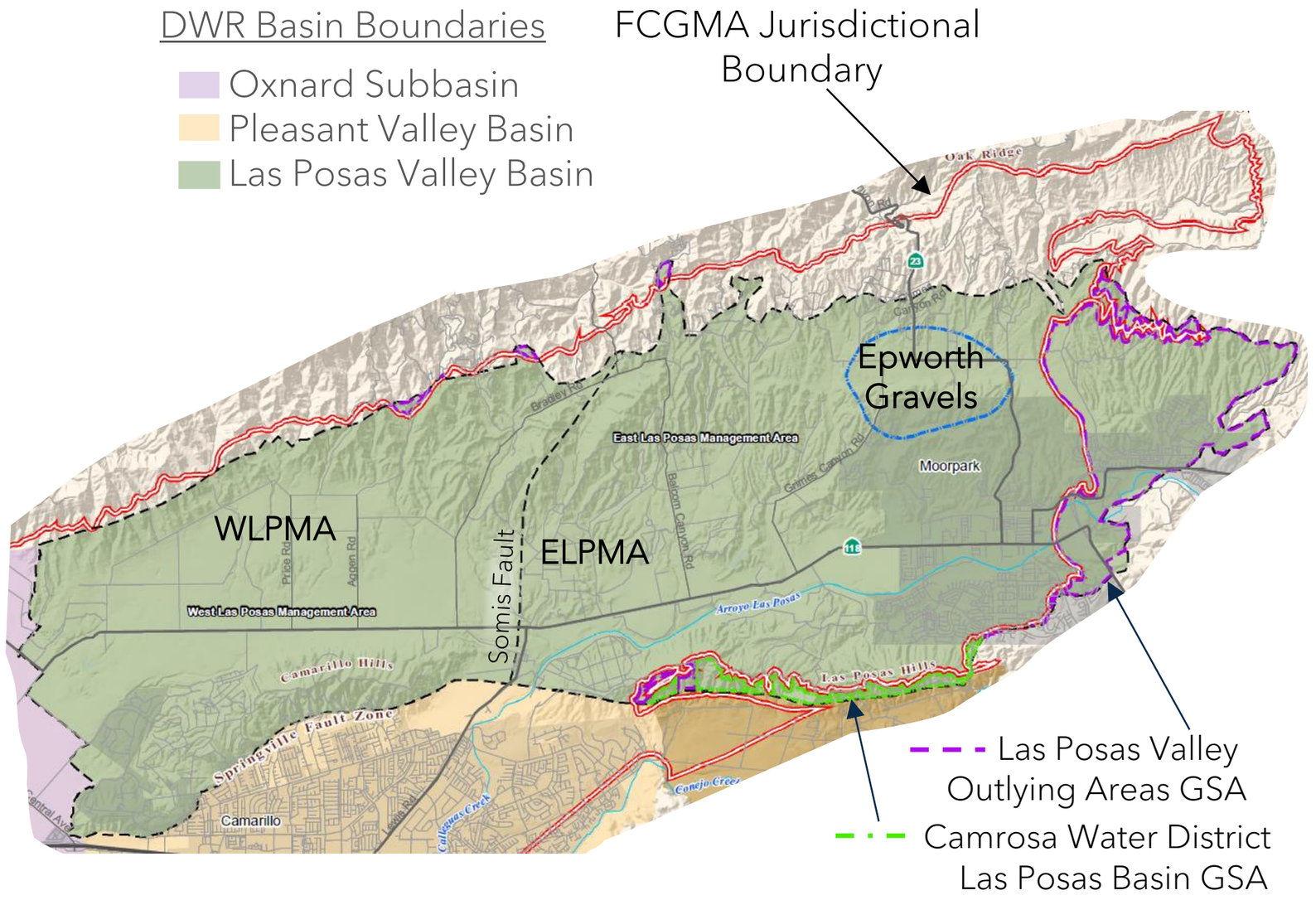
FCGMA Board Review of 5-Year Evaluations

Background Information – Undesirable Results in the LPVB

Previous GSP Modeling

SUSTAINABILITY INDICATORS

- Groundwater Elevation
- Groundwater in Storage
- Seawater Intrusion
- Groundwater Quality
- Land Subsidence
- Interconnected Surface Water and Groundwater



Background Information – GSP Modeling for the WLPMA

Previous GSP Modeling

Ventura Regional Groundwater Flow Model

- Numerical groundwater flow model developed and maintained by United Water Conservation District (UWCD 2018)
- Calibrated to groundwater elevations measured between 1985 and 2015
- Used to characterize groundwater budgets, forecast future groundwater conditions, and estimate the sustainable yield
- Independent peer reviews characterized model uncertainty and appropriate use for the GSP

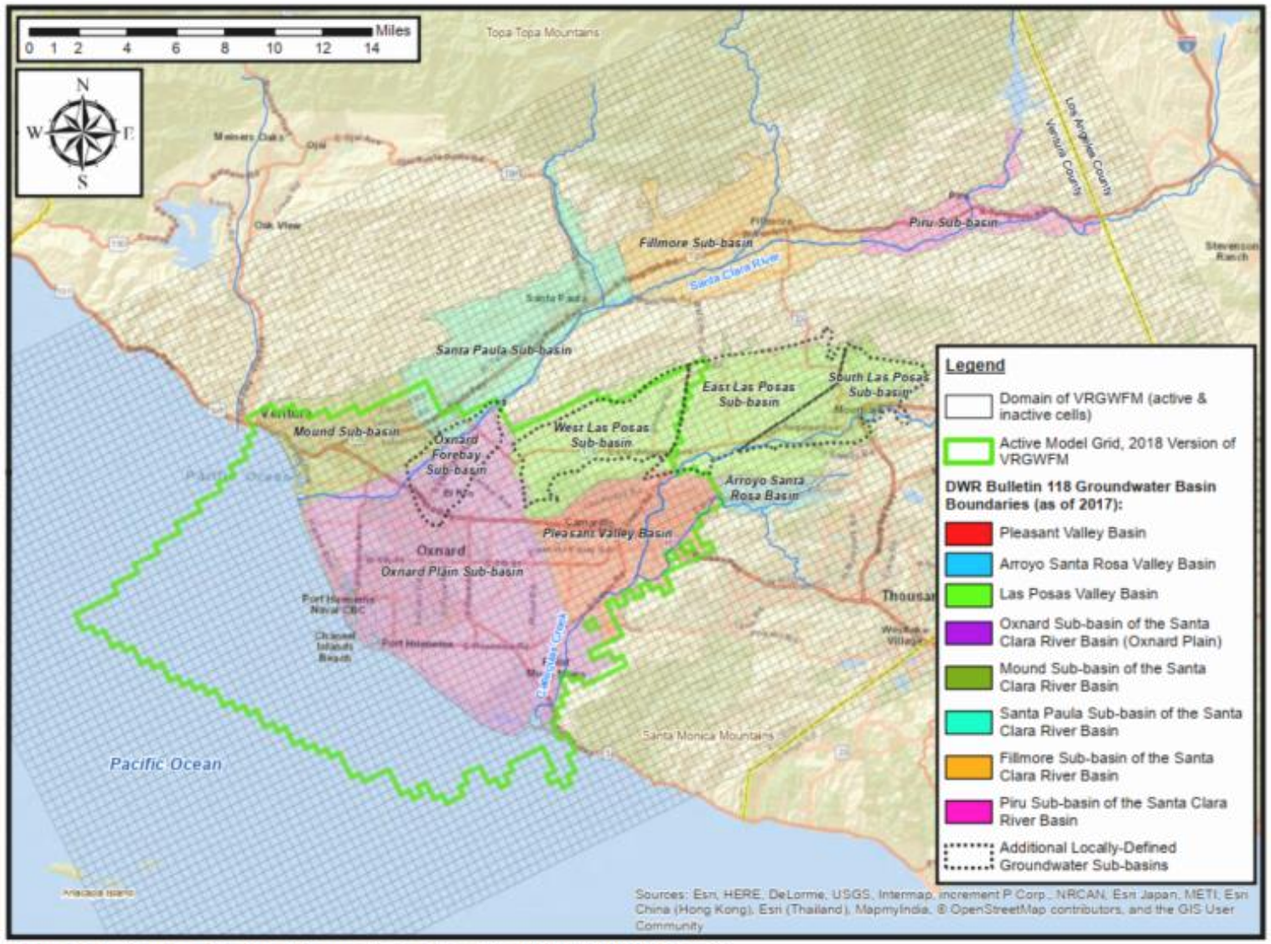


Figure 1-2. Ventura Regional Groundwater Flow Model (VRGWFM) Domain

UWCD (United Water Conservation District). 2018. Ventura Regional Groundwater Flow Model and Updated Hydrogeologic Conceptual Model: Oxnard Plain, Oxnard Forebay, Pleasant Valley, West Las Posas, and Mound Groundwater Basins. Open-File Report 2018-02. July 2018.

