UPPER VENTURA RIVER GROUNDWATER AGENCY GROUNDWATER SUSTAINABILITY PLAN WORKSHOP NO. 4A

Upper Ventura River GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

SEPTEMBER 3, 2021
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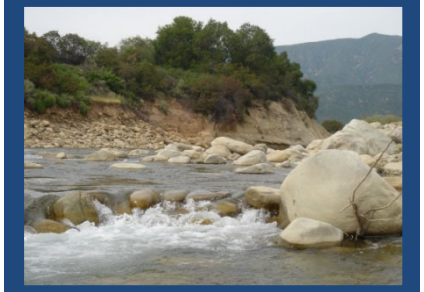
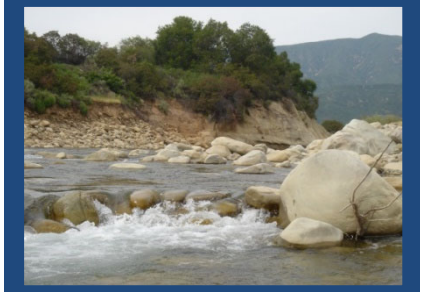


Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT



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We Serve Water

MEINERS OAKS WATER DISTRICT
VENTURA COUNTY SINCE 1949

COUNTY OF VENTURA CALIFORNIA

VENTURA WATER

SPECIAL THANKS TO VRWC FOR HOSTING THIS WORKSHOP

WORKSHOP COMPONENTS

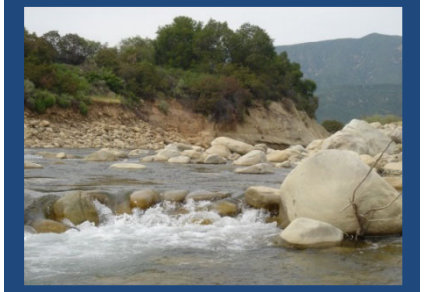
- SGMA and GSP Background
- Summary of Draft GSP Contents
- Questions and Stakeholder Feedback

WORKSHOP CAVEAT

- Many slides are recycled from prior workshops - minor differences between slide content and draft GSP may exist.

Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

SGMA AND GSP BACKGROUND



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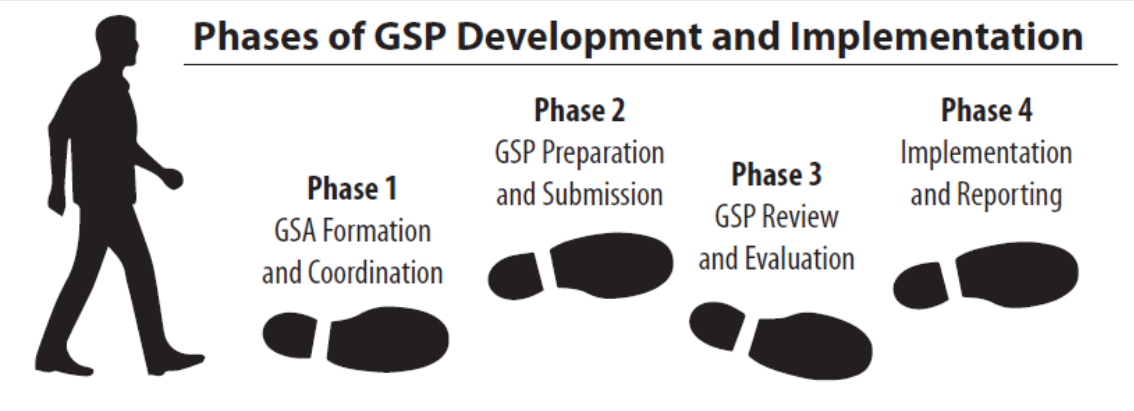
WHAT IS SGMA?

- Sustainable Groundwater Management Act
  - Three bill package signed into CA law in late 2014
  - Provides a statewide framework for long-term sustainable groundwater management in CA
  - Requires basins subject to the act to be managed sustainably 20 years after adopting a Groundwater Sustainability Plan (GSP) by a local Groundwater Sustainability Agency (GSA)

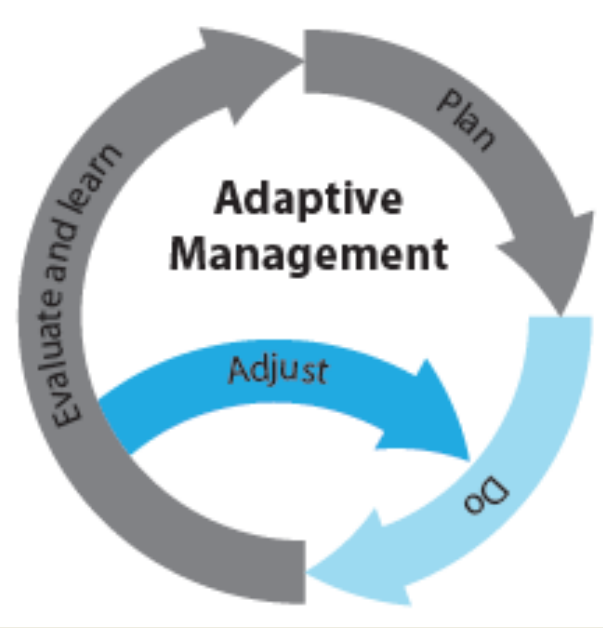
SGMA REQUIREMENTS

1. Form a Groundwater Sustainability Agency (GSA)
2. Adopt a Groundwater Sustainability Plan (GSP)
   - Due January 31, 2022
3. Achieve Sustainable Groundwater Management
   - 20 years following GSP adoption



WHAT IS A GSP?

The GSP is a flexible road map for how a groundwater basin will achieve long term sustainability by avoiding undesirable results through data-driven adaptive management



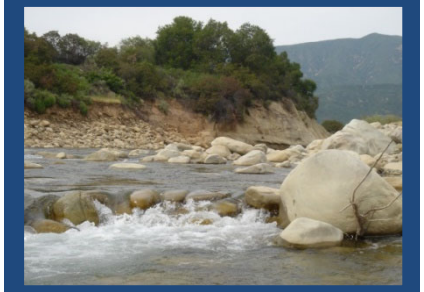
PURPOSE OF THE GSP IS TO AVOID "UNDESIRABLE RESULTS"

- Overarching goal of SGMA is to <u>avoid undesirable results</u> for each of the six SGMA sustainability indicators:

- Undesirable results and actions to prevent them are <u>defined at the local level by the GSA in the GSP</u>

Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

OVERVIEW GSP CONTENTS

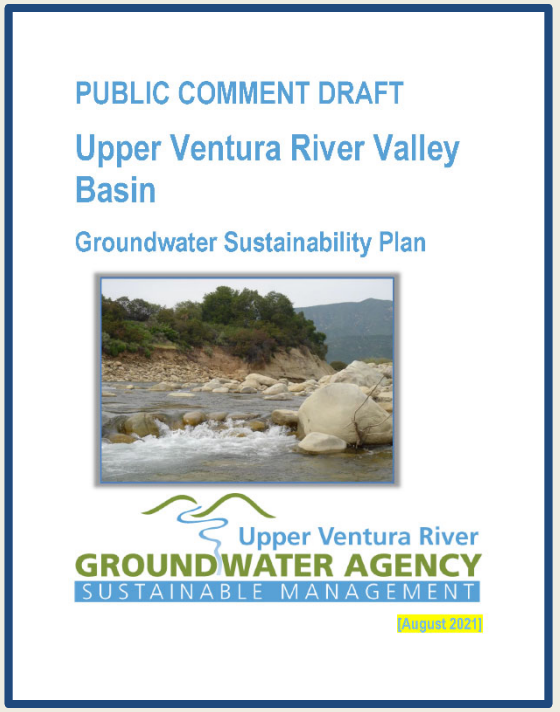


GSP CONTENTS

GSP Contents are per GSP Emergency Regulations:

- Executive Summary

1. Introduction to Plan Contents
2. Administrative Information
3. Basin Setting
4. Sustainable Management Criteria
5. Monitoring Networks
6. Projects and Management Actions
7. GSP Implementation



**** Preliminary Draft GSP Available On UVRGA Website****

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GSP LAYOUT

"Regulation Box" Describes the GSP Emergency Regulation that is addressed by the GSP section.

GSP content that addresses the GSP Emergency Regulation.

1.0 Introduction to Plan Contents [Article 5 §354]

§354 Introduction to Plan Contents. *This Article describes the required contents of Plans submitted to the Department for evaluation, including administrative information, a description of the basin setting, sustainable management criteria, description of the monitoring network, and projects and management actions.*

In 2014, the State of California enacted the Sustainable Groundwater Management Act (SGMA). This law requires groundwater basins in California that are designated as medium or high priority be managed sustainably. Satisfying the requirements of SGMA generally requires five basic activities:

1. Form one or multiple Groundwater Sustainability Agency(s) (GSAs) to fully cover the basin;
2. Develop one or more Groundwater Sustainability Plan(s) (GSPs) that fully cover the basin;
3. Implement the GSP to achieve sustainable groundwater management;
4. Annual reporting to the California Department of Water Resources (DWR); and
5. Prepare and submit a written assessment of the GSP at least every five-years to DWR and amend the GSP as necessary.

Upper Ventura River Groundwater Agency (UVRGA) was formed in 2016 to satisfy the requirement for a GSA to fully cover the Upper Ventura River Valley Basin (Department of Water Resources Basin 4-3.01; UVRGB or Basin), located in western Ventura County (Appendix A). UVRGA was designated as the exclusive Groundwater Sustainability Agency (GSA) for the Basin by the State on July 20, 2017. UVRGA developed this document to fulfill the GSP requirement for the Basin. This GSP provides administrative information, describes the Basin setting, develops quantitative sustainable management criteria that considers the interests of all beneficial uses and users of groundwater, identifies projects and management actions and monitoring networks that will ensure the Basin is demonstrably managed in a sustainable manner no later than the 20-year sustainability timeframe (2042) and for the duration of the entire 50-year planning and implementation horizon (2072).

Following submittal of an initial notification on December 20, 2017, UVRGA developed this GSP to comply with SGMA's statutory and regulatory requirements. As such, the GSP uses the terminology set forth in these requirements (see e.g., Water Code Section 10721 and 23 CCR Section 351) which is oftentimes different from the terminology utilized in other contexts (e.g., past reports or studies, past analyses, judicial rules, or findings). The definitions from the relevant statutes and regulations are provided in the section titled "Definitions of Key SGMA Terms."

The GSP includes all of the required elements of the GSP Emergency Regulation (see Appendix B), organized into eight sections plus tables, figures, and appendices. Each section contains a blue text box at the beginning stating the exact CCR Article text relevant to the section's content. The GSP sections are organized as follows:

- **Section 1 - Introduction to Plan Contents** provides an overview of SGMA and the plan contents.
- **Section 2 - Administrative Information** provides information about the GSA, a description of the Plan area, and a summary of information relating to notification and communication by the Agency with other agencies and interested parties.

Groundwater Sustainability Plan
Upper Ventura River Groundwater Agency

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SECTION 1
INTRO TO PLAN CONTENTS

- SGMA Background
- Overview of GSP Contents

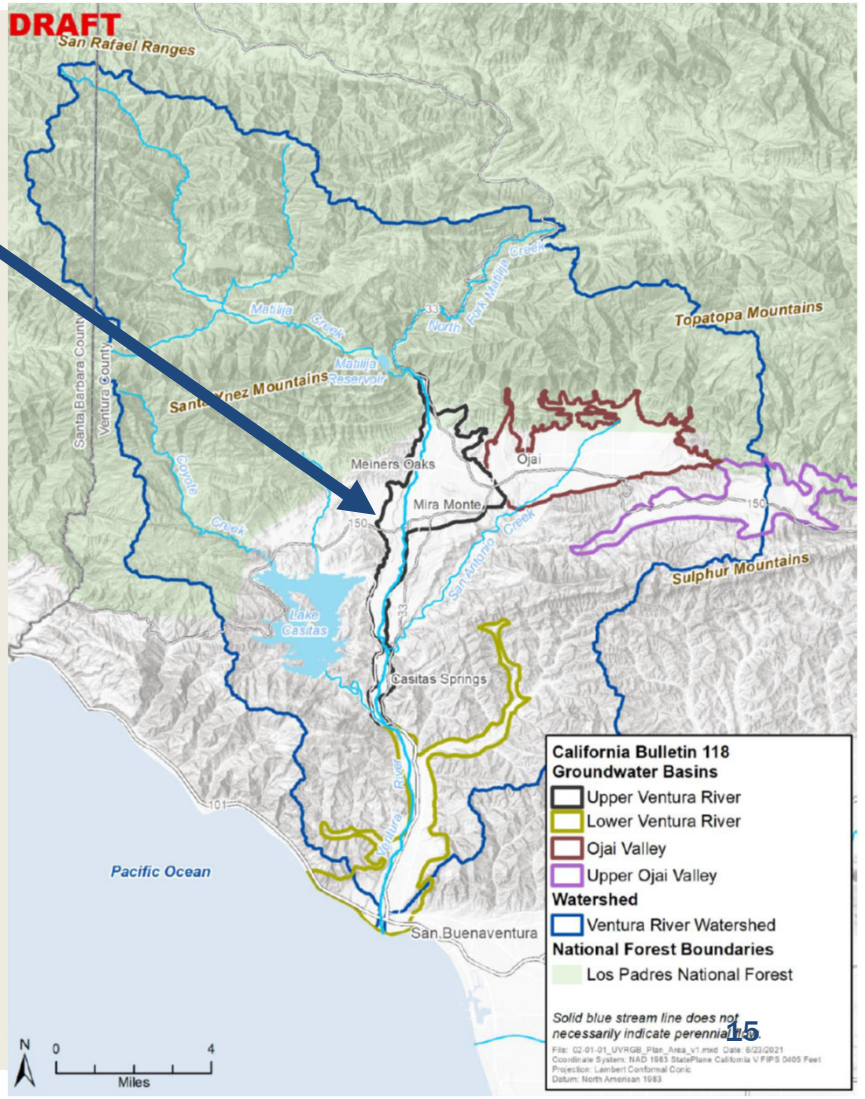
SECTION 2
ADMINISTRATIVE INFO

- Information about the GSA
- Description of the Plan area
  - Jurisdictional areas
  - Water resources programs that impact groundwater management
  - Land use plans
- Public Notice and Communication

SECTION 2
ADMINISTRATIVE INFO

UVRB is located in the central portion of the Ventura River Watershed along the Ventura River.

UVRGA consists of five public agencies (CMWD, VRWD, MOWD, City of Ventura and County of Ventura) plus agricultural and environmental representatives.

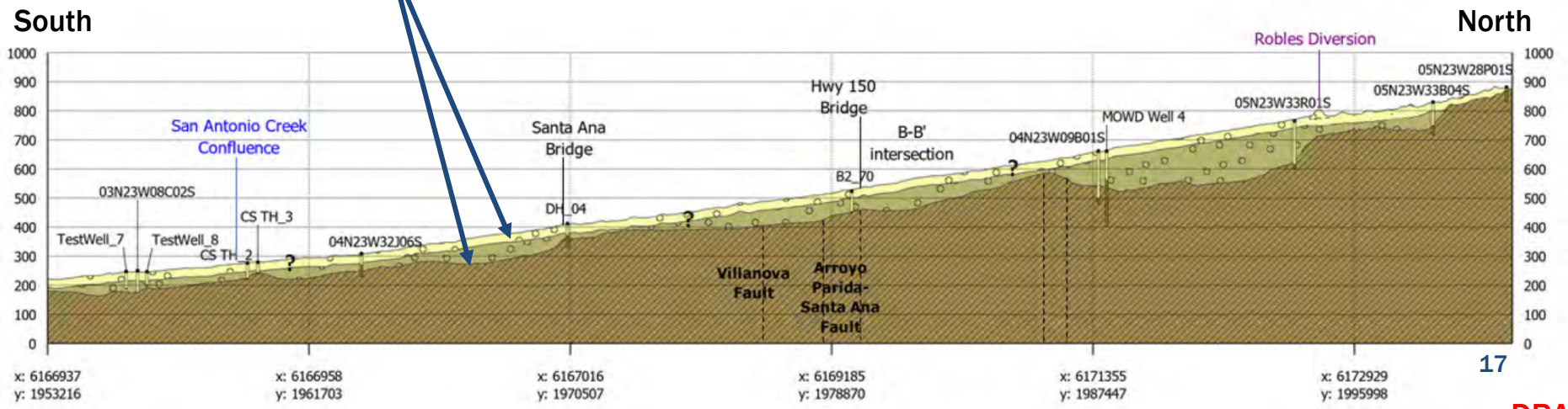


SECTION 3
BASIN SETTING

Sect. 3.1: Hydrogeologic Conceptual Model ("HCM")	• Description of the groundwater basin
Sect. 3.2: Groundwater Conditions	• Description of historical conditions in the Basin
Sect. 3.3: Water Budgets	• Description of water inflows and outflows

SECTION 3.1 HCM KEY INFO: AQUIFERS

- One "principal" aquifer:
  - Alluvium
    - Thin (typically 30 - ~180 feet thick)
    - Highly permeable
- Bedrock units provide minor quantities of water to wells and will not managed by UVRGA at this time



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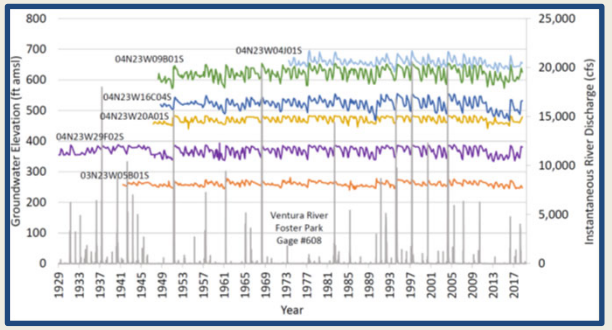
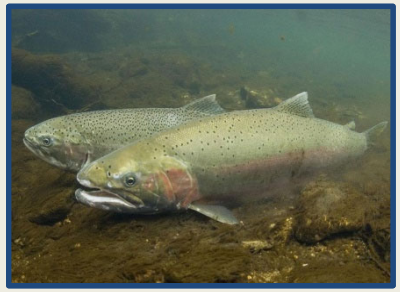
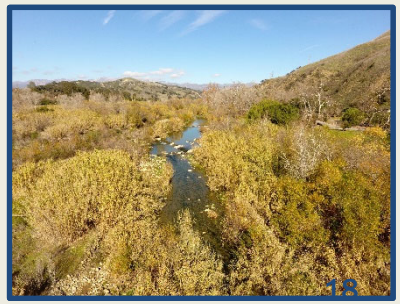
SECTION 3.2
GROUNDWATER CONDITIONS