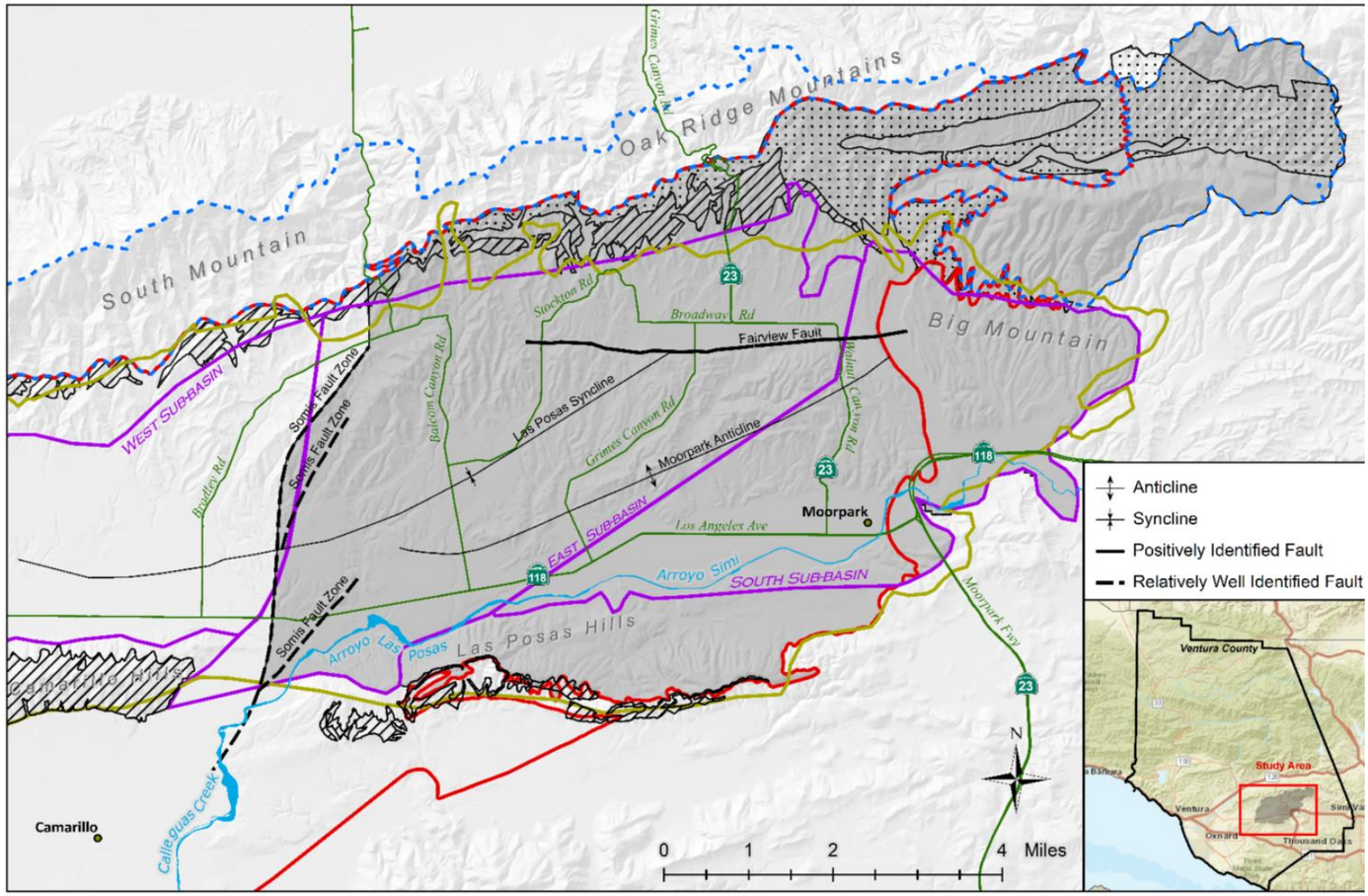
WLPMA = West Las Posas Management Area

Background Information – GSP Modeling for the ELPMA

Previous GSP Modeling

East Las Posas Model

- Numerical groundwater flow model developed by Calleguas Municipal Water District (CMWD 2018)
- Calibrated to groundwater elevations measured between 1970 and 2015
- Used to characterize groundwater budgets, forecast future groundwater conditions, and estimate the sustainable yield
- Independent peer reviews characterized model uncertainty and appropriate use for the GSP



CMWD (Calleguas Municipal Water District). 2018. Groundwater Flow Model of the East and South Las Posas Sub-Basins. Prepared by Intera Geoscience and Engineering Solutions. January 2018.

ELPMA = East Las Posas Management Area

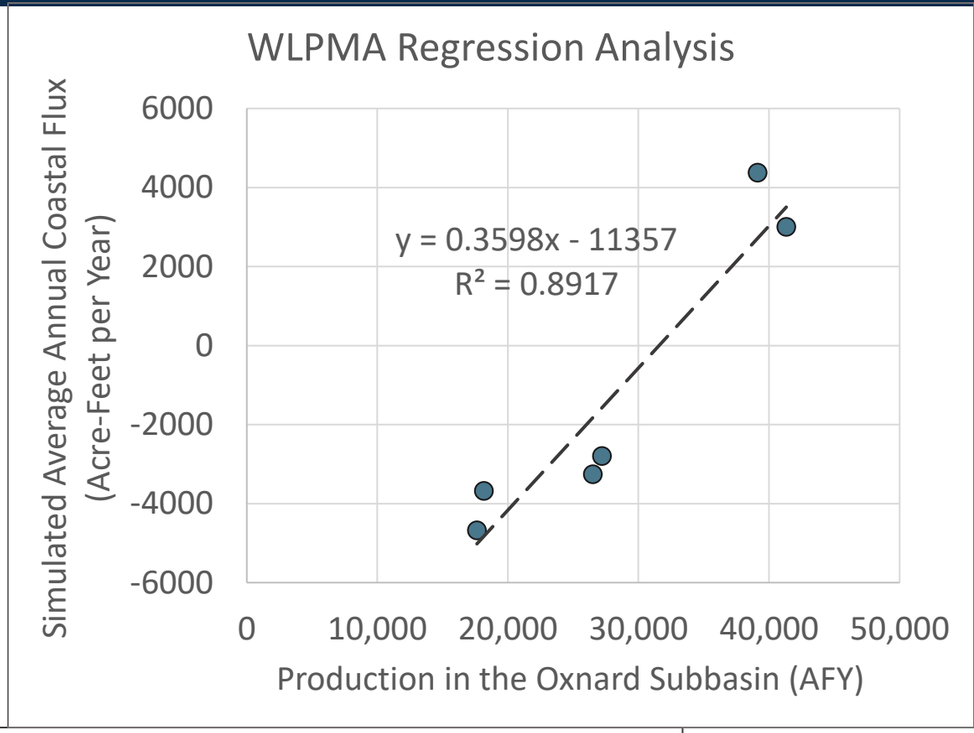
Background Information – GSP Modeling

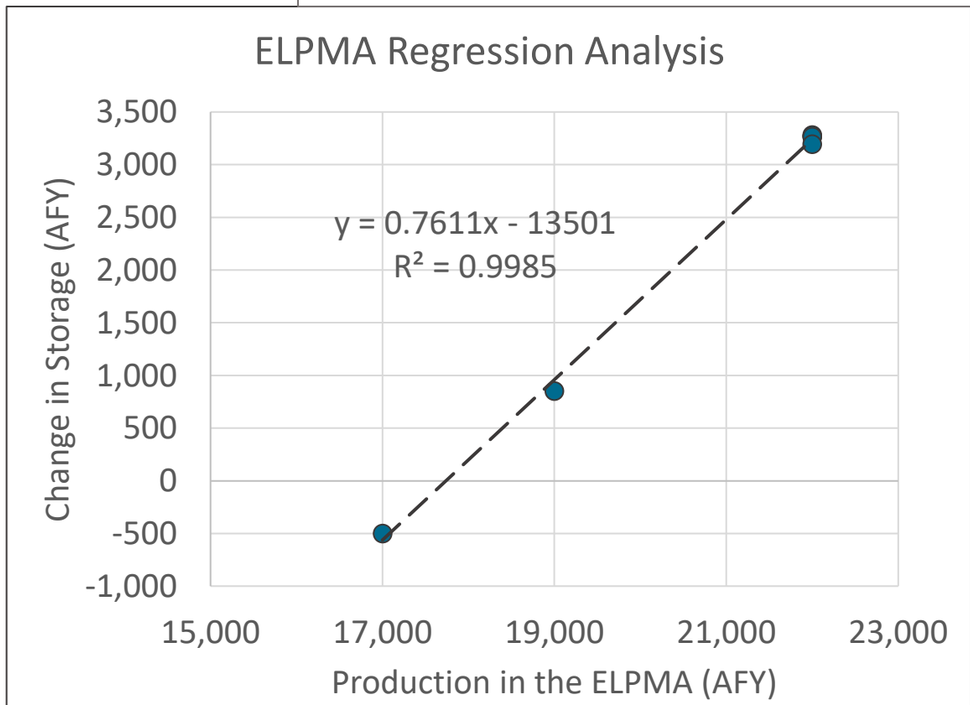
Previous GSP Modeling

GSP Modeling Scenarios

Model Scenario	Groundwater Extractions (Acre-Feet per Year [AFY])	
	WLPMA	ELPMA
Future Baseline	14,000	22,000
Future Baseline With Projects	12,000	22,000
Reduction With Projects	10,000	20,000
Reduction Without Projects 1	11,000	17,000
Reduction Without Projects 2	11,000	19,000
Reduction Without Projects 3	14,000	-

Management Area	Sustainable Yield (AFY)	
	Lower Range	Upper Range
WLPMA	11,300	13,700
ELPMA	15,500	20,100
Epworth Gravels	*1,300*	*1,340*
Total	**26,800**	**33,800**



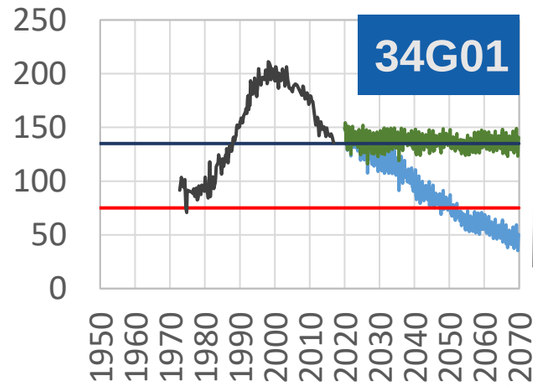


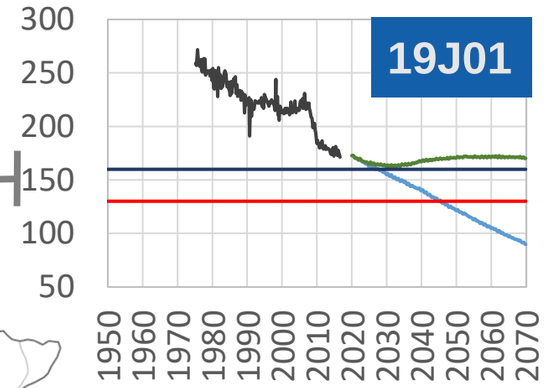
Las Posas Valley Basin Select Hydrographs

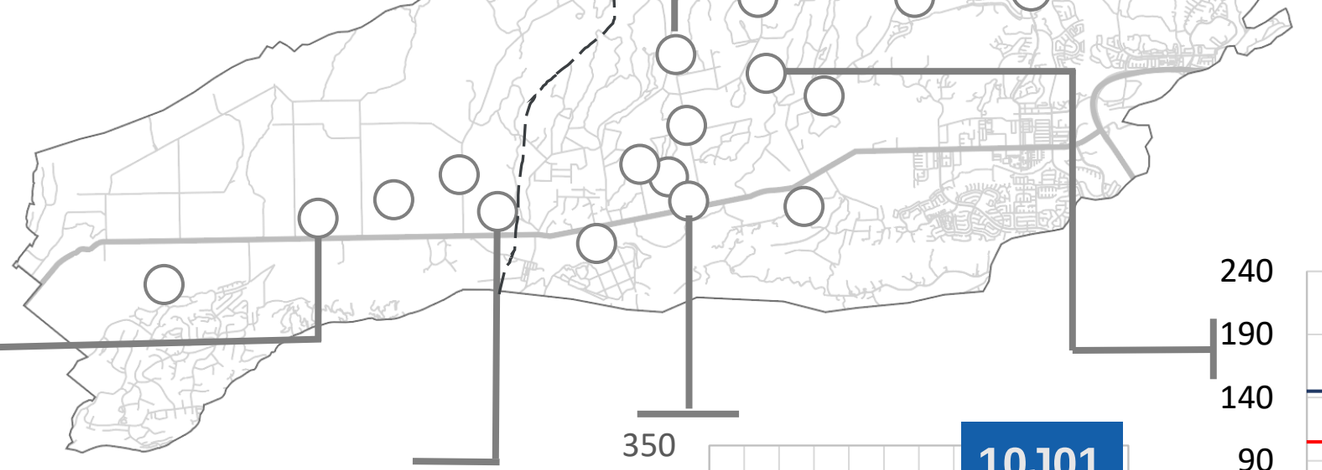
Previous GSP Modeling

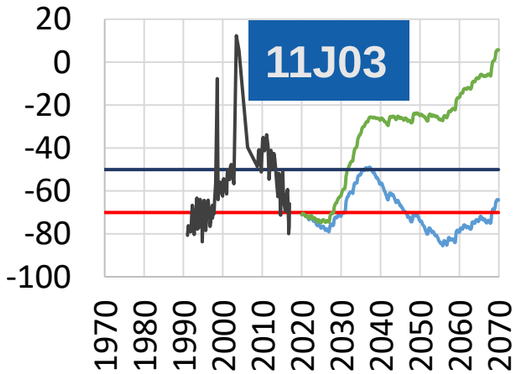
Legend

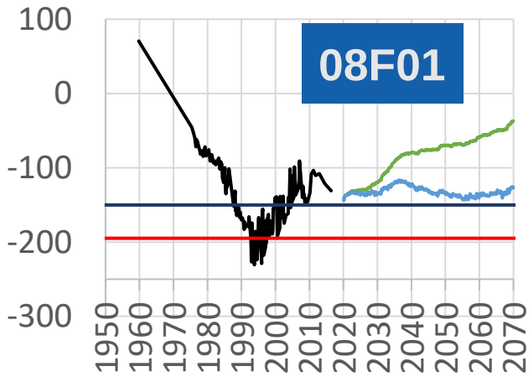
- Historical
- Measurable Objective
- Minimum Threshold
- Projects (WLPMA) Baseline (ELPMA)
- Reduction 1