- Groundwater Levels
- Change in Groundwater Storage*
- Seawater Intrusion**
- Groundwater Quality Impacts
- Land Subsidence **
- Interconnected Surface Water Systems
- Groundwater Dependent Ecosystems







* Addressed in water budget discussion

** Not applicable to UVRB

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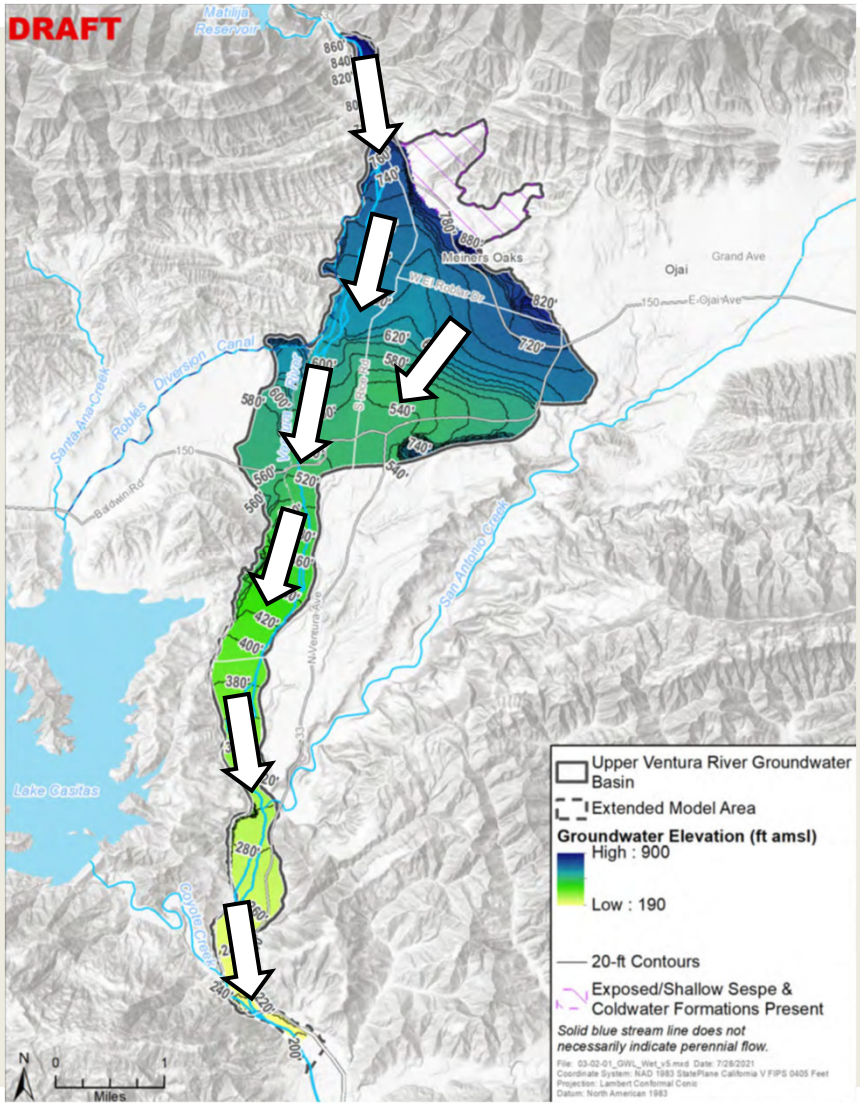
SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER LEVELS

- *Groundwater flows down the valley, generally parallel to the Ventura River.*
- *Groundwater flows many times faster than in most groundwater basins.*



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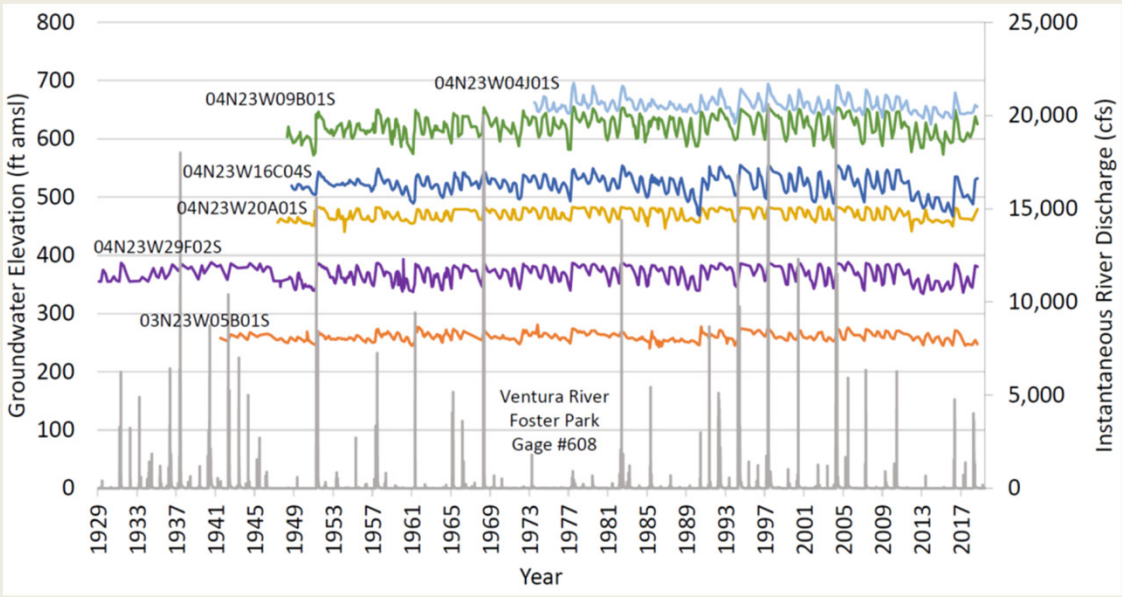
SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER LEVELS

- Groundwater levels rise and fall in response to Ventura River flows. Basin drains between storm events.
- Chronic lowering of groundwater levels & long-term reduction of groundwater storage have not been observed.



No pumping allocations or caps are proposed in the GSP because the basin is in balance. However, actions may be needed to address depletions surface water. These actions will be developed over the next 10-15 years.

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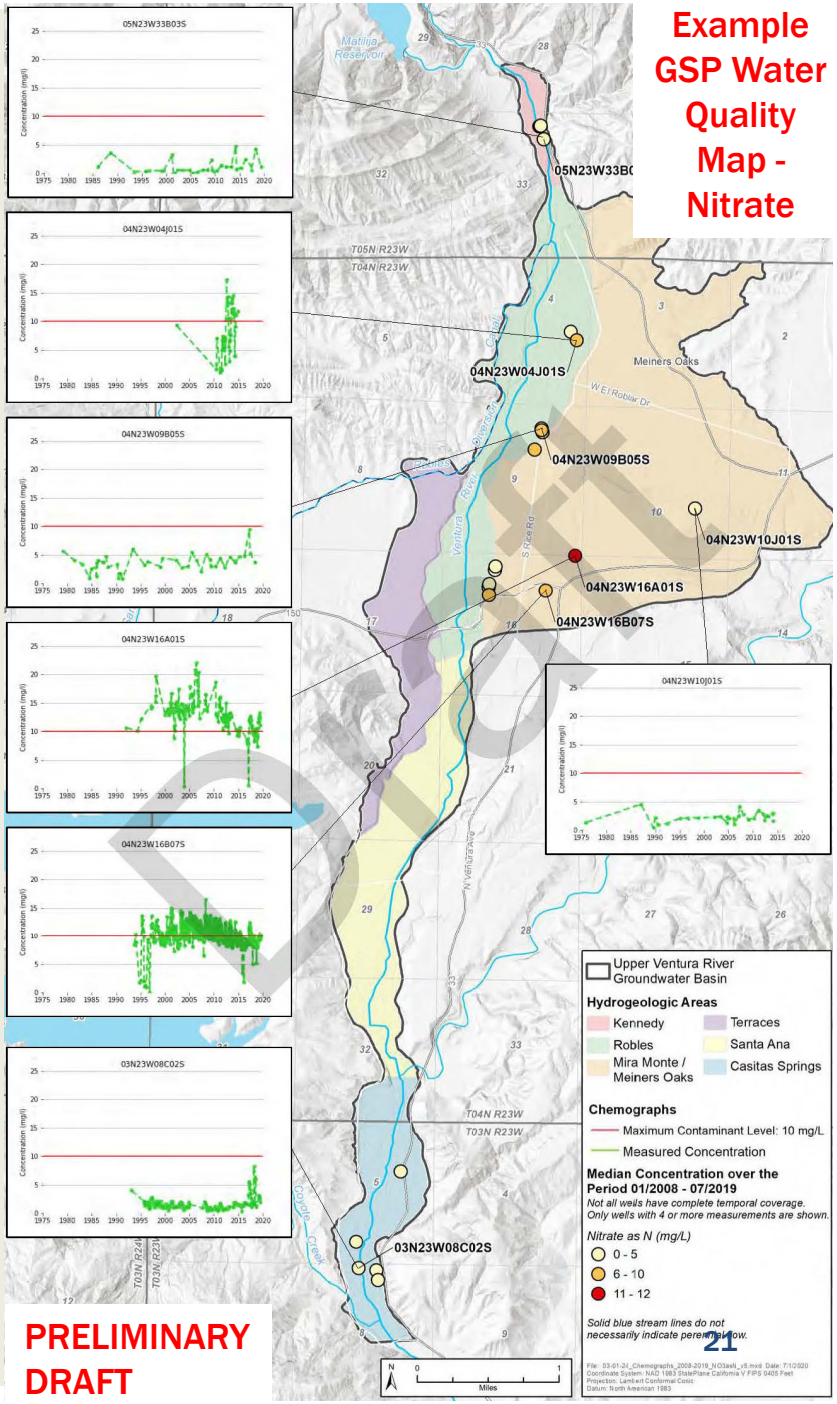
GROUNDWATER QUALITY

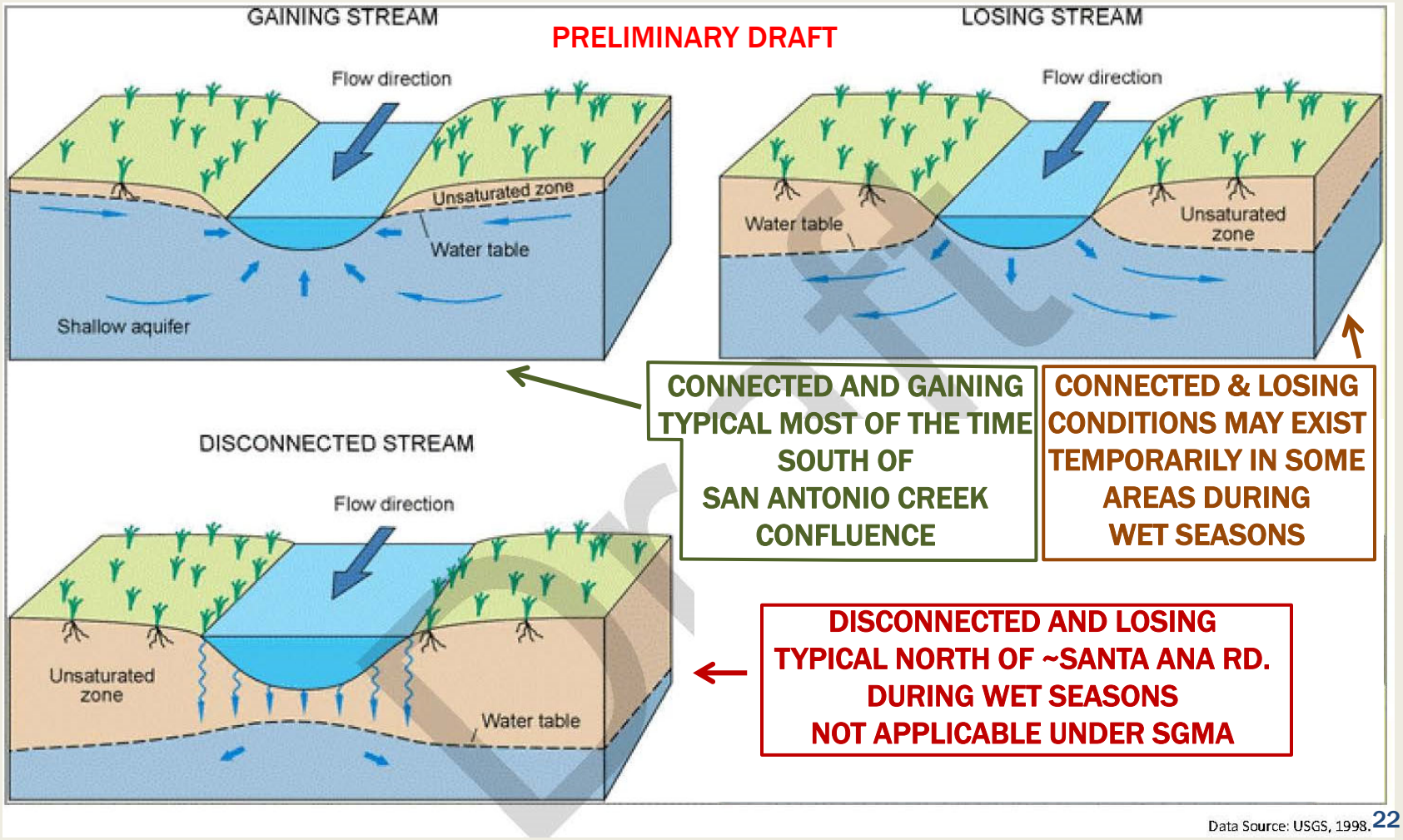
- No contamination plumes

- Water Quality Indicators:

Constituent	WQO (mg/l)	Status
Nitrate-N	10	• Mostly below objective • Highest in east of VR in Mira Monte and Meiners Oaks
TDS	800	• Generally below objectives • Some exceptions • Fluctuations related to surface water flow, not pumping. • GSP will not actively manage these constituents
Sulfate	300	
Chloride	100	
Boron	0.5	



SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER - SURFACE WATER INTERACTION



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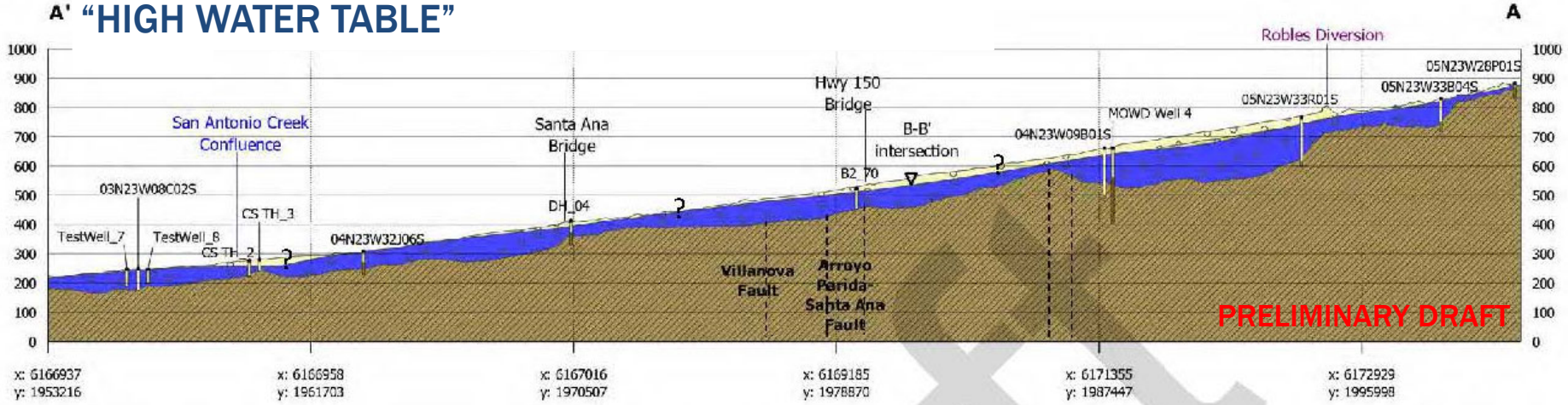
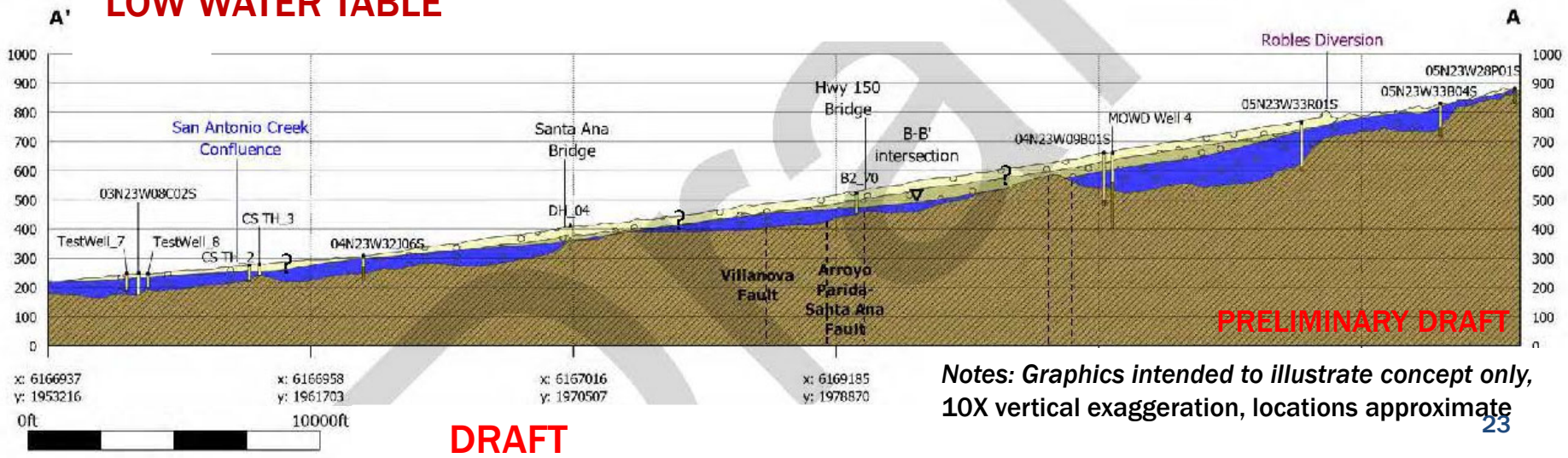
SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER - SURFACE WATER INTERACTION