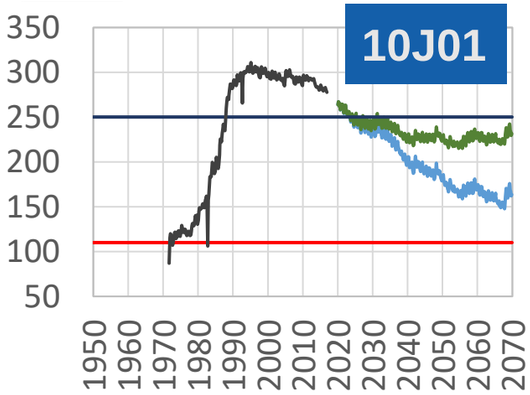


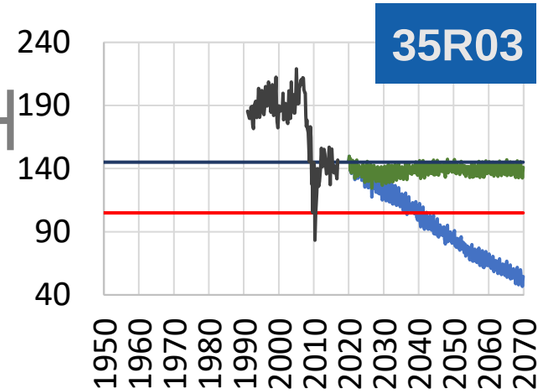












Modeling for the LPVB 5-Year GSP Evaluations

Update Numerical Model

- Evaluate the numerical model's ability to simulate current conditions
- Integrate newly collected / available data to improve predictions

Update Model Scenarios

- Incorporate new and updated project information
- Update hydrology
- Forecast groundwater conditions through the end of water year 2069

Re-evaluate key metrics

- Directly estimate sustainable yield under different future basin management scenarios
- Re-evaluate the minimum thresholds, measurable objectives, and interim milestones

Numerical Model Update for the WLPMA

Modeling for the 5-Year GSP Evaluation

Ventura Regional Groundwater Flow Model

- Numerical groundwater flow model developed and maintained by United Water Conservation District
- Updates since adoption of the GSP:
  - Expanded to encompass the Santa Paula, Filmore, and Piru Basins
  - Revised stratigraphic layering along the coast, near Port Hueneme and Point Mugu, based on additional geologic data
  - Updated coastal boundary conditions to better simulate groundwater elevations along the coastline
- Numerical model extended through September 30, 2022

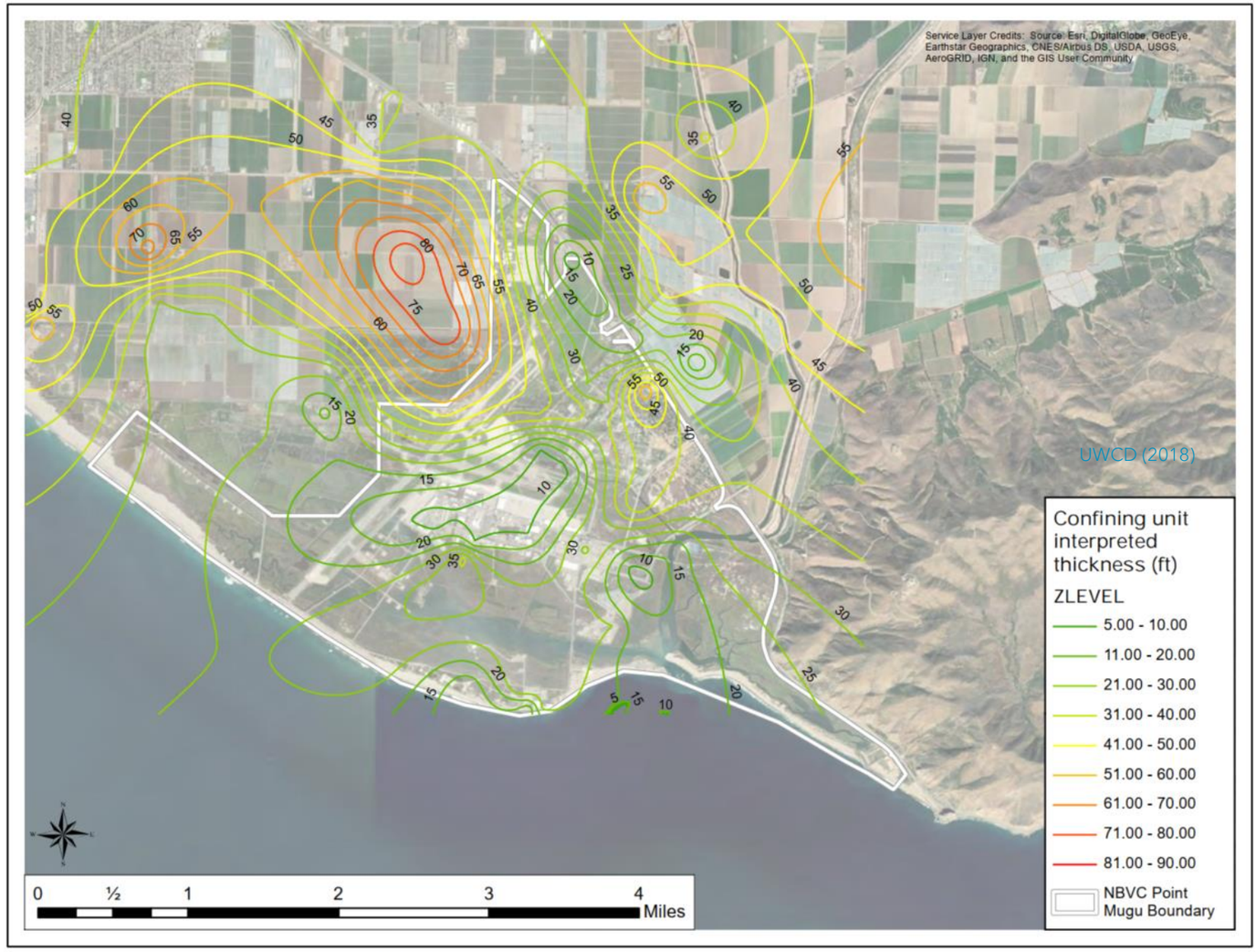


Figure 14. Confining Unit (Layer 2) thickness contours (feet)

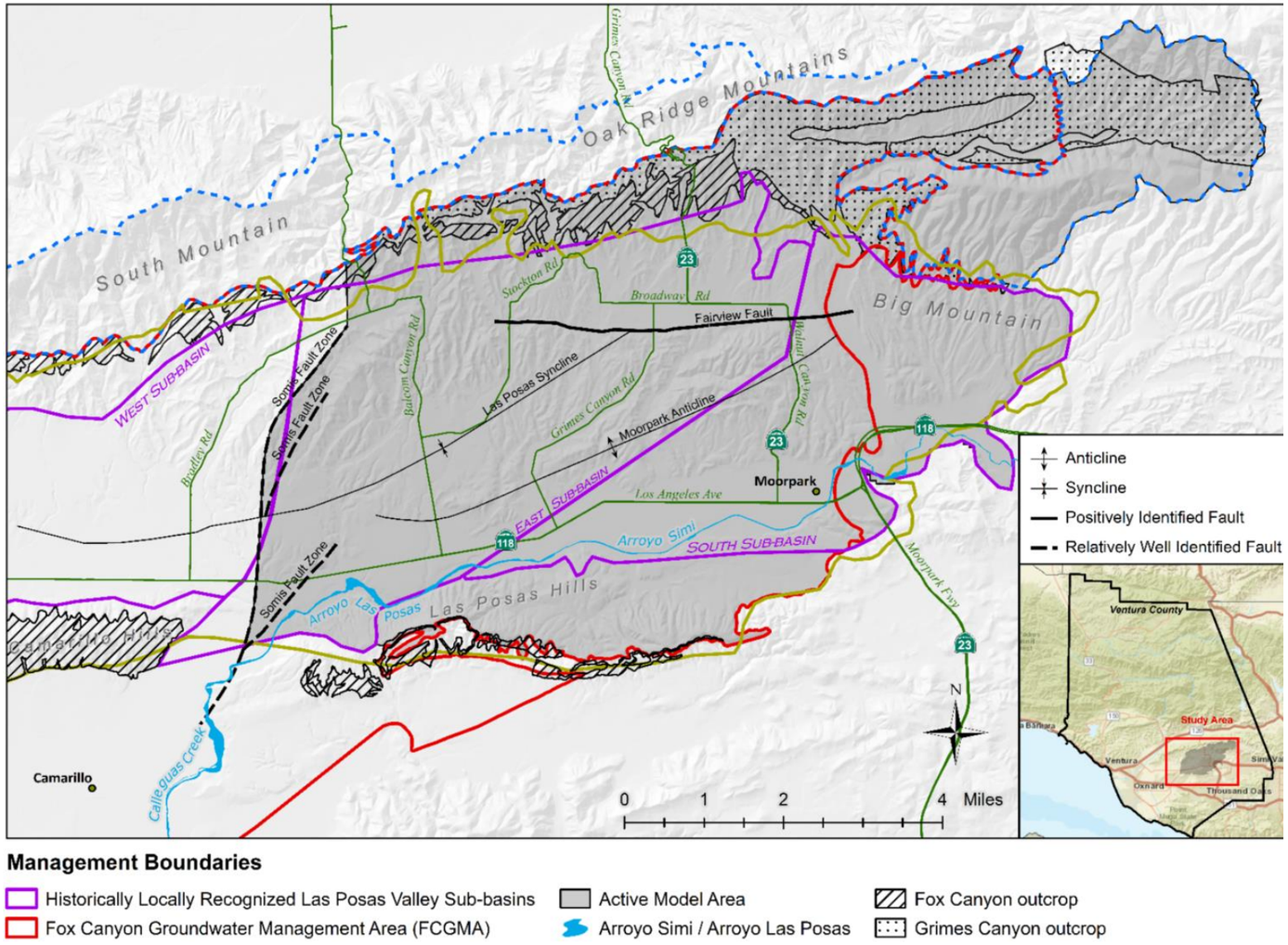
UWCD (United Water Conservation District). 2021. Geologic Refinements Near Naval Base Ventura County Point Mugu, Ca. Technical Memorandum 2021-02. September 2021.

Numerical Model Update for the ELPMA

Modeling for the 5-Year GSP Evaluation

East Las Posas Model

- Numerical model provided to FCGMA by CMWD for 5-Year GSP Evaluation
- Numerical model extended through September 30, 2022, to validate predictive capabilities
- East Las Posas model was not revised as part of the 5-year GSP Evaluation



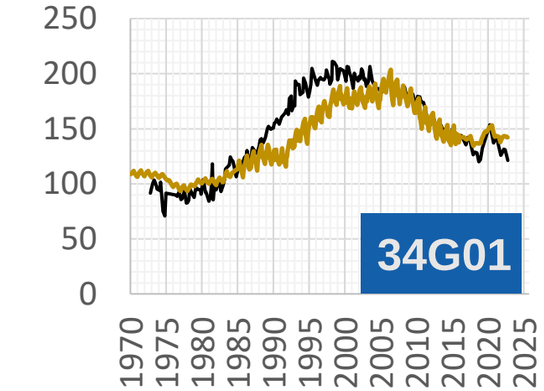
CMWD (Calleguas Municipal Water District). 2018. Groundwater Flow Model of the East and South Las Posas Sub-Basins. Prepared by Intera Geoscience and Engineering Solutions. January 2018.

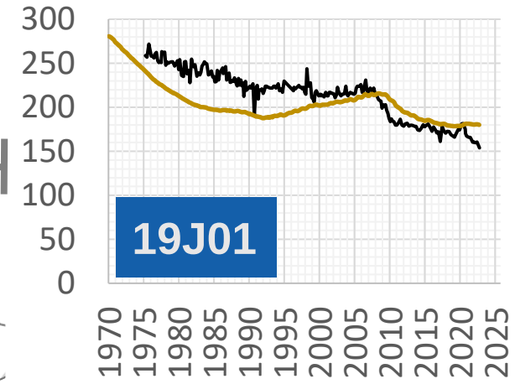
Las Posas Valley Basin Select Hydrographs Through WY 2022

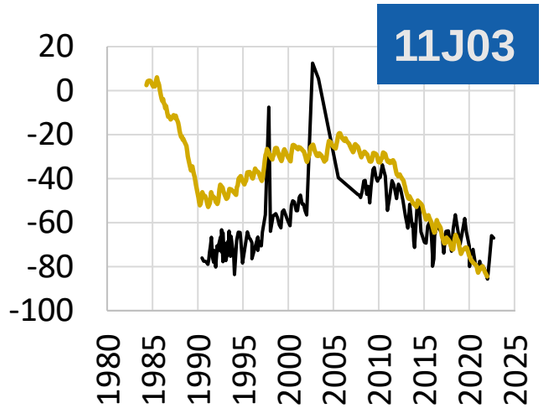
Legend

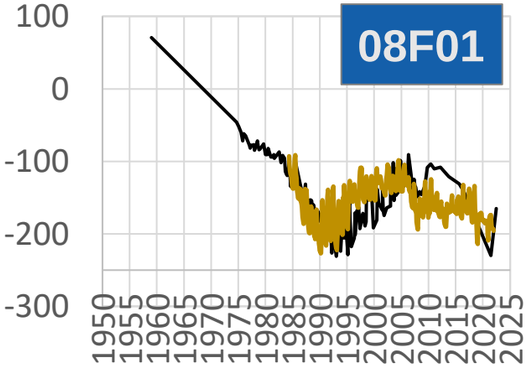
Measured

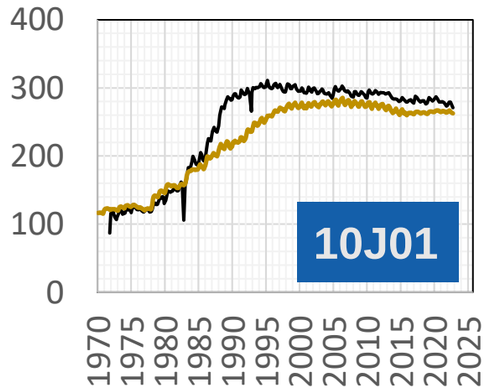
Simulated

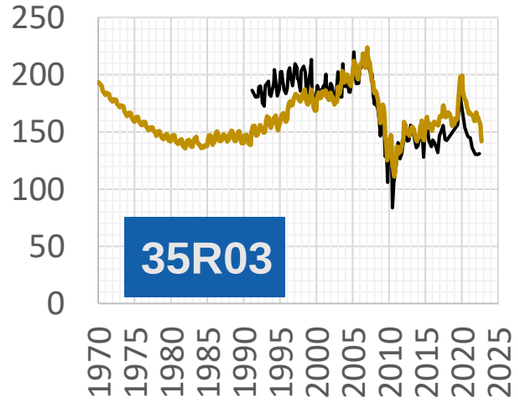












Updating the GSP Modeling Scenarios

Modeling for the 5-Year GSP Evaluation

Future Baseline

Updated pumping and expanded suite of projects

- Reflects recent pumping trends
- Includes projects that are currently funded and under construction in the LPVB and OPV

No New Projects

Sustainable pumping rate

- Includes projects currently funded and under construction in the LPVB and OPV

Projects

Integrates Management Actions and New Projects

- Adds future projects that are consistent with the Judgment and likely to be implemented in the LPVB and OPV
- Evaluates the impacts of demand reduction through voluntary temporary fallowing

Projects With EBB

Shifts the management framework

- Operation of UWCDs Extraction Barrier Brackish (EBB) water project
- **Only applicable for WLPMA**