A' "HIGH WATER TABLE"



"LOW WATER TABLE"



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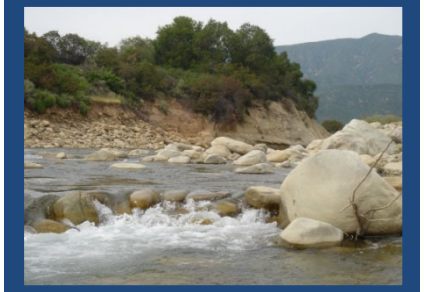
Notes: Graphics intended to illustrate concept only, 10X vertical exaggeration, locations approximate

Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

ANIMATION ILLUSTRATING GROUNDWATER SURFACE WATER INTERACTION



Modeled Surface Water and Groundwater Conditions

Historical Pumping Scenario

January 2011 - March 2017

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Modeled Surface Water and Groundwater Conditions

Historical No-Pumping Scenario

January 2011 - March 2017

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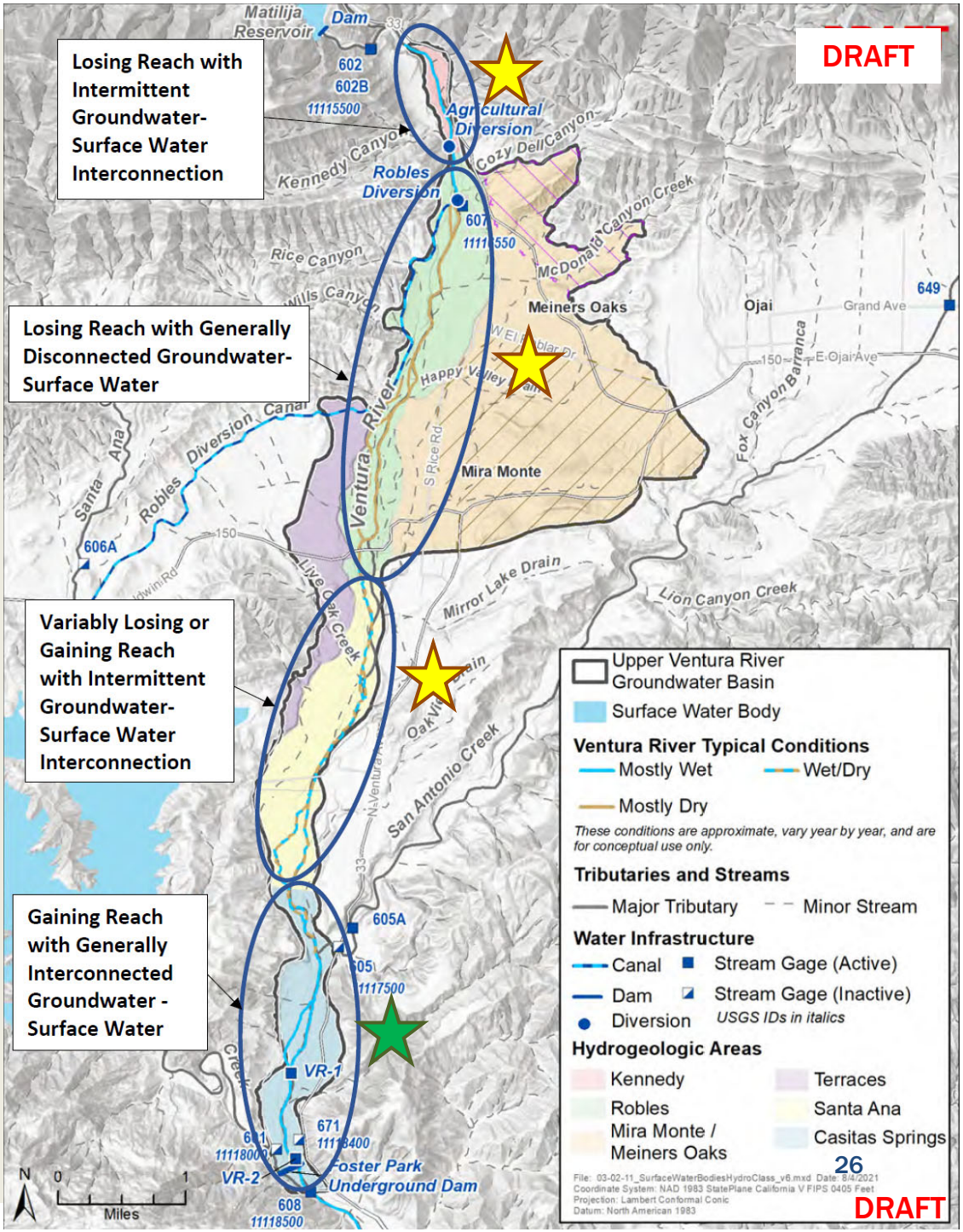
GROUNDWATER SURFACE WATER INTERACTION

- 4 areas along Ventura River with different types of GW-SW interaction

★ Consistently interconnected

★ Interconnection is transient and spatially variable



SECTION 3.2 GW CONDITIONS KEY INFO: HISTORICAL SURFACE WATER DEPLETION

- SGMA requires quantification of historical depletion of interconnected surface water "ISW".
- Under SMGA "depletion" means the direct or indirect reduction of stream flow resulting from groundwater extraction.
  - Other processes that reduce surface water flow are not considered under SGMA

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SURFACE WATER DEPLETION MECHANISMS

1. Direct Depletion: Wells very close to the river capture flow directly from the river
2. Indirect Depletion: Wells further removed from the river:
   a. Capture groundwater flow that would otherwise have discharged to the surface water system in the future.
   b. Lower the water table causing more streamflow to percolate during storm events

GSP must address both types of depletion

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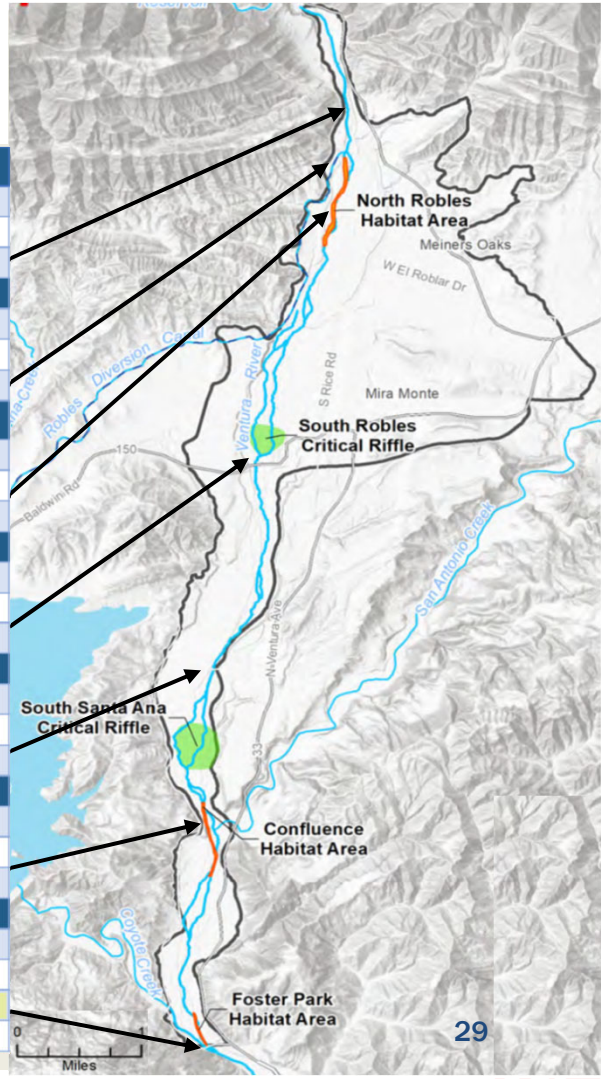
SECTION 3.2 GW CONDITIONS KEY INFO: HISTORICAL SURFACE WATER DEPLETION

Numerical modeling was performed to estimate historical rates of surface water depletion.

South Kennedy (Boundary of Kennedy & Robles Area)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median Flow (Historical)	32.1	39.6	42.4	18.6	10.8	4.1	1.2	0.2	0.0	0.1	0.9	5.8
Median Flow (Historical No Pumping)	33.0	39.9	43.0	19.0	11.3	4.8	2.4	0.8	0.3	0.5	1.7	6.3
Median Depletion	0.3	0.4	0.4	0.4	0.4	0.7	0.6	0.4	0.2	0.2	0.4	0.4
Robles Diversion (Gage 607)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Median Flow (Historical)	23.2	34.3	30.0	14.6	7.8	1.7	0.1	0.0	0.0	0.0	0.2	3.2
Median Flow (Historical No Pumping)	23.4	34.8	30.4	14.7	8.3	2.3	0.4	0.0	0.0	0.0	0.5	3.6
Median Depletion	0.3	0.4	0.4	0.4	0.3	0.3	0.1	0.0	0.0	0.0	0.2	0.3
North Robles (near Happy Valley Drain)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Median Flow (Historical)	3.9	15.4	17.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Median Flow (Historical No Pumping)	3.9	15.8	18.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Median Depletion	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Robles (150 Bridge)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Median Flow (Historical)	4.7	14.1	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Median Flow (Historical No Pumping)	5.3	14.3	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Median Depletion	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Santa Ana Bridge	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Median Flow (Historical)	7.3	17.6	16.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Median Flow (Historical No Pumping)	7.4	17.7	16.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Median Depletion	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
San Antonio Confluence	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Median Flow (Historical)	7.1	28.7	27.3	10.5	6.1	3.1	0.8	0.0	0.0	0.0	0.0	0.8
Median Flow (Historical No Pumping)	10.7	31.2	29.3	13.6	9.2	6.7	4.7	2.2	0.3	0.0	0.1	1.2
Median Depletion	1.5	2.2	1.8	1.1	0.7	0.7	0.3	0.6	0.3	0.0	0.1	0.4
Foster Park (Gage 608)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Median Flow (Historical)	10.7	28.2	25.8	10.9	6.9	4.7	4.5	4.1	2.7	3.5	4.2	4.3
Median Flow (Historical No Pumping)	15.8	36.1	33.1	17.5	14.3	12.6	11.3	10.2	9.8	9.8	9.7	8.9
Median Depletion	5.1	5.1	6.7	4.6	4.5	4.6	4.4	4.3	4.4	4.5	4.2	4.6

All values are cubic feet per second (cfs).



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SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER DEPENDENT ECOSYSTEMS (GDES)

- SGMA Definition: "*Ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.*"
  - Riparian plant communities and species that rely on plant communities
    - *Applicable Sustainability Indicator: GW Levels/Storage*
  - Aquatic communities where surface water is interconnected with groundwater
    - *Applicable Sustainability Indicator: Depletion of ISW*

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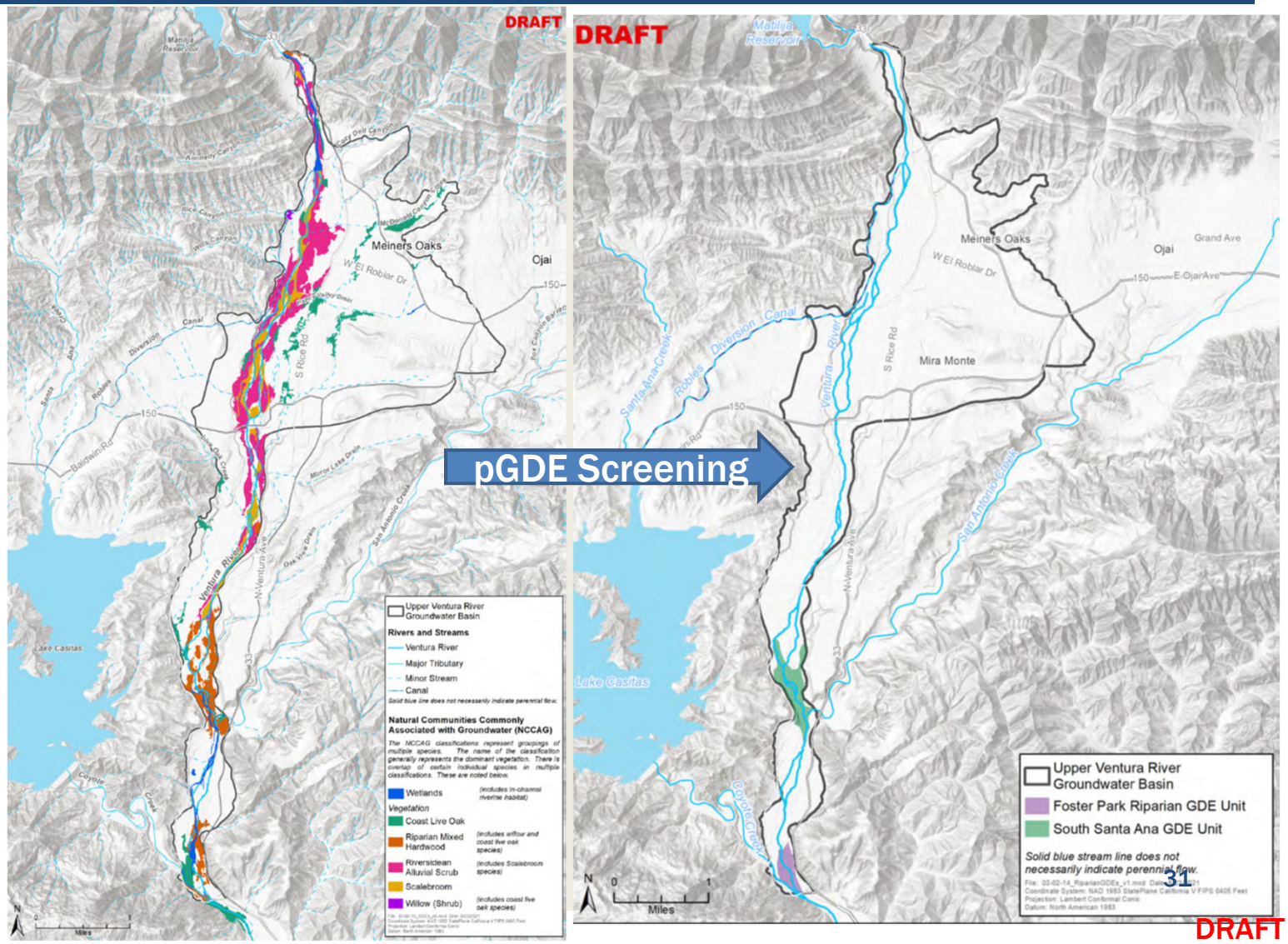
SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER DEPENDENT ECOSYSTEMS

Potential riparian GDEs were identified and reviewed

Plants not dependent on groundwater were screened out following TNC recommended procedures.

Two riparian GDE areas identified for consideration in the GSP



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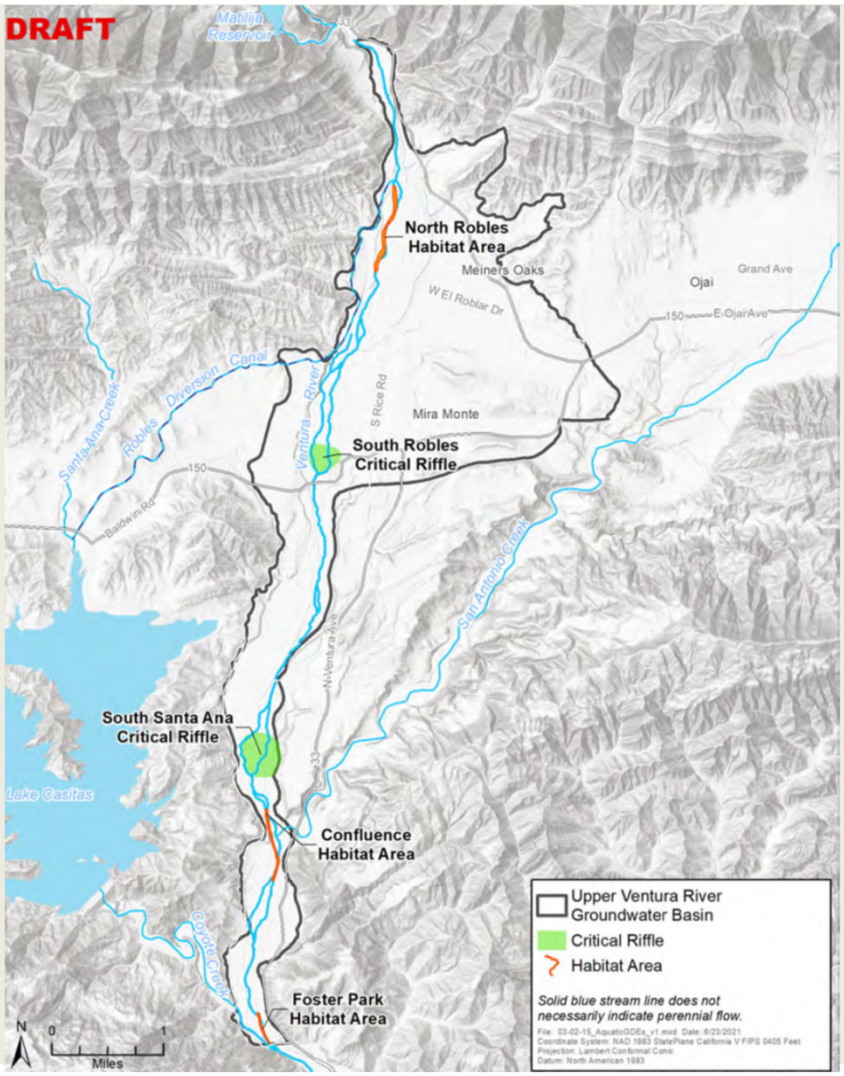
SECTION 3.2 GW CONDITIONS KEY INFO: GROUNDWATER DEPENDENT ECOSYSTEMS