Updating the GSP Modeling Scenarios: Time Period and Hydrology

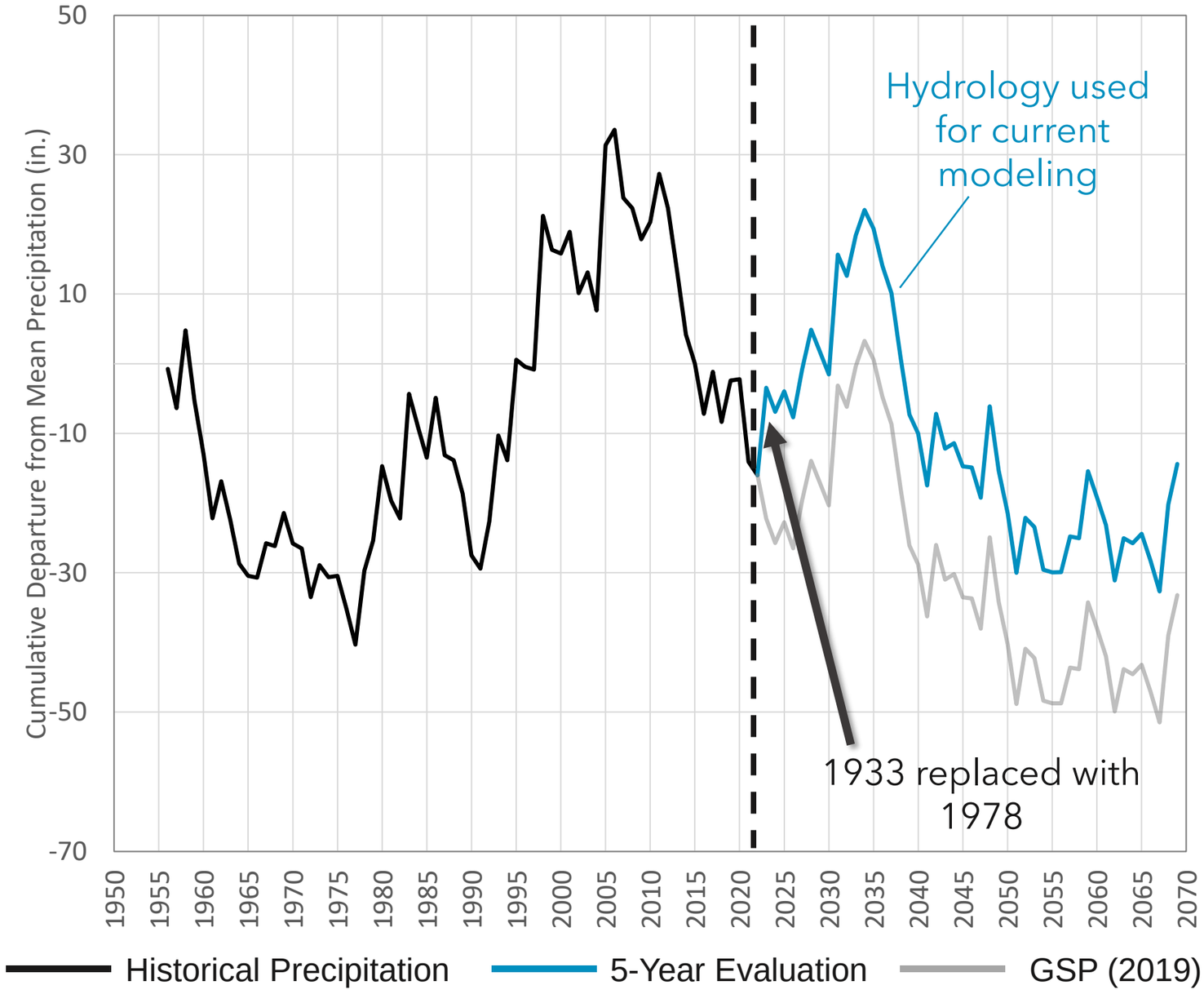
Modeling for the 5-Year GSP Evaluation

What was done for the GSP?

- Calendar Year 2020 through Calendar Year 2069
- 1930 – 1979 Hydrology, adjusted by DWR's 2070 climate change factors

What is being simulated for the 5-year evaluation?

- Water Year 2023 through Water Year 2069
- 1933 – 1979 Hydrology, adjusted by DWR's 2070 climate change factors
  - 1933 replaced with 1978 to reflect the wet 2023 water year conditions



Baseline Model Scenario: Pumping

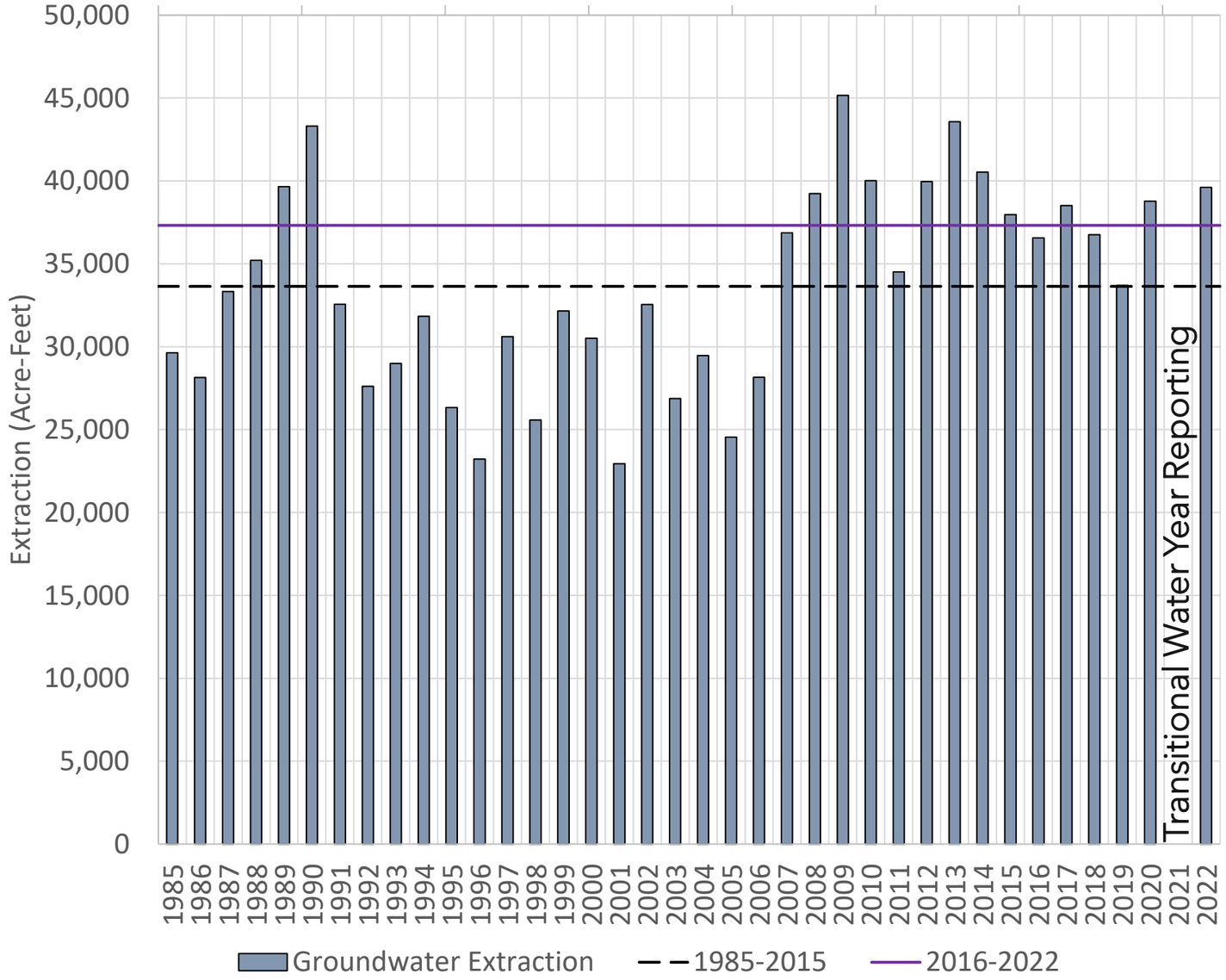
Modeling for the 5-Year GSP Evaluation

What was done for the GSP?

- Pumping held constant at average 2015-2017 rates

What is being simulated for the 5-year evaluation?

- Pumping held constant at average 2016-2022 rates (37,300 AFY)
- Approximately equal to the 2015-2017 rates (37,500 AFY)
- Consistent with updated baseline rates for the OPV



AFY = Acre-Feet per Year

Baseline Model Scenario

Modeling for the 5-Year GSP Evaluation

Projects simulated in the GSP:

- Conejo Creek Project
- North Pleasant Valley Desalter Project
- AWPF Deliveries for AG

Change in projected water supply from GSP Baseline

- Approximately 3,600 AFY of recharge from Arroyo Las Posas

New Baseline Projects

Project Name	Project Proponent	Basin	Anticipated Water Supply (AFY)	Projected Offset Pumping Reduction (AFY)
SVWQCP Discharges to Arroyo Las Posas	-	LPVB	3,600	0
Ferro-Rose Recharge Basin	UWCD	OPV*	2,500	Variable
Supplemental SWP purchase	UWCD	OPV*	6,000	Variable
Camarillo Recycled Water Deliveries to PVCWD	City of Camarillo	OPV*	1,300	1,300
Laguna road recycled water interconnect	UWCD	OPV*	0 – 1,500	0

*Included because these projects impact water levels in the WLPMA

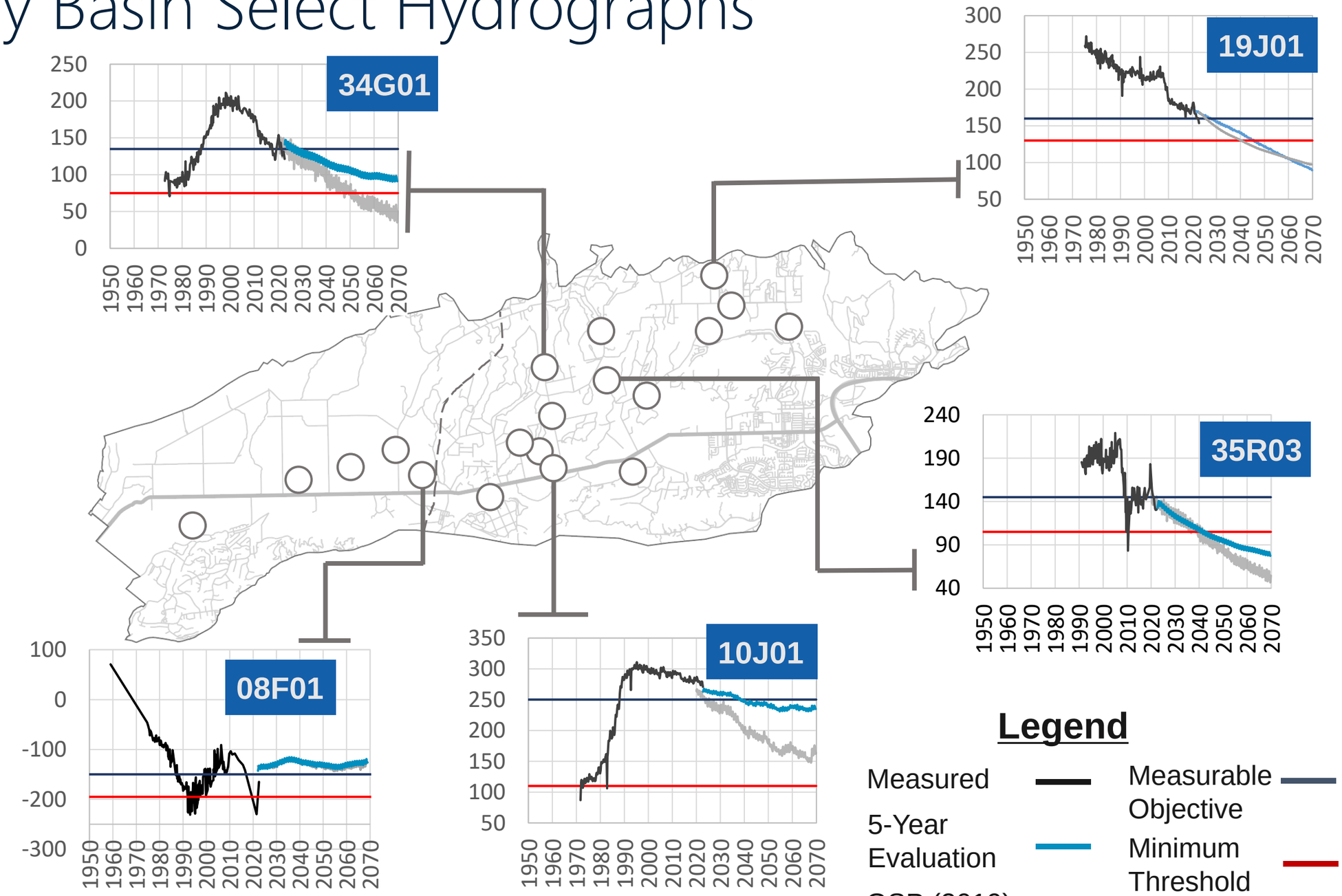
Las Posas Valley Basin Select Hydrographs

5-Year Evaluation Baseline Simulated Groundwater Elevations

- Groundwater elevations in 9 of the 20 key wells are forecasted to be below the minimum thresholds established in the GSP

Comparison to GSP Baseline Scenario

- ELPMA groundwater elevations are up to 90 feet higher than the baseline results from the GSP
- WLPMA groundwater elevations are up to 15 feet higher than the baseline results from the GSP



Preliminary Model Results Subject to Change

Baseline Model Scenario: Preliminary Results Summary

Modeling for the 5-Year GSP Evaluation

Simulated Coastal Flux

- Landward migration of the 2015 saline water impact front continues after 2040
- 50% reduction in estimated coastal flux into the UAS compared to the GSP Baseline
  - 1,600 AFY south of Port Hueneme
- 5% reduction in estimated coastal flux to the LAS compared to the GSP Baseline
  - 3,200 AFY south of Port Hueneme

Simulated Change in Storage

- Groundwater in storage in the ELPMA declined at a 33% lower rate than the GSP Baseline
  - -2,200 AFY in the ELPMA
  - Groundwater elevations and storage exhibit chronic declines in northeastern ELPMA

Simulated Groundwater Elevations

- Groundwater elevations remain below the minimum thresholds established in the GSP in 9 of the 20 key wells in the LPVB
- Baseline conditions are not sustainable

No New Projects Scenario

Modeling for the 5-Year GSP Evaluation

- Projects, simulation period, and hydrology are consistent with the Baseline Scenario
- Groundwater extractions will be incrementally adjusted until:
  - **WLPMA**
    - No net seawater intrusion in Oxnard
  - **ELPMA**
    - No net decline in groundwater in storage
- Improves on previous estimate of sustainable yield through direct simulation rather than regression

Projects Scenario

Modeling for the 5-Year GSP Evaluation

Projects and Management Actions simulated in the GSP:

- Arundo Removal
- In-Lieu deliveries to WLPMA

Sustainable Yield:

- Iterative adjustments to simulate pumping at the sustainable yield

OPV Projects:

- New projects in the OPV include the Freeman Expansion
- This project will influence groundwater elevations in the WLPMA

New Future Projects

Project Name	Project Proponent	Anticipated Water Supply (AFY)	Projected Offset Pumping Reduction (AFY)
ZMWC Infrastructure Improvement	ZMWC	0	500
Importing of surplus water	<u>Unknown</u> Will be scoped, designed, and evaluated as part of the Basin Optimization Plan.		
Arroyo Las Posas storm water capture and recharge			
Desalter construction			
Recycled water delivery pipeline			
New or modified in lieu delivery infrastructure			
Using CMWD facilities for replenishment			