Potential aquatic habitat areas were identified and reviewed

Five aquatic habitat areas identified for consideration in the GSP



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SECTION 3.3 WATER BUDGET OVERVIEW:

- Water budget is an accounting of water inflows and outflows to/from the Basin
- GSP requirements
  - Historical/Current Water Budget
  - Future Water Budgets
- Water budget developed in concert with calibration of a numerical flow model of the groundwater basin
  - More information about numerical model available in Workshop No. 2 slides and GSP Appendix H (both available at https://uvrgroundwater.org/)

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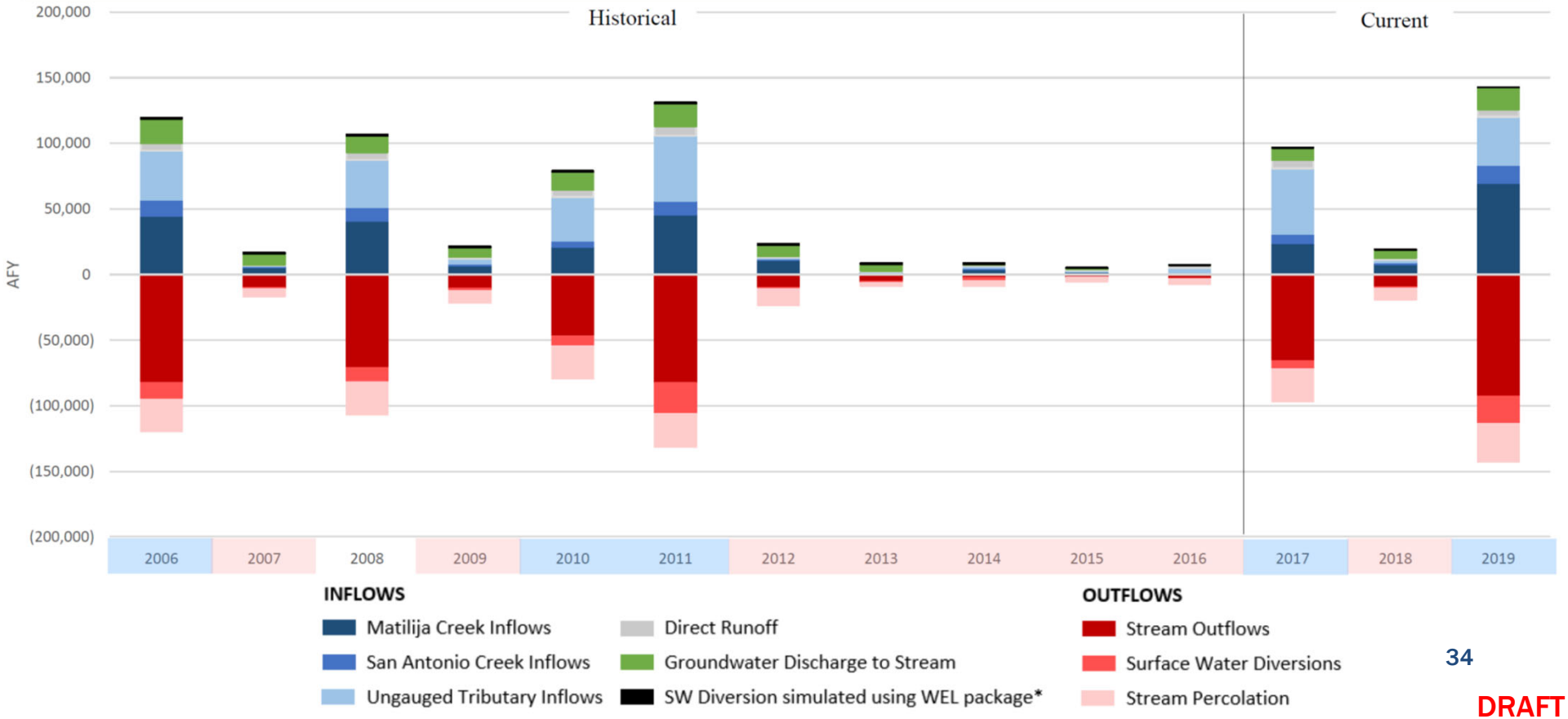
SECTION 3.3 WATER BUDGET HISTORICAL/CURRENT SURFACE WATER BUDGET

Key Takeaways:

Surface water budget is dominated by surface water passing over the basin. Groundwater discharge becomes a larger percentage of the budget in dry years.



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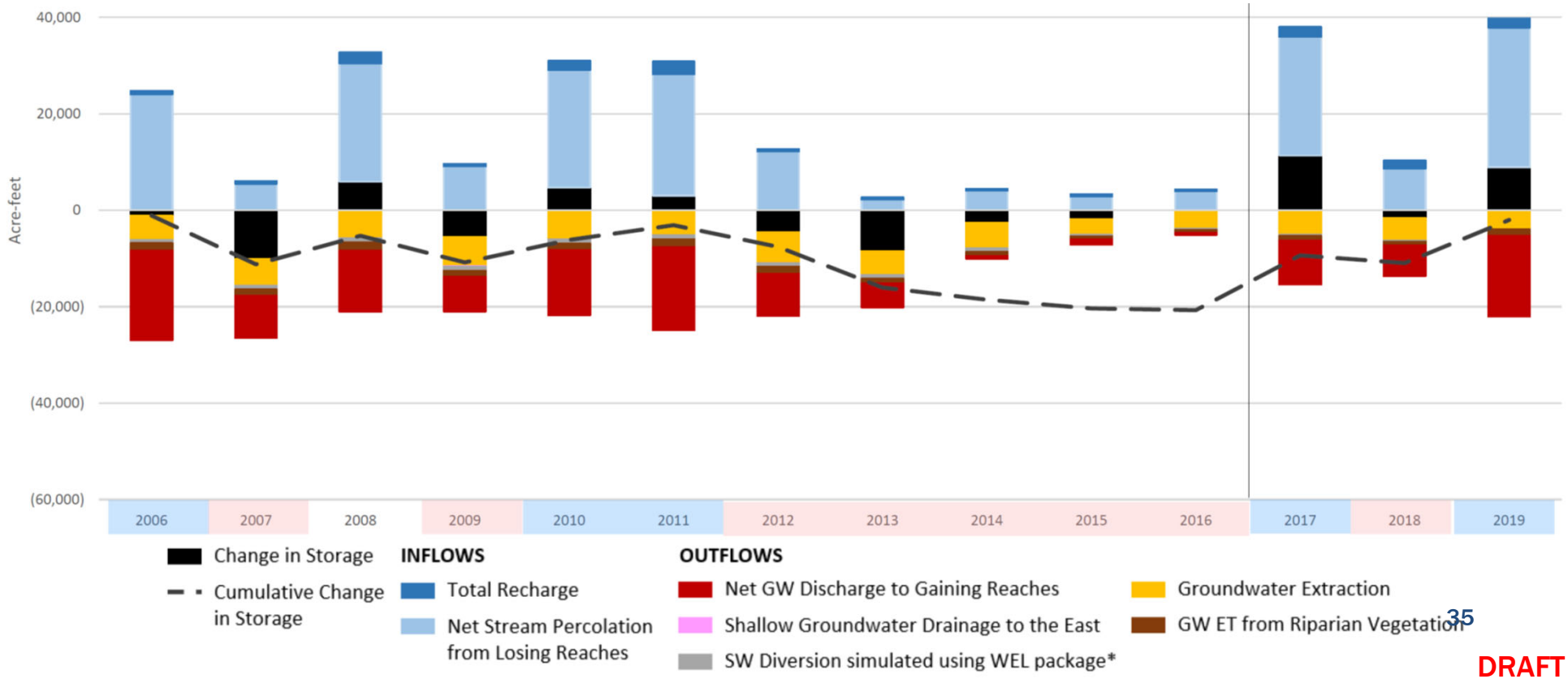
SECTION 3.3 WATER BUDGET HISTORICAL / CURRENT GROUNDWATER BUDGET

Key Takeaways:

Groundwater budget is dominated by Ventura River percolation to the water table and discharge of groundwater back to the Ventura River.

No long-term reduction in groundwater storage.



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FUTURE WATER BUDGET REQUIREMENTS

- SGMA requires minimum 50-yr future projections of groundwater conditions, including water budget for the basin
- Must use >= 50 yrs. of *historical* hydrology
- Must use most recent conditions for baseline estimate of future water demands
- Must evaluate potential effects on water demand due to:
  - Land Use Change
  - Population Change
  - Climate Change

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FUTURE CONDITIONS KEY ASSUMPTIONS

- Hydrology: 1970 – 2019 is proxy for future conditions
  - Several wet-dry cycles
  - Precipitation average similar to long-term average
  - Includes 1985 Wheeler and 2017 Thomas Fires

- Groundwater Extraction:
  - Municipal based on planning documents & agency input
    - Land use and population expected to be small – no increase in extractions expected
  - Agriculture based on historical estimated use
    - Note: this is not a pumping allocation or cap of any kind, it is just a planning estimate, can and will be updated
  - Domestic assumed 2 acre-feet per year per parcel

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FUTURE CONDITIONS KEY ASSUMPTIONS

- Surface Water Diversions
  - Robles Diversion –biological opinion operating rules implemented
  - Private Diversion – based on historical reported diversions
- Climate Change:
  - Used change factors provided by DWR for 2030 and 2070 central tendency estimates
    - Climate change effects are small and not anticipated to materially impact GSP implementation

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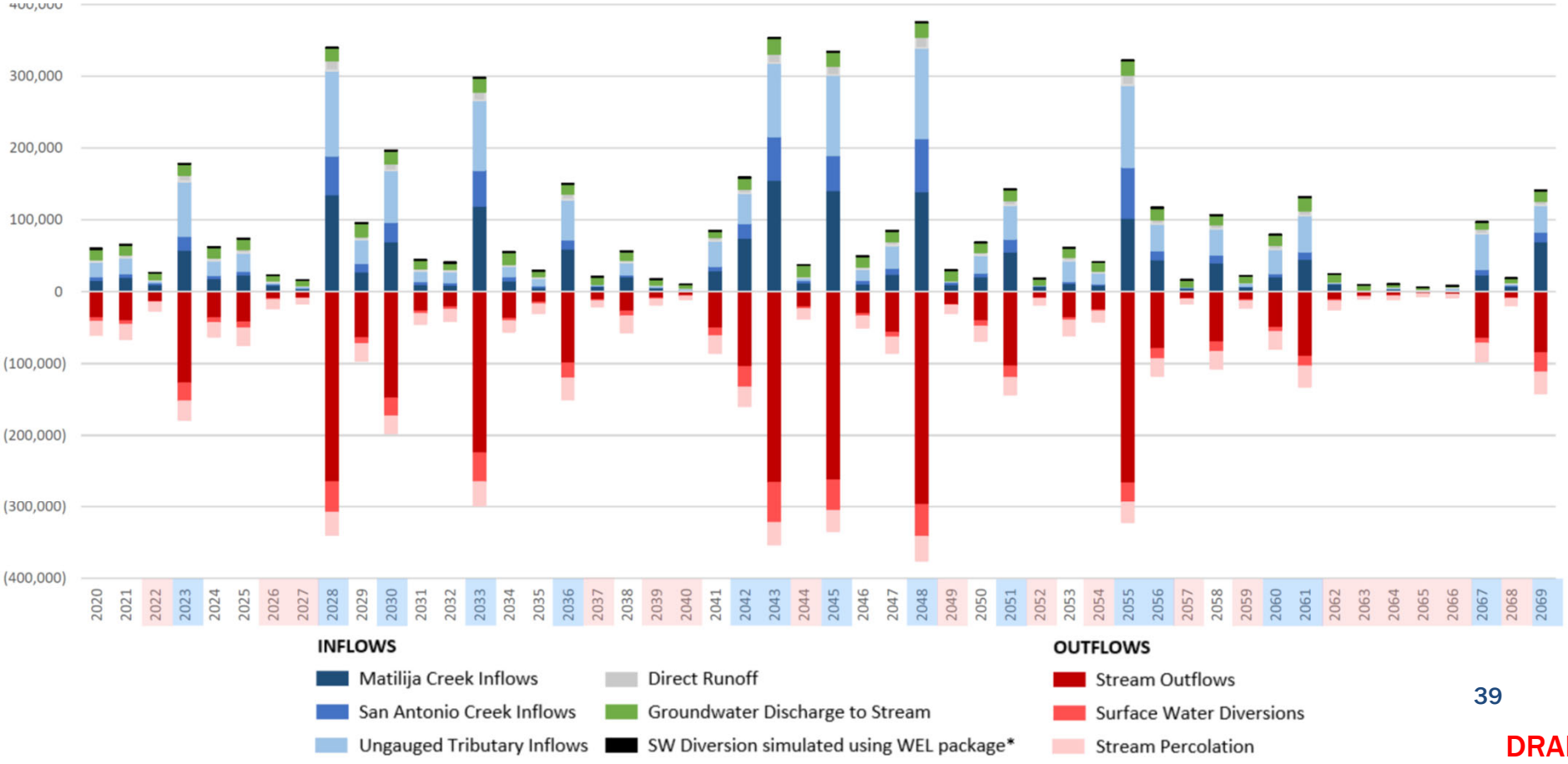
SECTION 3.3 WATER BUDGET
FUTURE PROJECTED
SURFACE WATER BUDGET

Key Takeaways:

Surface water budget is dominated by surface water passing over the basin.

Groundwater discharge becomes a larger percentage of the budget in dry years.



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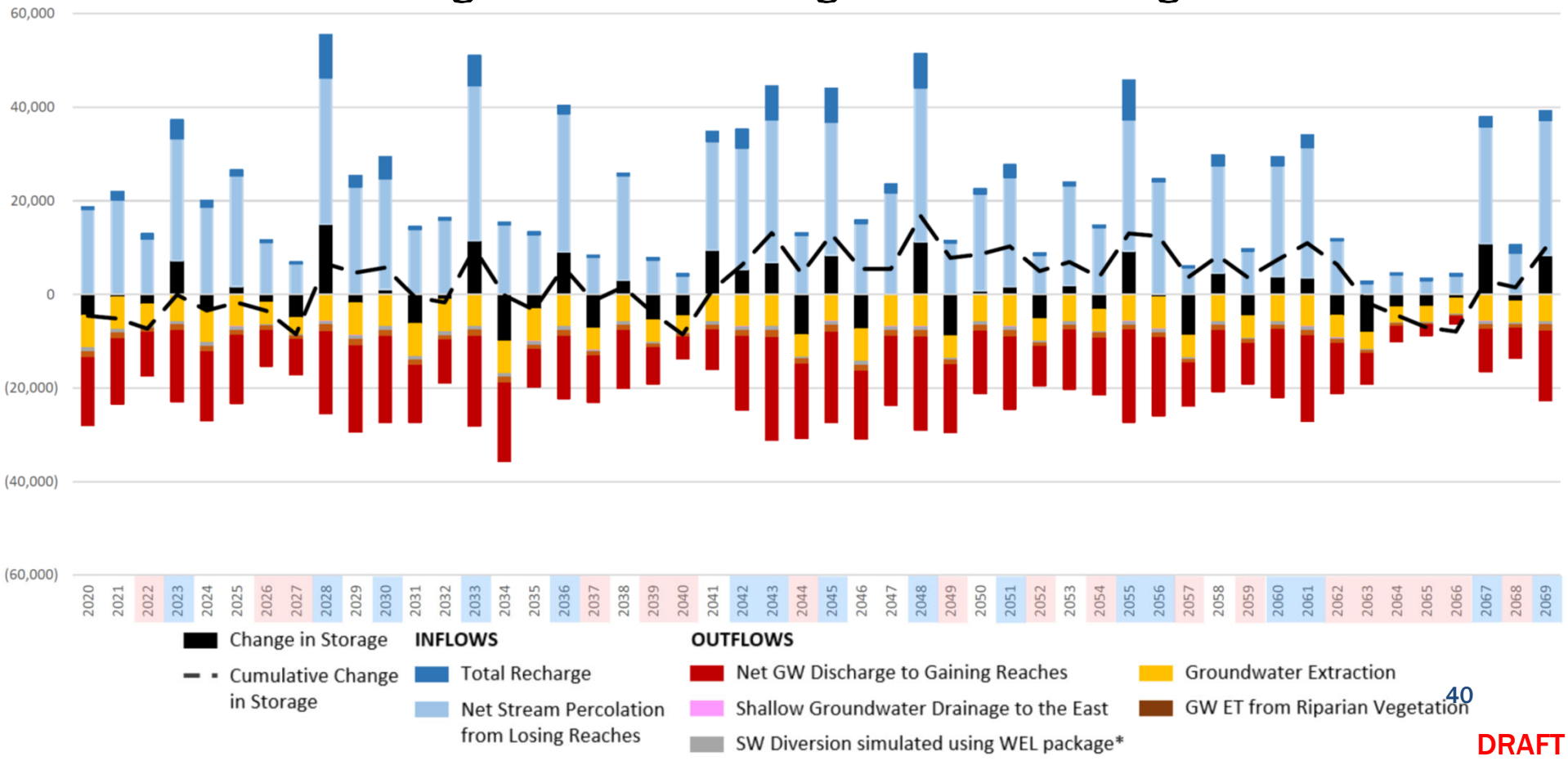
SECTION 3.3 WATER BUDGET
FUTURE PROJECTED
GROUNDWATER BUDGET

Key Takeaways:

Groundwater budget is dominated by Ventura River percolation to the water table

No long-term reduction in groundwater storage.