Projects with EBB Scenario

Modeling for the 5-Year GSP Evaluation

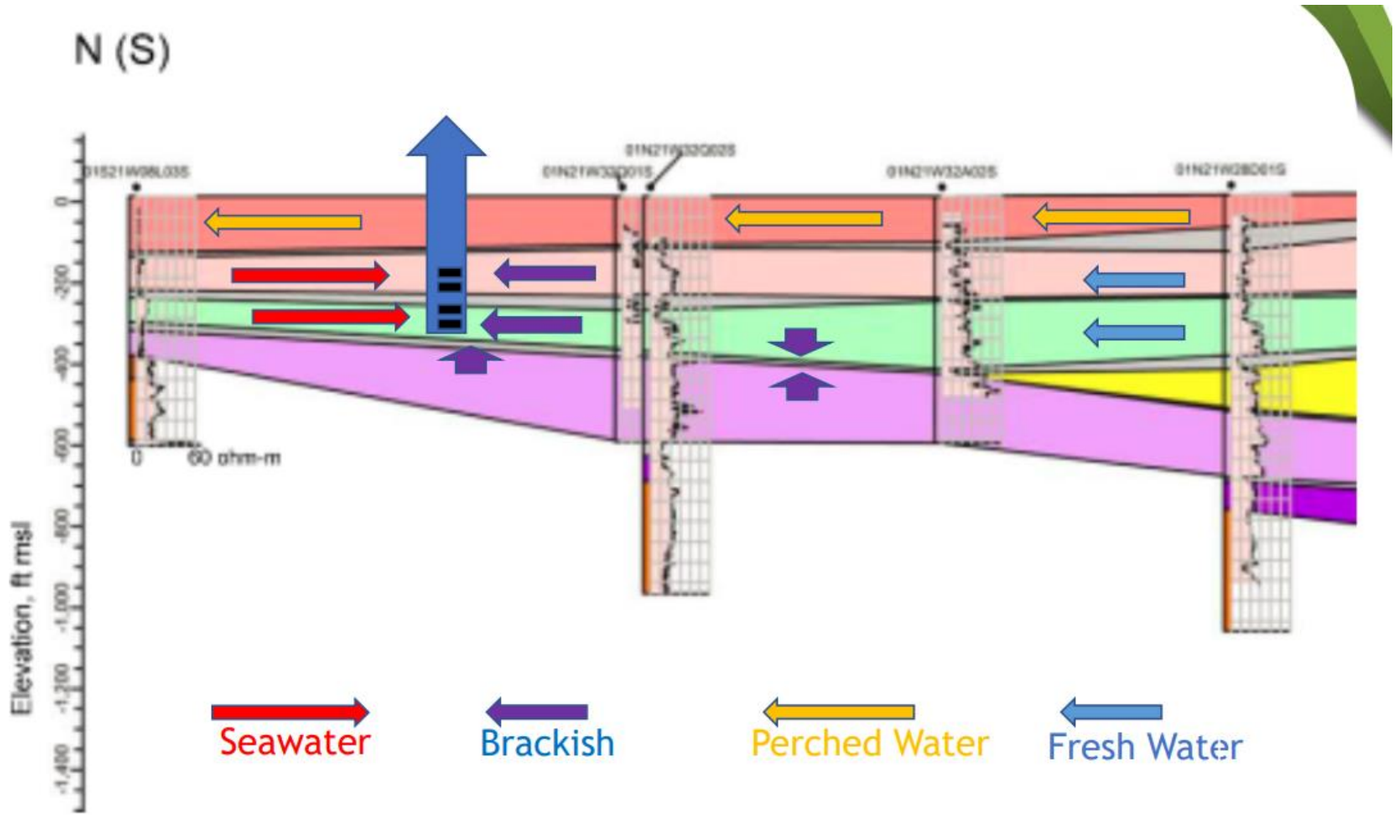
EBB Design:

- Extraction of 10,000 AFY near Point Mugu
- 5,000 AFY of treated product water
  - 1,500 AFY delivered to Navy
  - 3,500 AFY delivered to AG operators in the OPV

Sustainable Yield and Management Criteria

- Revised method for tracking landward seawater intrusion
- Revised Minimum thresholds and measurable objective

Project Name	Project Proponent	Anticipated Water Supply (Acre-Feet per Year)	Projected Offset Pumping Reduction
Extraction Barrier Brackish Water Project	UWCD	5,000	3,500 – 5,000



https://www.unitedwater.org/wp-content/uploads/2022/10/UWCD_WSSIII-EBB-Water-Treatment-Project-2022-10-19.pdf

Updating the GSP Modeling Scenarios

Modeling for the 5-Year GSP Evaluation

Future Baseline

Status

- Preliminary Simulations Complete

Results

- Projected future seawater intrusion into Oxnard
- Projected future decline in groundwater in storage in the LPVB

No New Projects

Status

- Simulations are underway

Results

- Preliminary results anticipated end of April/May 2024

Projects

Status

- Simulations are under development

Results

- Preliminary results anticipated May 2024

Projects With EBB

Status

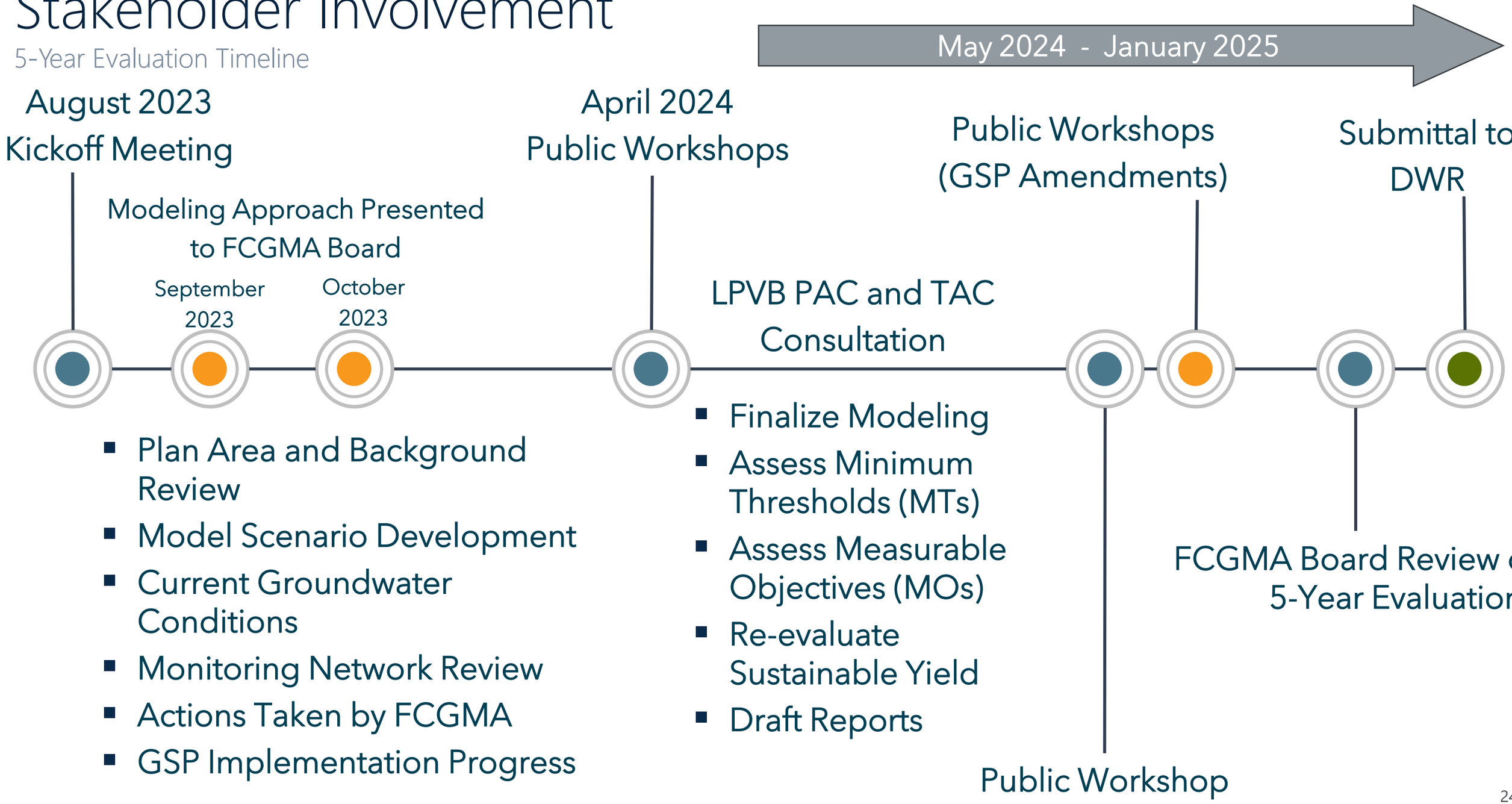
- Simulations have not started

Results

- Preliminary results anticipated June 2024

Stakeholder Involvement

5-Year Evaluation Timeline



Questions & Answers