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SECTION 3.3 WATER BUDGET

- Detailed results in draft GSP:
  - Tables 3.3-01 through 3.3-16
  - Figures 3.3-01 through 3.3-09
  - GSP Appendix H

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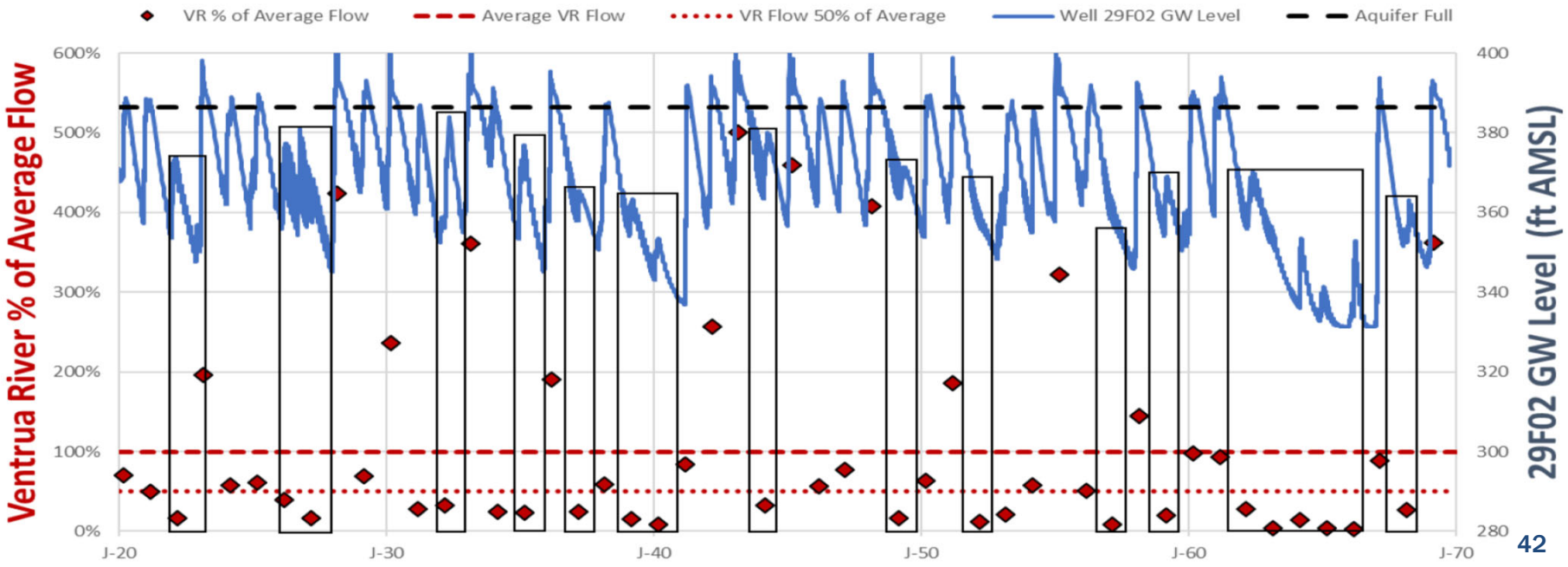
SIMULATED FUTURE GROUNDWATER LEVELS

Key Takeaways:

1. *No chronic decline in groundwater levels is predicted.*
2. *Basin is predicted to "drain" and "refill" as it has historically.*
3. *Basin is predicted to "refill" when Ventura River flows >= 50% of ave. flow.*



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SECTION 3.3
WATER BUDGET CONCLUSIONS

- The basin is in balance with no chronic lowering of groundwater levels or storage reduction.

- No pumping allocations or caps are proposed in the GSP because the basin is in balance. However, actions may be needed to address depletions surface water. These actions will be developed over the next 10-15 years.

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SECTION 4
SUSTAINABLE MANAGEMENT CRITERIA

- Overarching goal of SGMA is to <u>avoid undesirable results</u> for each applicable SGMA sustainability indicator:

- One section for each sustainability indicator

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SECTION 4
SUSTAINABLE MANAGEMENT CRITERIA

- Sustainability Goal
- Measurable Objectives
  - Quantitative metrics that reflect basin desired conditions
- Minimum Thresholds
  - Quantitative metrics indicating significant and unreasonable effect likely exist
- Undesirable Results
  - Significant and unreasonable effects for sustainability indicators caused by groundwater conditions occurring throughout the basin; identified as a combination of minimum threshold exceedances

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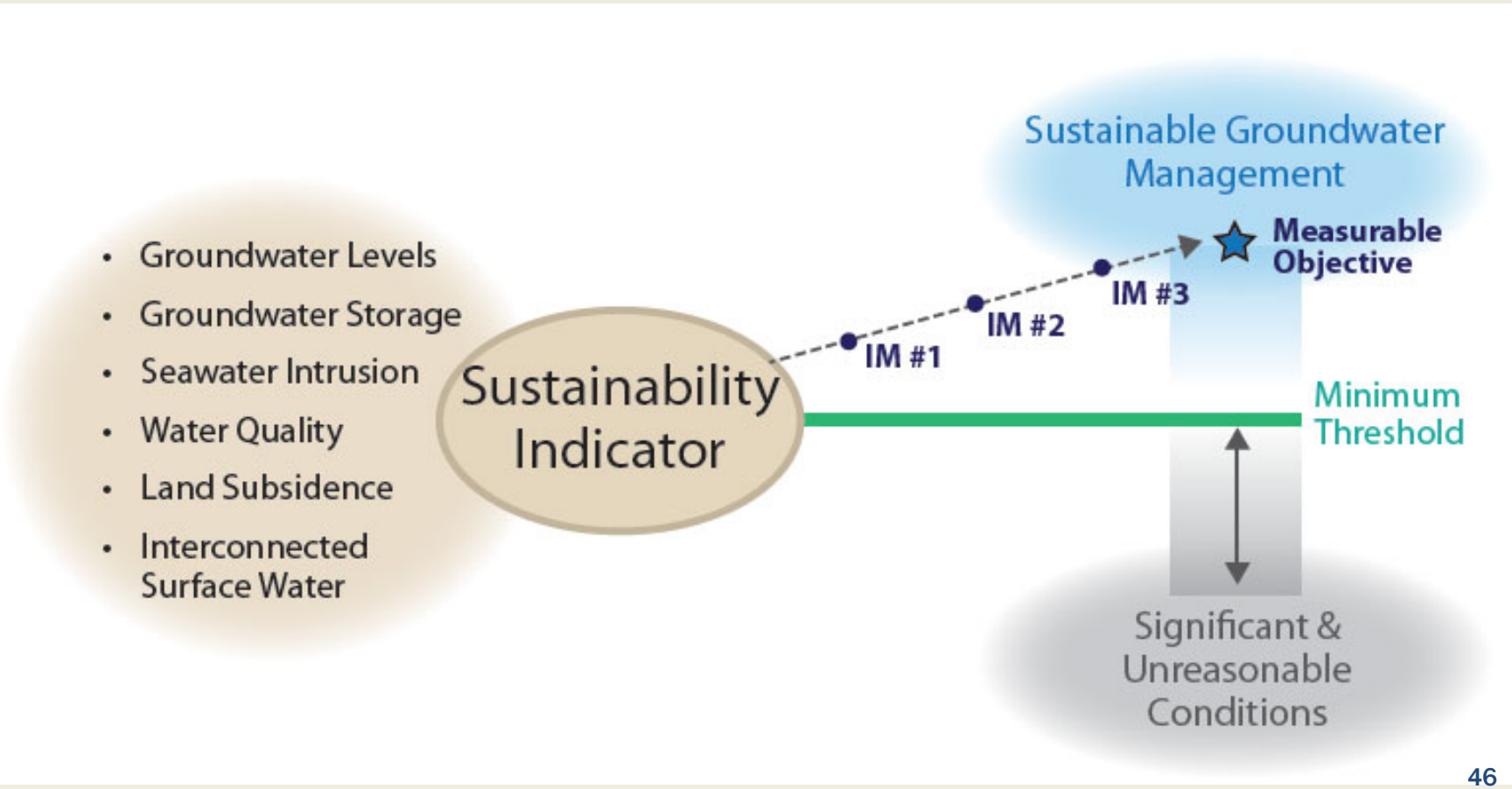
SUSTAINABLE MANAGEMENT CRITERIA

The overarching goal of SGMA is to avoid undesirable results



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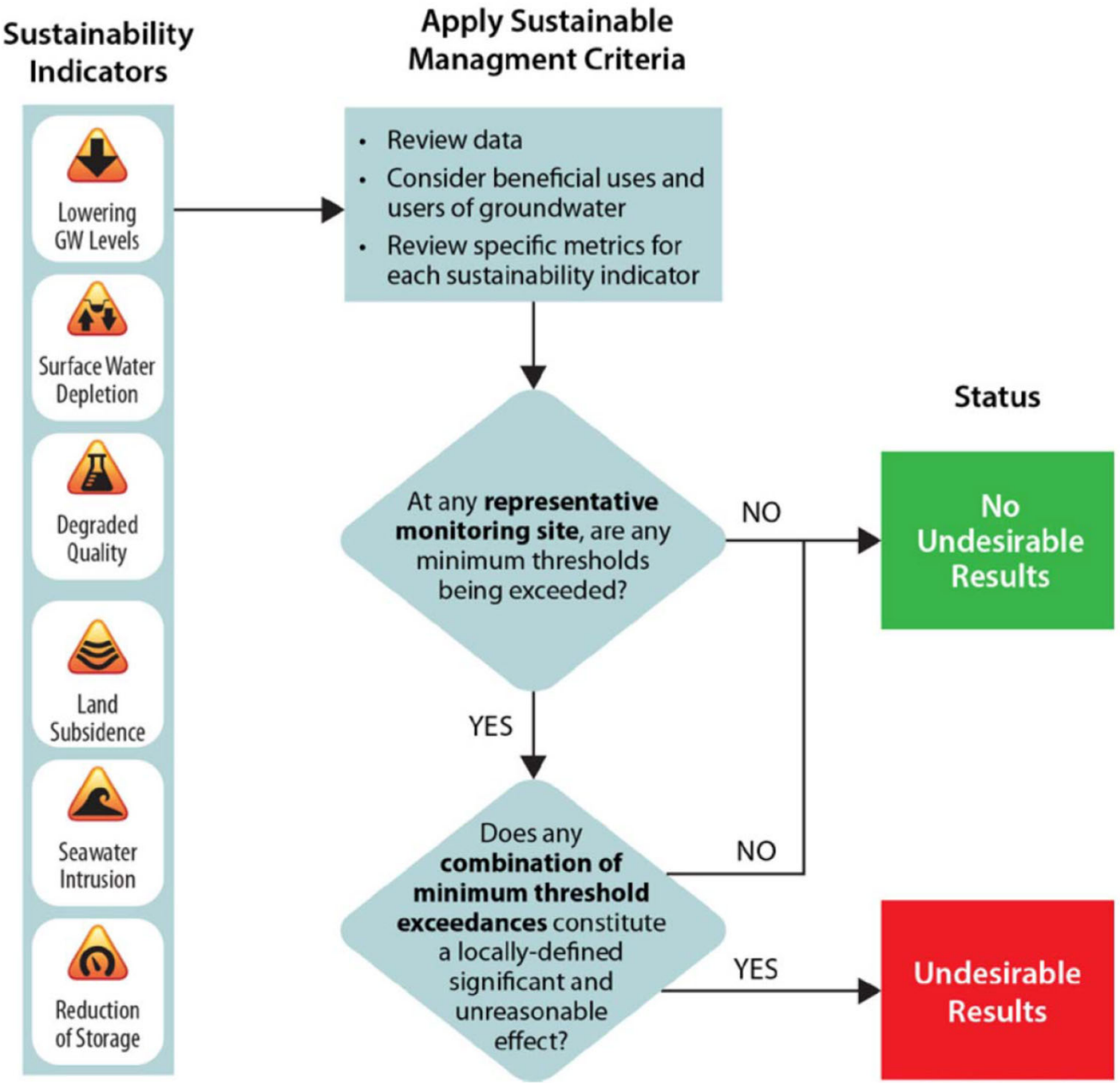

UR PROCESS

Minimum Thresholds:

Quantitative measures that indicate significant and unreasonable effects in a particular area

Undesirable Results:

<u>Combination</u> of minimum thresholds exceedances that defines undesirable results

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IDENTIFIED BENEFICIAL USERS CONSIDERED IN SMC DEVELOPMENT

- **Groundwater**
  - *Municipal, agricultural, and domestic water supply wells*
  - *Riparian Groundwater Dependent Ecosystems (GDEs)*
- **Surface Water:**
  - *Municipal diversions*
  - *Agricultural diversion*
  - *Aquatic GDEs*
  - *Recreation*

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DEFINING UNDESIRABLE RESULTS

- Degraded Water Quality
  - Undesirable results = water supply impairment
- Groundwater levels:
  - *Significant and unreasonable depletion of supply (i.e. the beneficial users who rely on groundwater supply)*
- Groundwater Storage:
  - *Directly related to groundwater levels – same URs as groundwater levels*
- Depletions of Interconnected Surface Water:
  - *Significant and unreasonable adverse impacts on beneficial uses of the surface water*

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DRAFT GSP SMC

Disclaimers

The following SMC proposals are not approved by the UVRGA Board until it adopts the GSP.

Initial SMC adopted in the GSP will be revisited during each 5-year GSP review for potential modification based on monitoring results and other new information.

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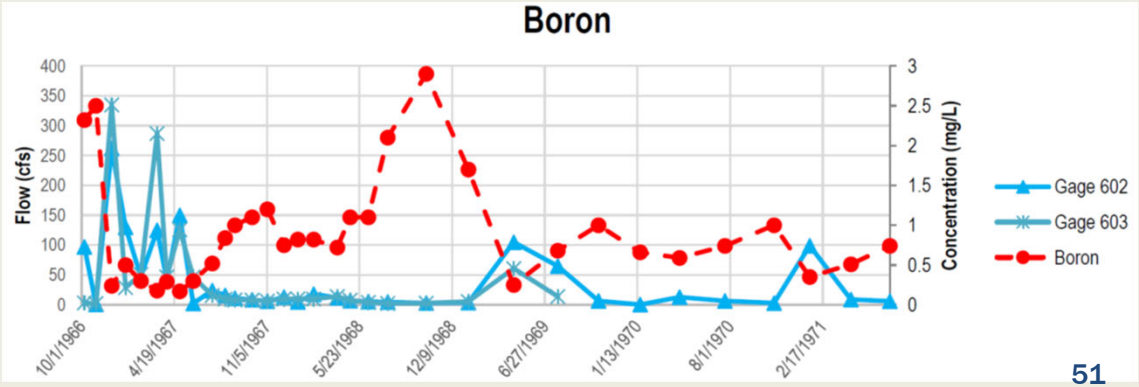
DEGRADED WATER QUALITY SMC

NOTE: SIGNIFICANT MODIFICATIONS WILL BE MADE TO DEGRAGED WATER QUALITY SCM BEFORE GSP IS ADOPTED

- Naturally occurring water quality constituents:
  - Surface water quality controls groundwater quality
  - No meaningful nexus with groundwater pumping
  - No SMC required



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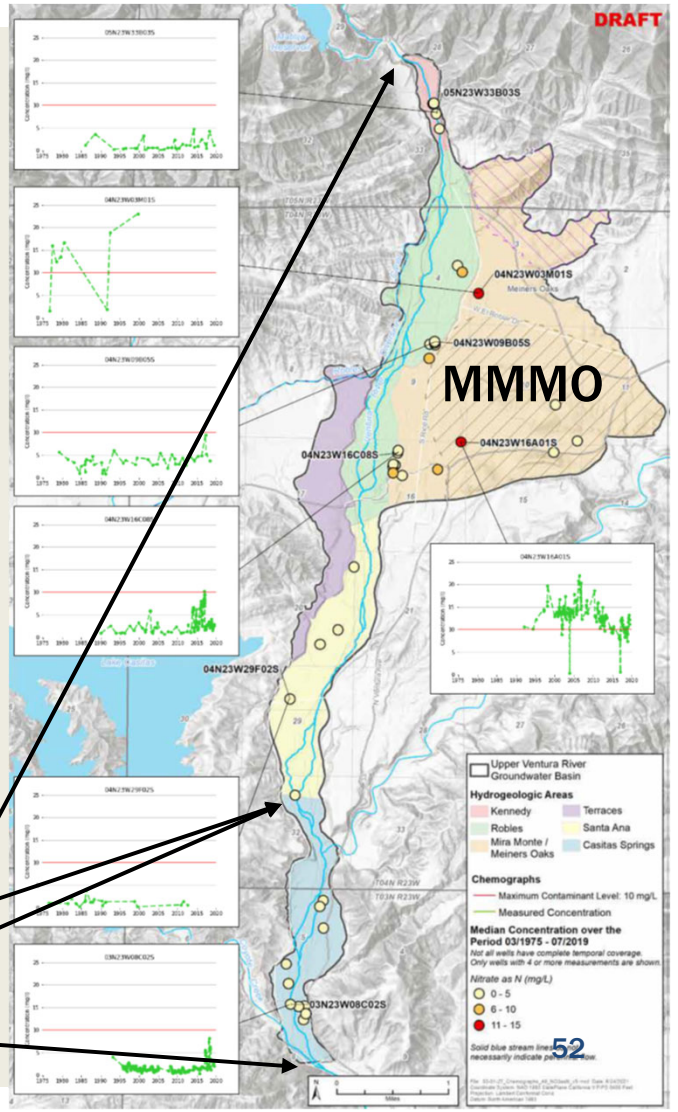
DEGRADED WATER QUALITY SMC

Degraded Quality

- Nitrate
  - Elevated nitrate concentrations in Mira Monte / Meiners Oaks Area
  - Undesirable result = spreading of nitrate in excess of MCL (10/mg/L) to other areas of basin caused by pumping
  - MT = any 10 mg/L isocontour outside of MMMO area caused by pumping
  - MO based on background conc.
    - 7.5 mg/L in percolating GW areas
    - 3 mg/L in rising GW areas



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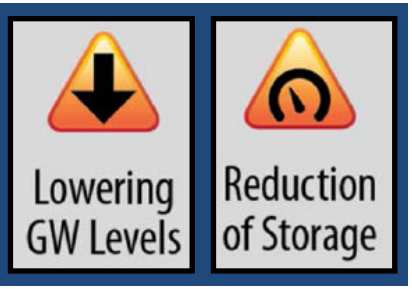
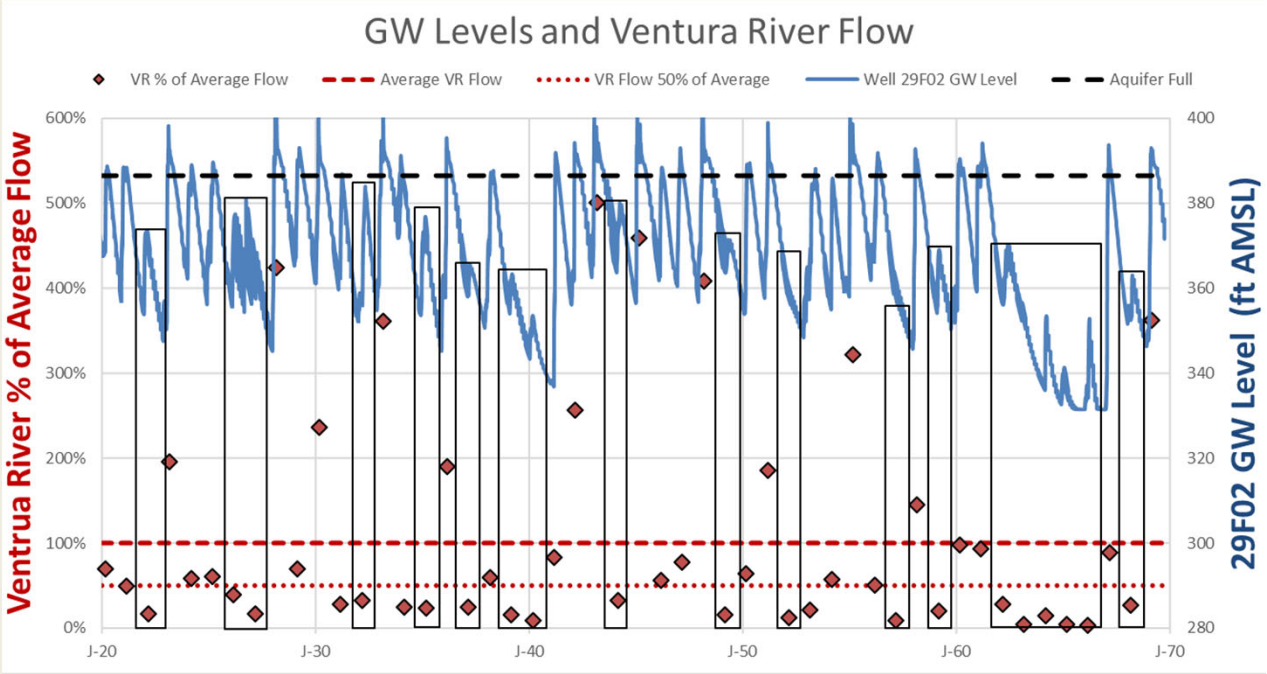
GROUNDWATER LEVELS & STORAGE SMC



- No chronic GW level declines or storage reduction historically and not anticipated
- Basin refills in years when Ventura River flow is ~>=50% of average flow
- Address pumping effects during periods of low GW levels



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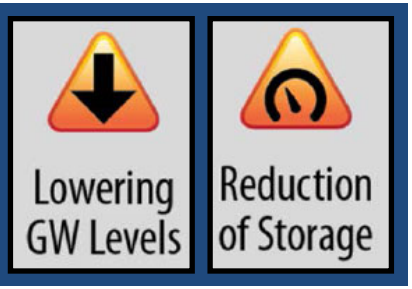
GROUNDWATER LEVELS & STORAGE SMC



Basis for Minimum Thresholds:

- No reported S&U effects with low GW levels
- Wells may be impacted at lower GW levels
- Impacts to riparian GDEs - Deeper groundwater levels could lead to more widespread or longstanding effects.

<u>Conclusion</u>: minimum thresholds set at historical low GW levels will be reasonably protective against significant and unreasonable effects

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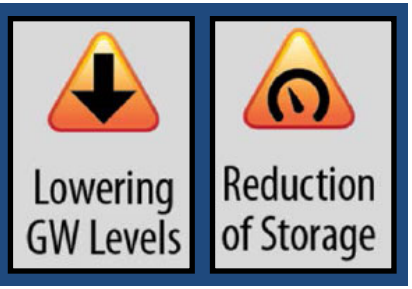
GROUNDWATER LEVELS & STORAGE SMC



- Measurable Objectives: Set at the typical high GW level historically observed in years when aquifer fills
  - MO usually should be met with spring high GW level when VR flow is > 50% of mean
- Minimum Thresholds: Historical low levels to protect domestic wells and riparian GDEs
- Undesirable Results: Minimum threshold exceedance at all seven representative monitoring locations

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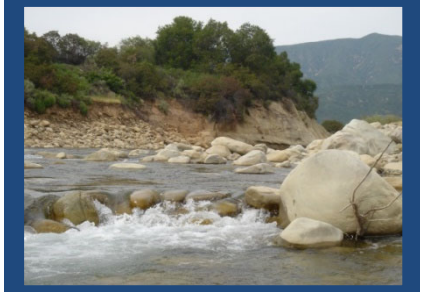
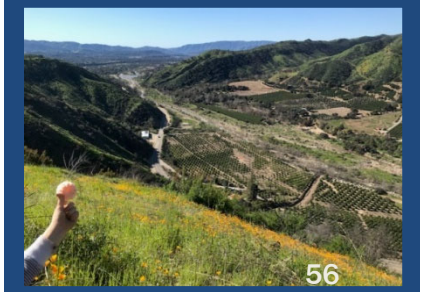
Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

EXAMPLE SMC

The following charts show the proposed MO and MT superimposed on historical groundwater level data and projected future groundwater levels with current climate change conditions (baseline), 2030 climate change conditions, and 2070 climate change conditions.





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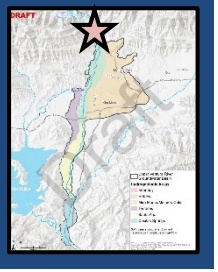
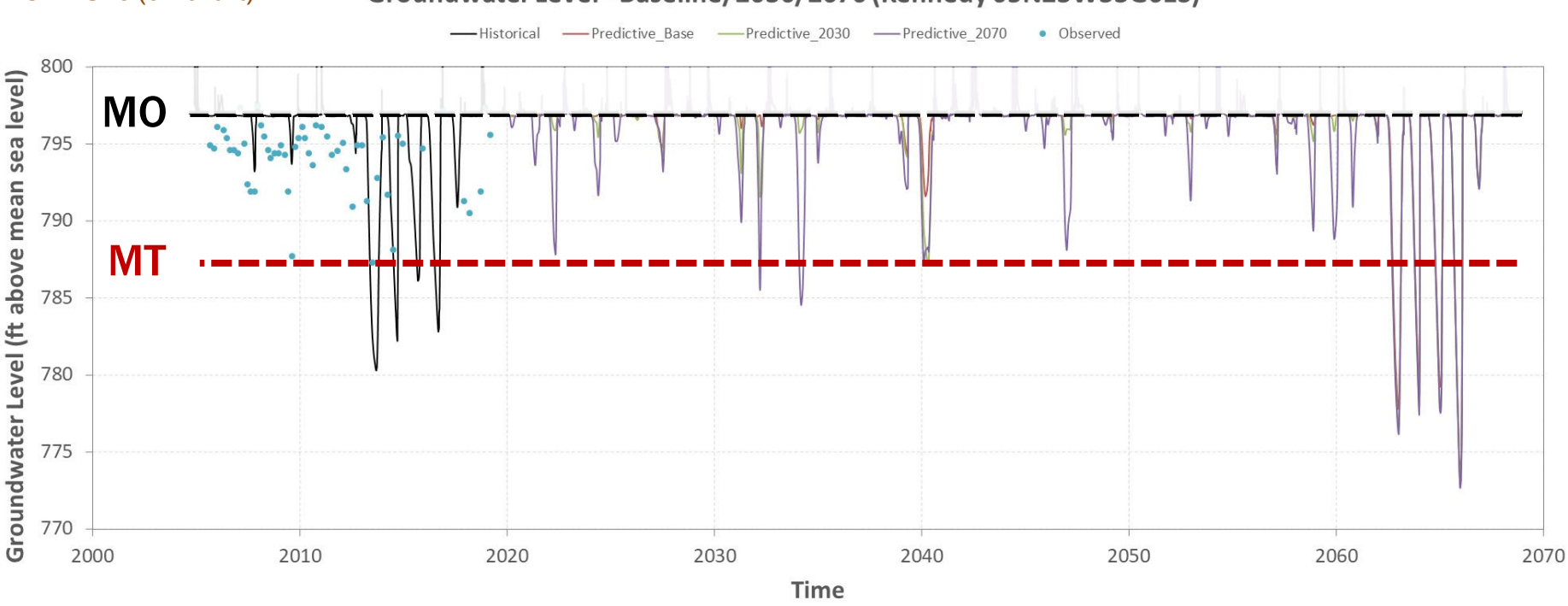
EXAMPLE SMC: KENNEDY AREA WELL



LSE = 816 (off chart)



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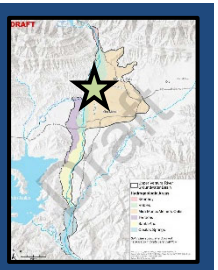
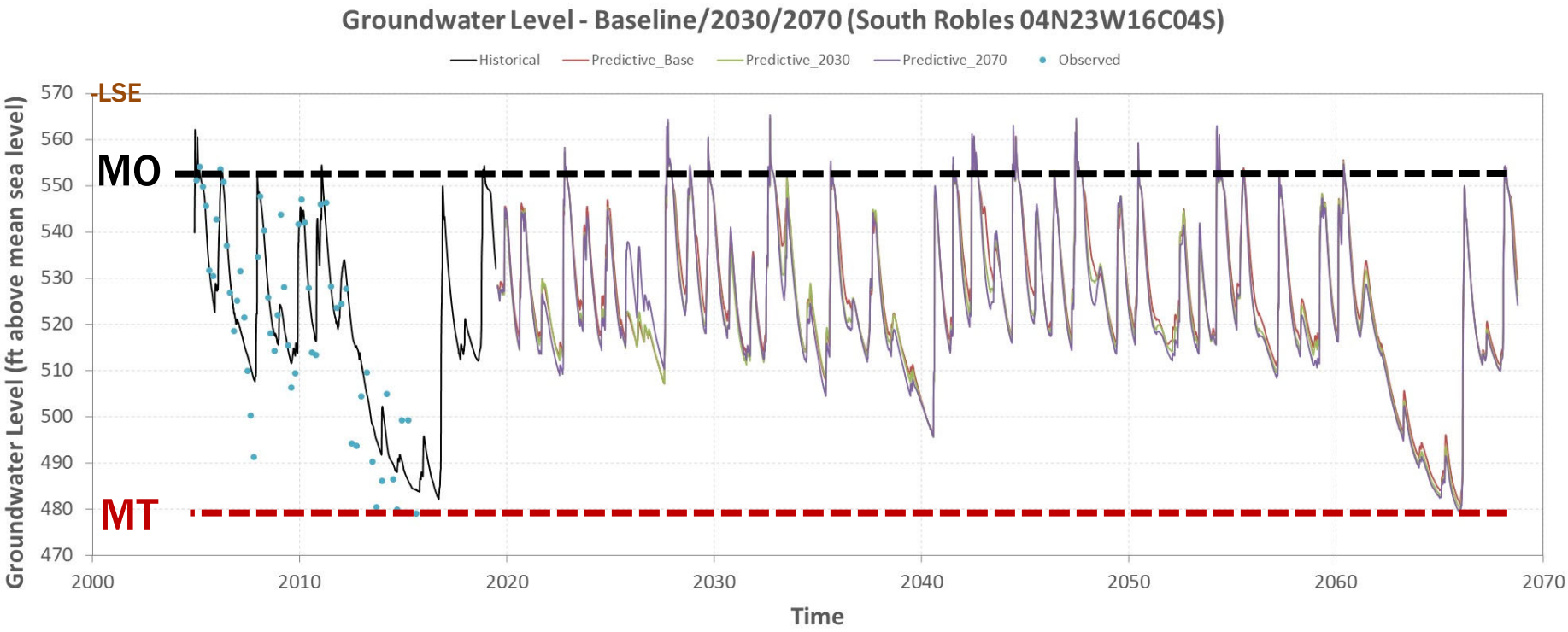
EXAMPLE SMC: SOUTHERN ROBLES AREA WELL





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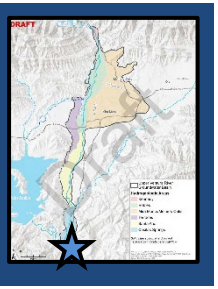
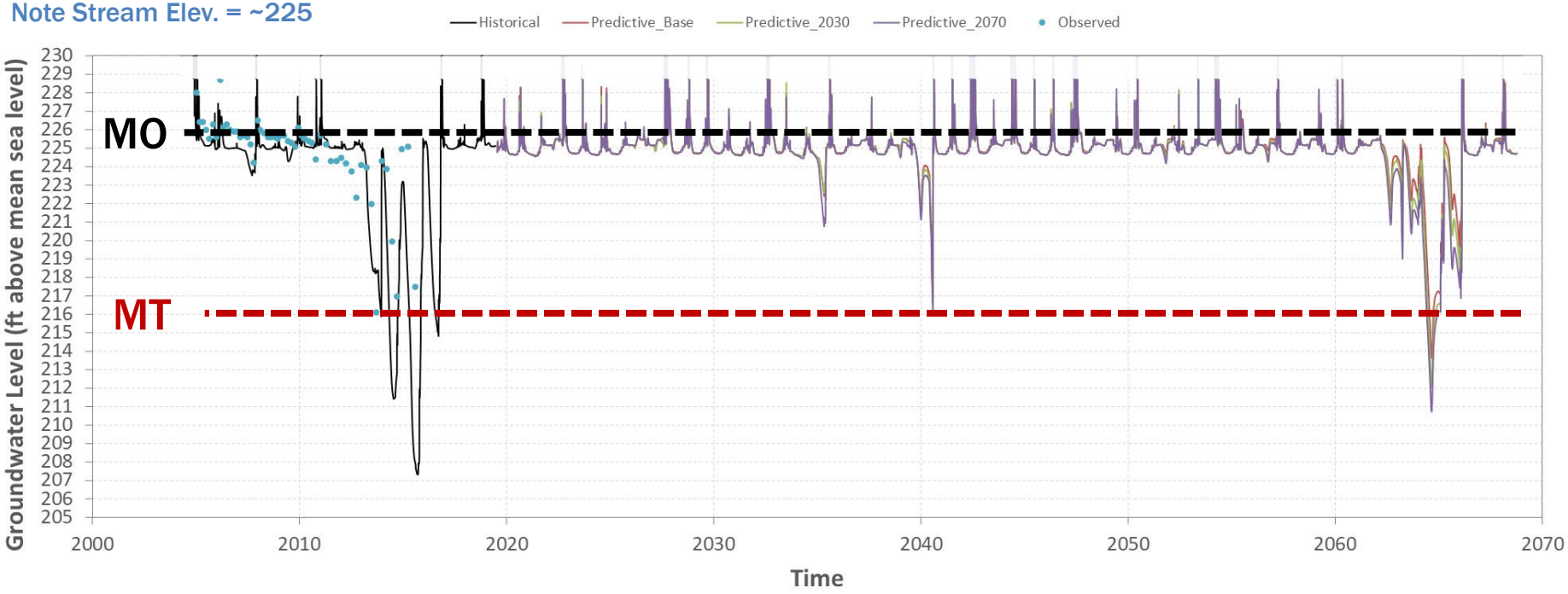
EXAMPLE SMC: FOSTER PARK WELL



LSE = 241.6 (off chart)

Note Stream Elev. = ~225



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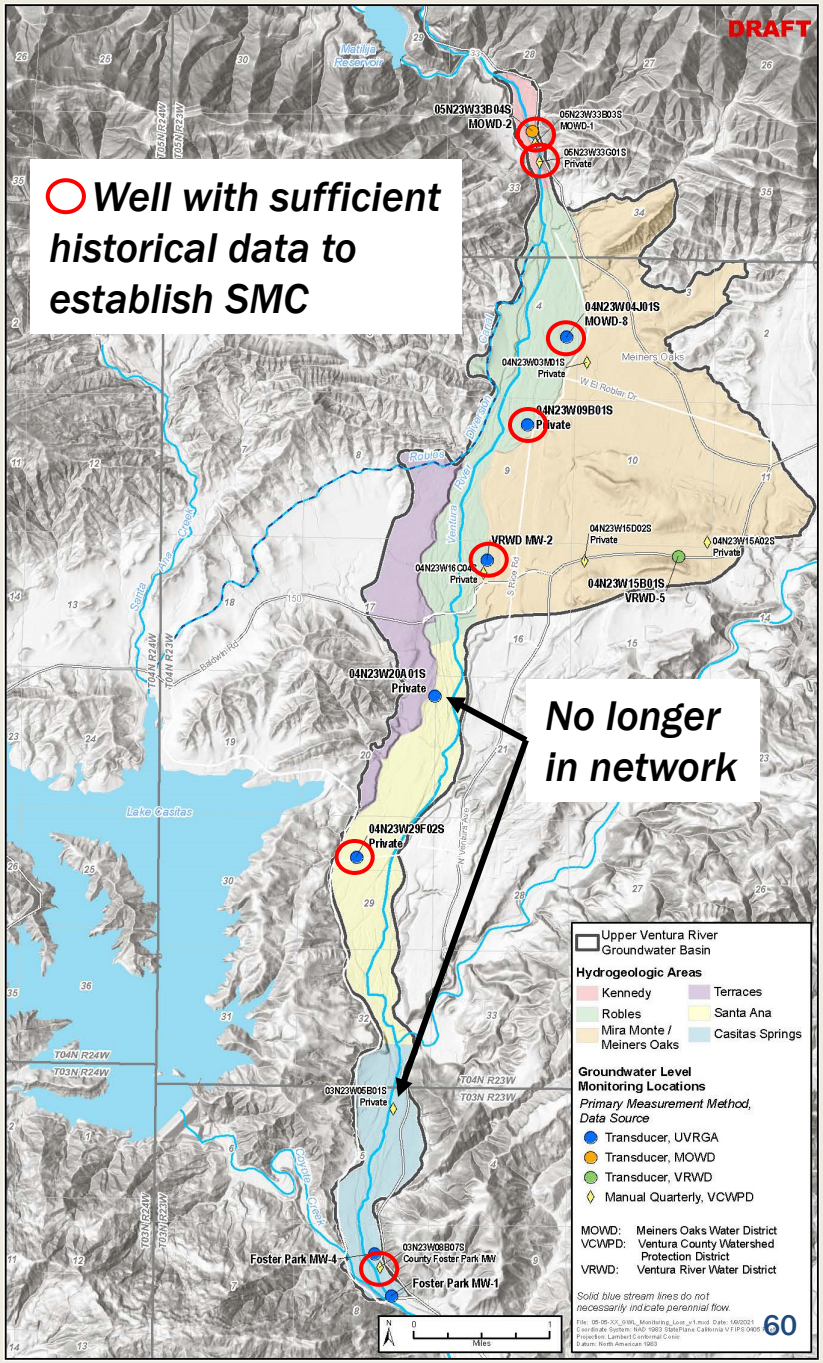
GROUNDWATER LEVEL AND STORAGE UNDESIRABLE RESULTS

- *15 wells in monitoring network*
- *7 wells have sufficient historical data to establish SMC*
- *Undesirable results = MT exceedance in all seven representative wells*
- *Gaps in monitoring network to be addressed during GSP implementation*



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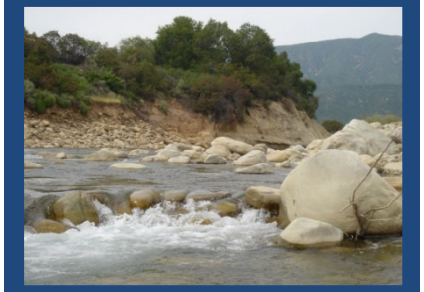
Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

DEPLETION OF INTERCONNECTED SURFACE WATER SMC PROPOSAL



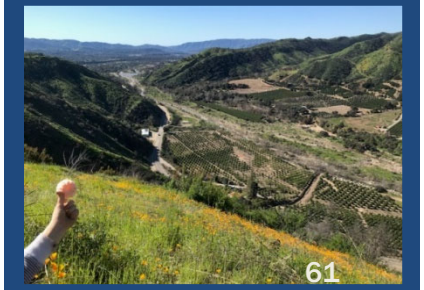
CASITAS Municipal Water District

We Serve Water

MEINERS OAKS WATER DISTRICT
VENTURA COUNTY SINCE 1949

COUNTY OF VENTURA CALIFORNIA

VENTURA WATER



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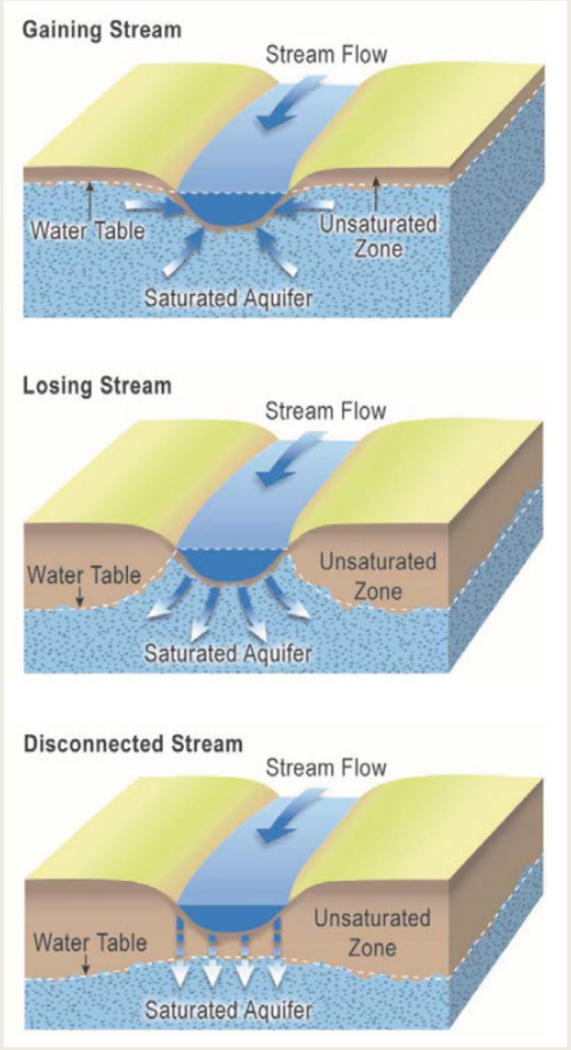
WHAT IS ISW?

Interconnected Surface Water ISW:

"Surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted."

(GSP Emerg. Regs § 351)



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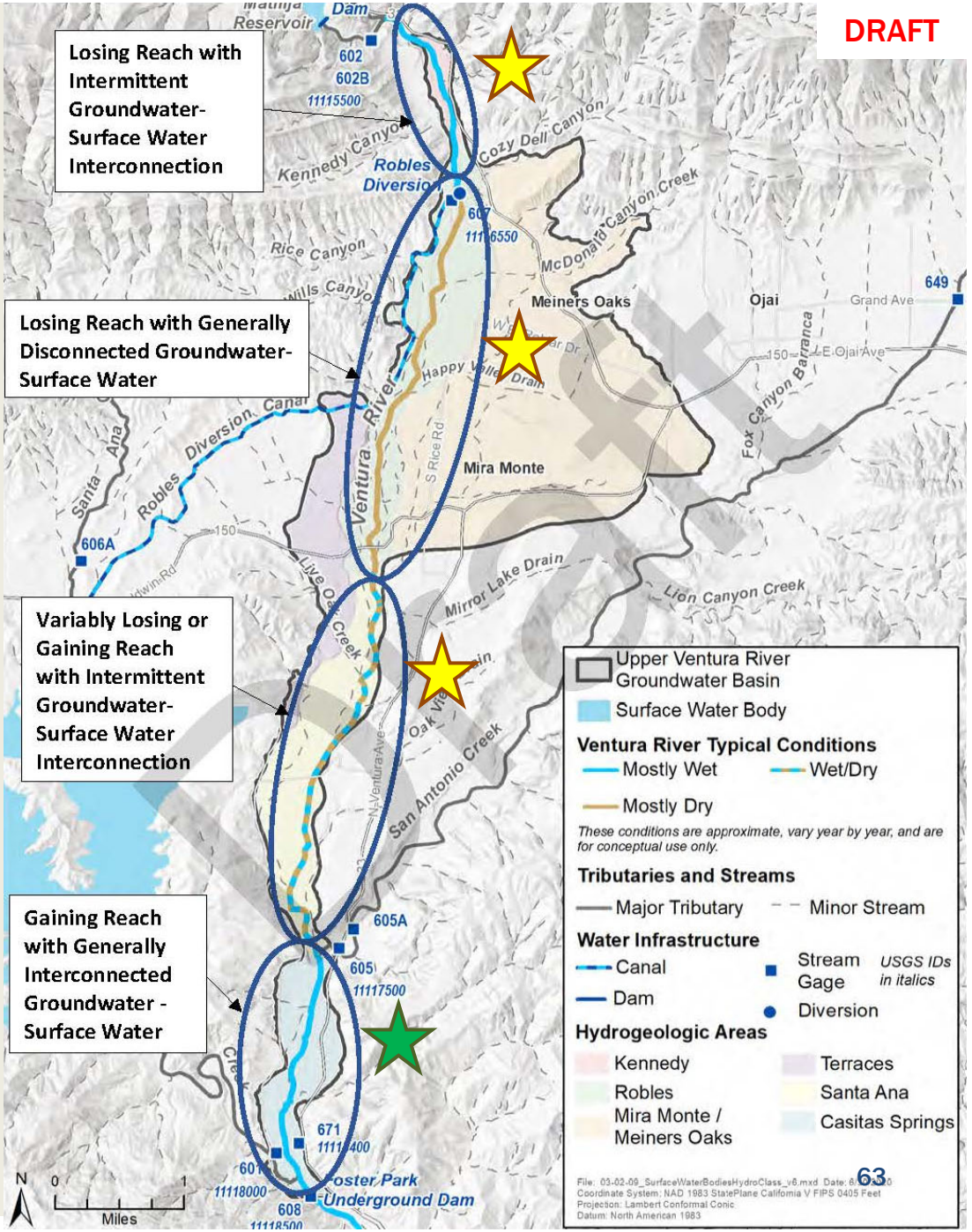
GROUNDWATER SURFACE WATER INTERACTION

- 4 areas along Ventura River with different types of GW-SW interaction

★ Consistently interconnected

★ Interconnection is transient and spatially variable



SURFACE WATER DEPLETION MECHANISMS

1. Direct Depletion: Wells very close to the river capture flow directly from the river
2. Indirect Depletion: Wells further removed from the river:
   a. Capture groundwater flow that would otherwise have discharged to the surface water system in the future.
   b. Lower the water table causing more streamflow to percolate during storm events

GSP must address both types of depletion

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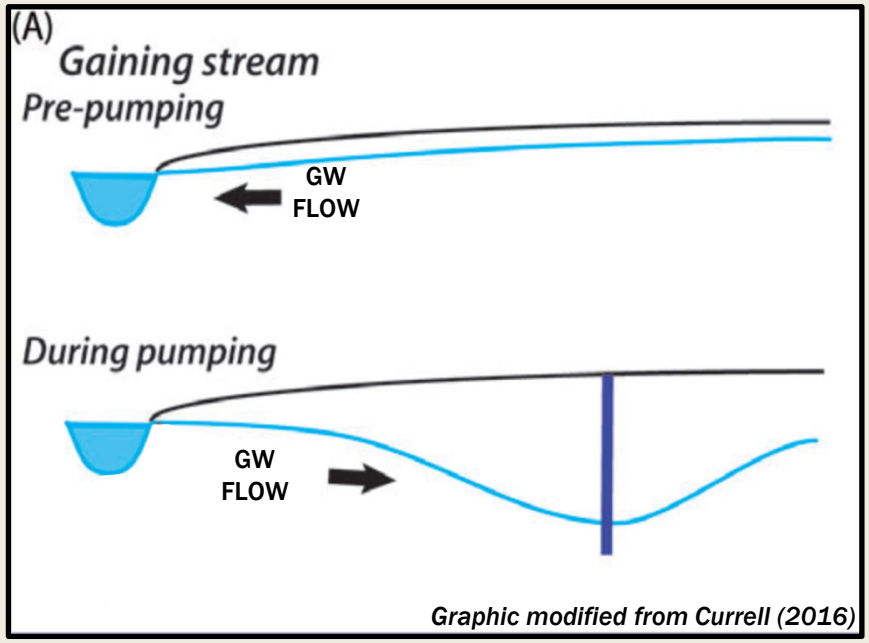
DIRECT DEPLETION

- Well proximal to surface water body creates a water table "cone of depression" that induces flow from surface water body toward the wells
- Predominantly occurs at Foster Park



Graphic modified from Currell (2016)

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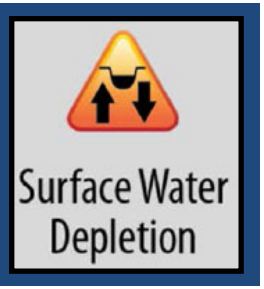
ISW DEPLETION SMC



- GSA must address pumping–related significant and unreasonable impacts (depletion) on beneficial uses:
  - Recreation
  - Surface water diversions
  - Aquatic GDEs

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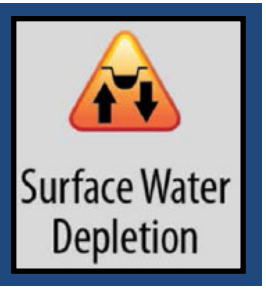
ISW DEPLETION EFFECTS ON RECREATION



- Prominent Recreation Areas Coincide with Habitat Areas:
  - Robles "Pool" – Robles Habitat Area
  - Confluence / Steelhead Preserve – Confluence Habitat Area
  - Foster Park – Foster Park Habitat Area
- Assume no significant and unreasonable effects on recreation if GDEs are addressed

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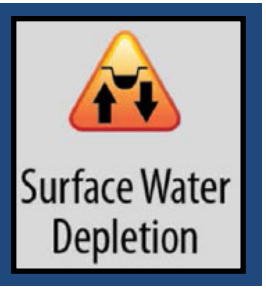
ISW DEPLETION MODELING



- Evaluation Method: Compare baseline 50-yr future project simulation with and without pumping
- Evaluation Areas:
  - Near surface water diversions
  - Two critical riffle areas
  - Three habitat areas

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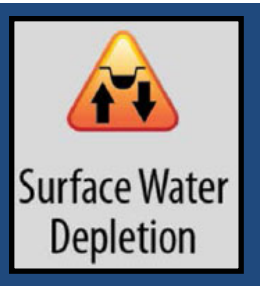
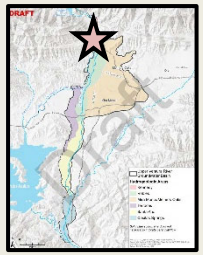
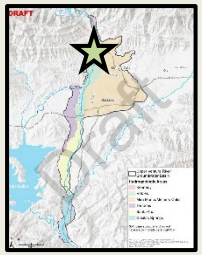
ISW DEPLETION EFFECTS ON DIVERSIONS



- Surface water diversions:
  - Rancho Matilija MWC (Kennedy Area)



  - Robles Diversion (Robles Area)



  - Downstream of Basin:
    - Two small abandoned diversions (N/A)

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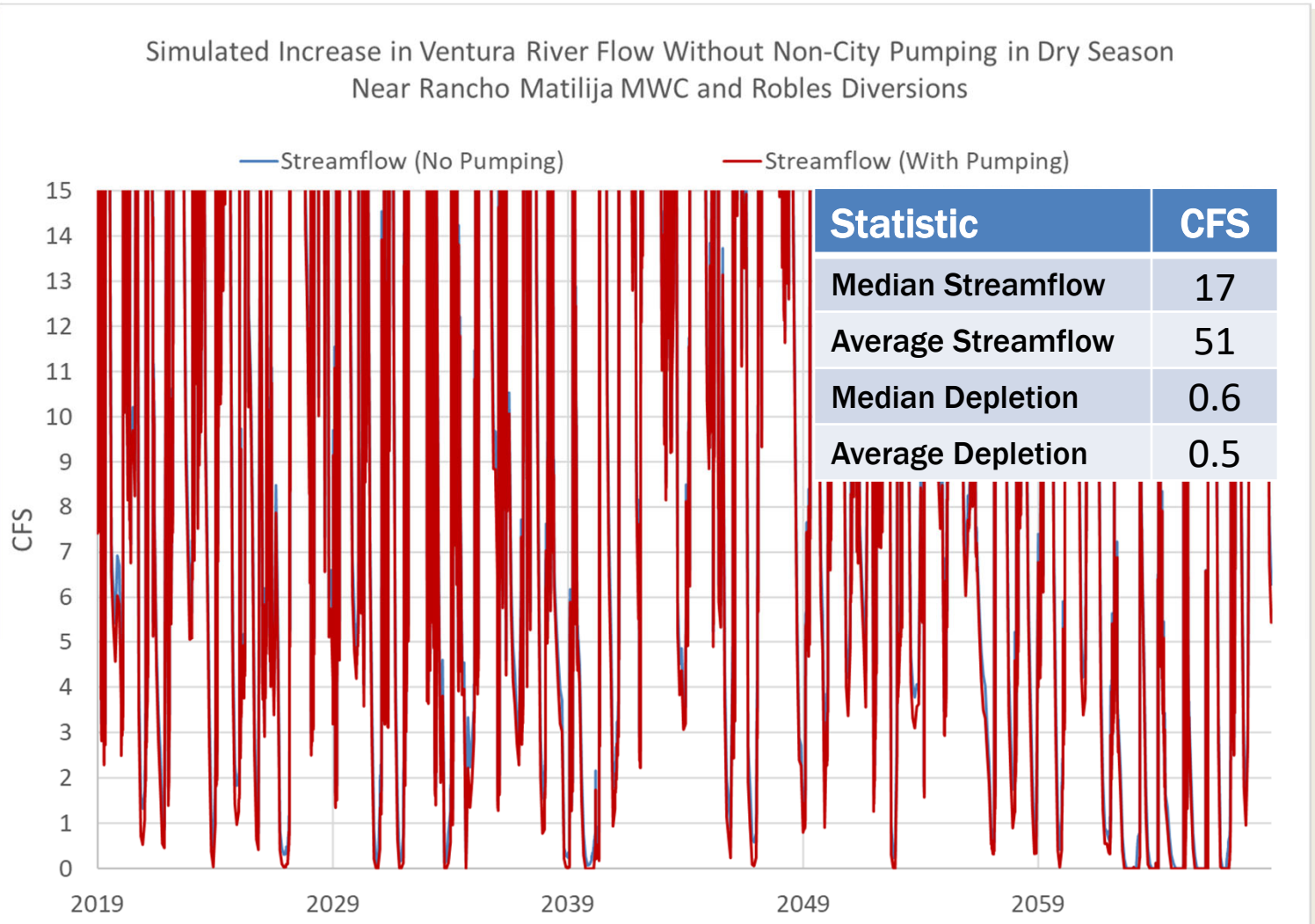
ISW DEPLETION EFFECTS ON DIVERSIONS

Surface Water Depletion



Statistic	CFS
Median Streamflow	17
Average Streamflow	51
Median Depletion	0.6
Average Depletion	0.5

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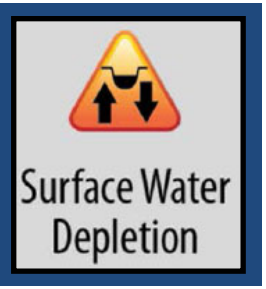
DIVERSIONS
WHAT IS PROPOSED?



- Because estimated depletions are small, conclude there are not significant and unreasonable effects of depletion on diversions

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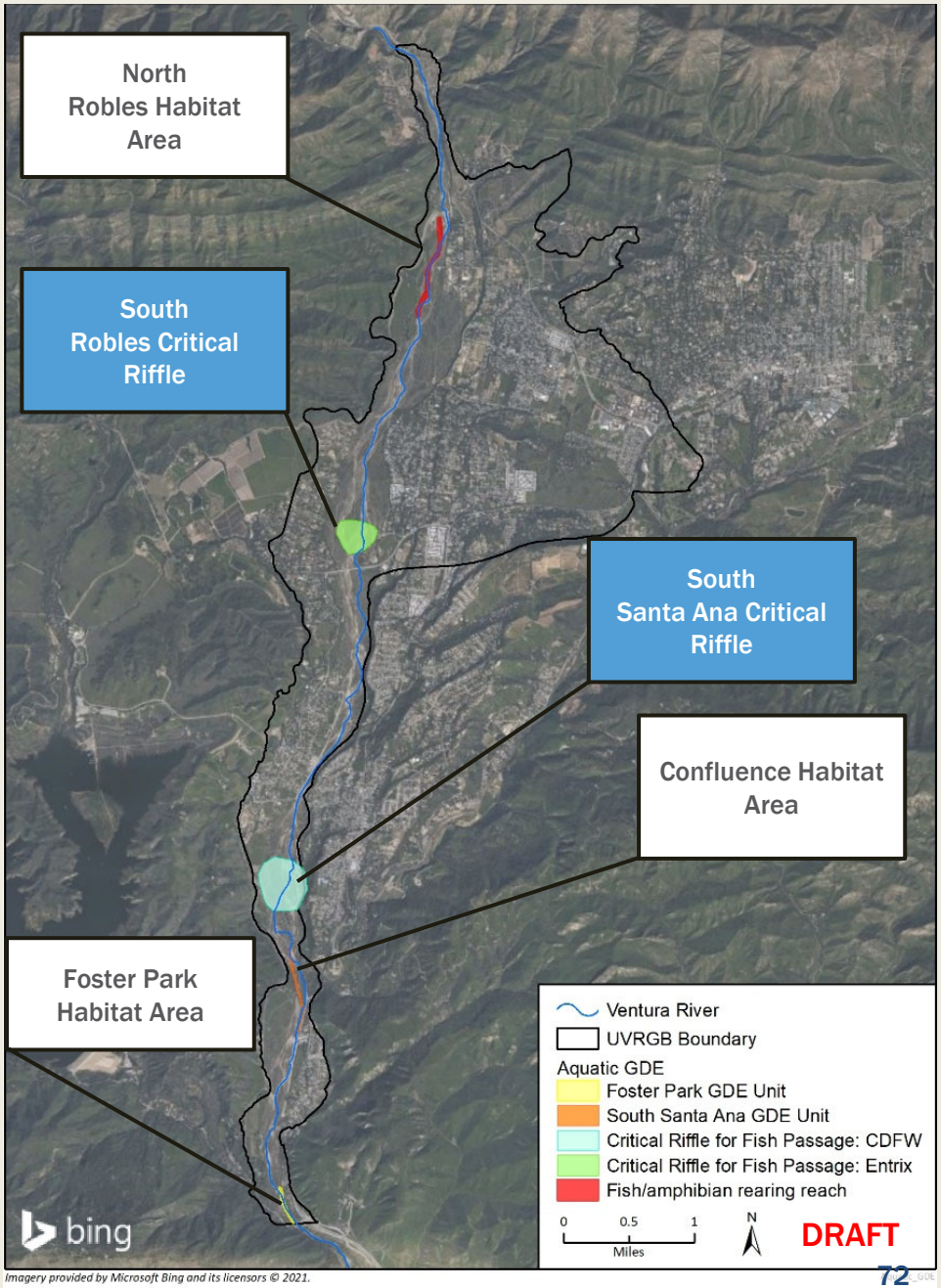
IMPORTANT AQUATIC GDE AREAS

- Critical Riffles
  - South Robles
  - Santa Ana
- Habitat Areas
  - North Robles
  - Confluence
  - Foster Park



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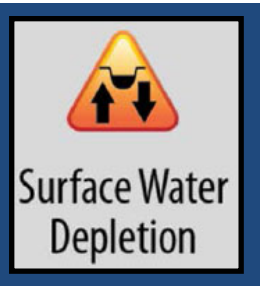
MODELED DEPLETION IN AQUATIC GDE AREAS

Depletion of Potential Concern Under Certain Conditions



Robles CR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median Flow	4.4	26	22	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	0.6
Median Depletion	<0.1	0.2	0.4	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	<0.1
Santa Ana CR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median Flow	2.3	12	14	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	0.1
Median Depletion	<0.1	<0.1	1.2	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	<0.1
Robles HA	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median Flow	14	32	32	12	6.3	0.9	DRY	DRY	DRY	DRY	0.5	5.2
Median Depletion	0.3	0.4	0.4	0.5	0.5	0.5	DRY	DRY	DRY	DRY	0.1	0.2
Confluence HA	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median Flow	16	44	50	22	17	13	8.8	5.4	2.1	1.0	2.0	7.5
Median Depletion	2.2	2.0	1.9	1.3	0.9	0.8	0.9	1.2	1.4	1.1	1.5	1.8
Foster Park HA	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Median Flow	23	51	61	28	23	19	16	14	13	13	13	15
Median Depletion	4.0	7.0	7.4	7.3	7.4	7.5	7.3	7.5	7.5	7.1	6.6	5.1

All values are cubic feet per second (cfs)

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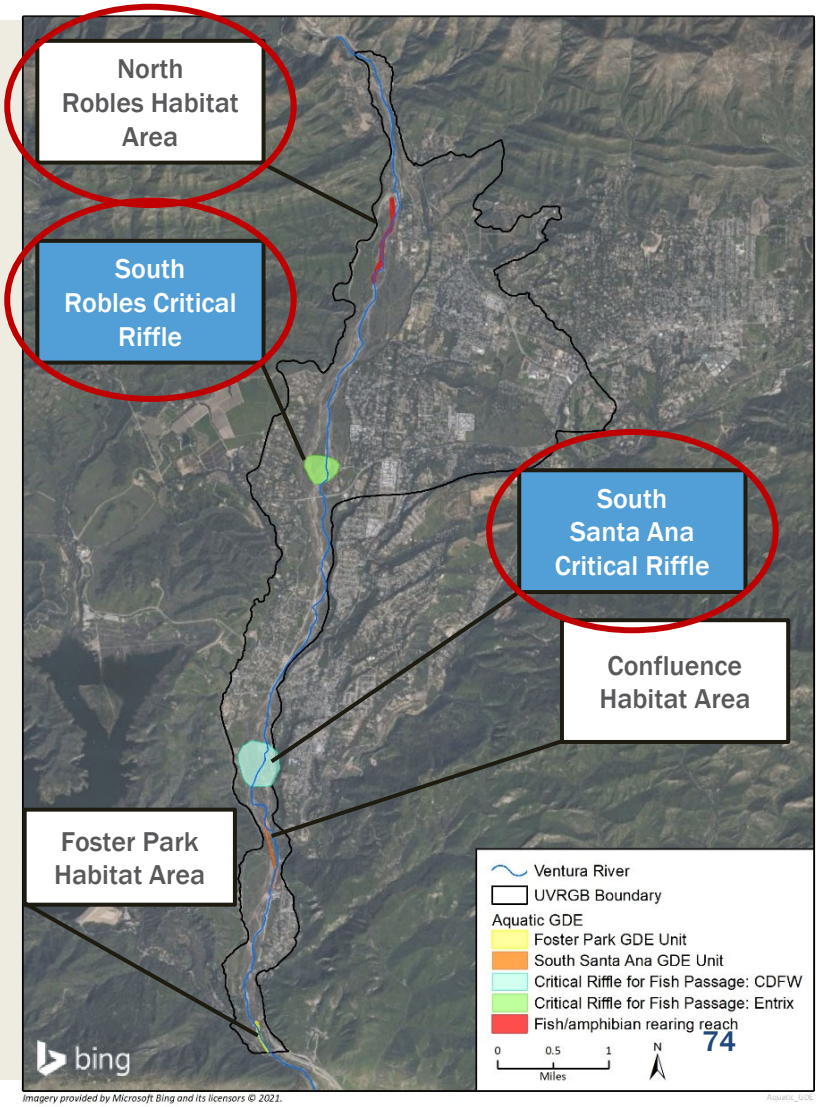
AQUATIC GDE AREAS
WHAT IS PROPOSED?

Surface Water Depletion

- Because estimated depletions are small, conclude there are not significant and unreasonable effects of depletion on three of the five Aquatic GDE areas:
  - North Robles Habitat Area
  - S. Robles Critical Riffle
  - S. Santa Ana Critical Riffle



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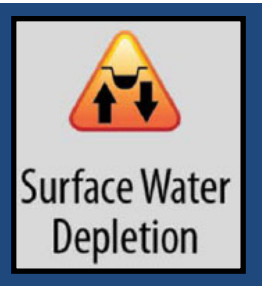
CONFLUENCE HABITAT AREA WHAT DO WE KNOW?



- Undepleted stream flow <0.5 cfs 29.6% of the time
- Depletion causes stream flow <0.5 cfs to increase to 37.1% of the time
  - Depletion 4,682 acre-feet (AF) or 94 acre-feet per year (AFY) on average.
- Undepleted stream flow declines to zero (no flow) in the dry seasons of many years. Depletion causes stream to go dry sooner than it would otherwise.
  - Only a few years in which depletion causes the stream to go dry (or nearly dry) when it would not have otherwise.

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STREAMFLOW DEPLETION CONFLUENCE HABITAT AREA

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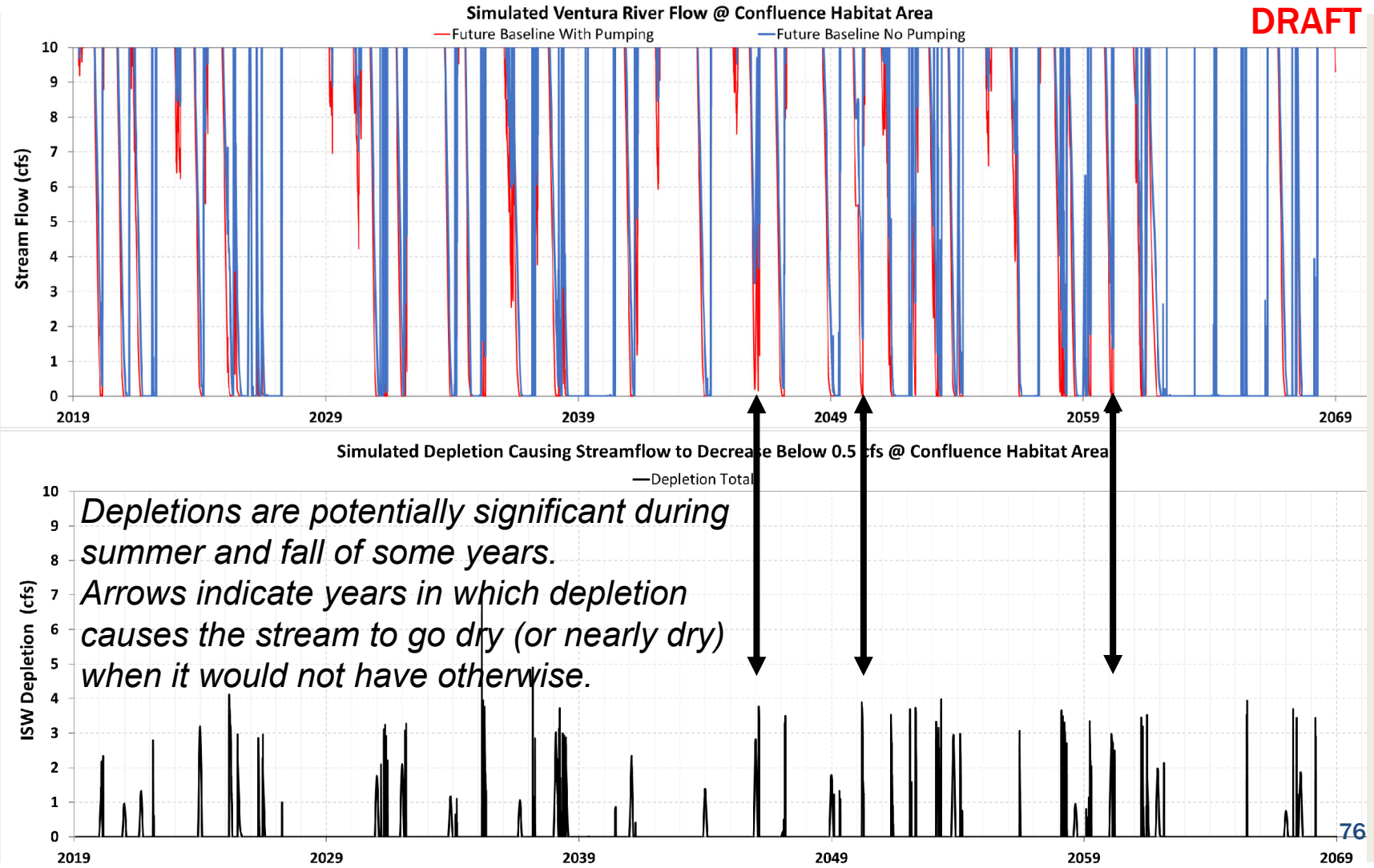

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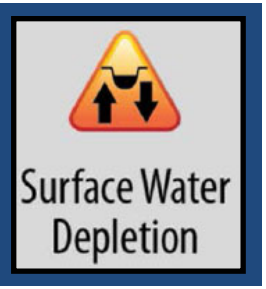
Depletions are potentially significant during summer and fall of some years.
Arrows indicate years in which depletion causes the stream to go dry (or nearly dry) when it would not have otherwise.

Note: Model is Daily Nov - March & Monthly April - Oct

CONFLUENCE HABITAT AREA WHAT DON'T WE KNOW?



- Insufficient data to assess whether depletion effects are significant and unreasonable
  - Unknown whether aquatic species become stranded during critical periods or take refuge in perennial areas (San Antonio Creek or Foster Park)
- Groundwater levels and stream flow within the habitat area
- Uncertainty in model estimates of indirect depletion in the habitat area

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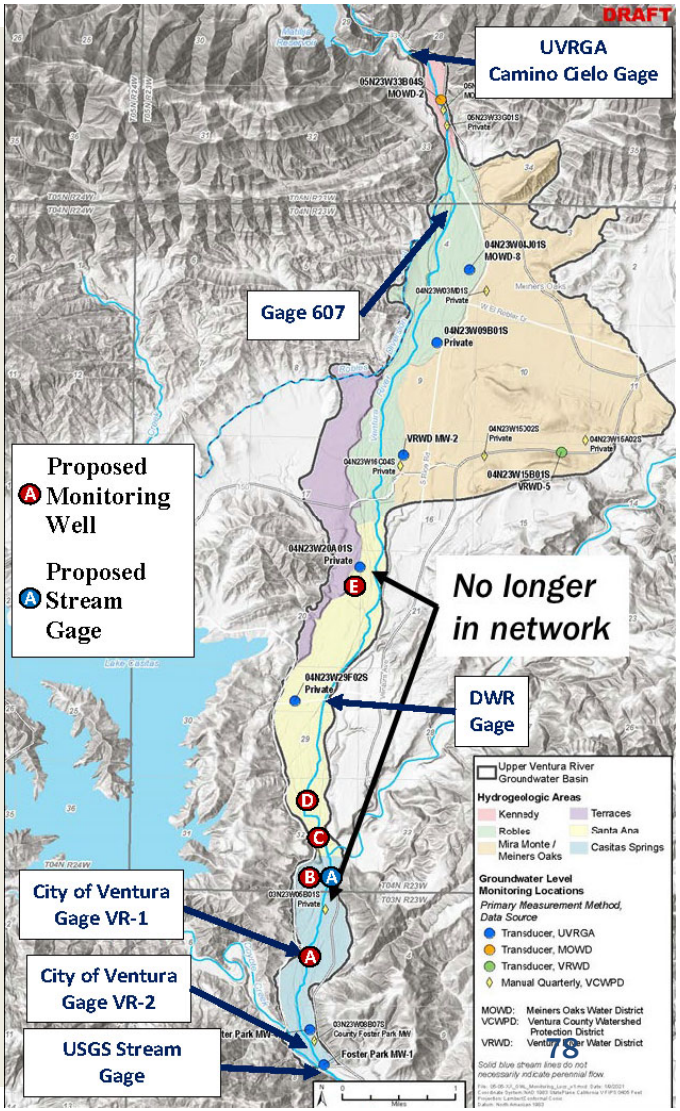
CONFLUENCE HABITAT AREA WHAT IS PROPOSED?

Surface Water Depletion

- Biological monitoring to assess whether S&U effects on aquatic GDEs occurs
- Construct monitoring wells within and upstream of habitat area
  - Sites B, C, D, & E
- Construct stream flow gage (A)
- Update modeling to better assess indirect depletion at habitat area
- Revisit need for SMC in first 5-year GSP assessment



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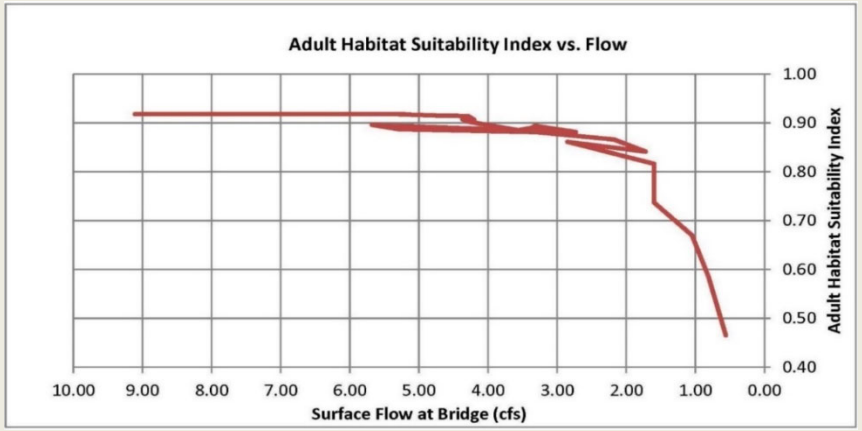
FOSTER PARK HABITAT AREA WHAT DO WE KNOW?

Surface Water Depletion

- Best available science for understanding ISW depletion effects at Foster Park = Hopkins (2013)
- Concurrent Rainbow Trout Habitat Suitability Indices (HSI) and surface flow monitoring.
- HSI score dropped steeply at 2 cfs (measured at the Casitas Vista Road bridge) indicating significant effects



Hopkins, 2013 available at: https://uvrgroundwater.org/library/

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STREAMFLOW DEPLETION FOSTER PARK HABITAT AREA

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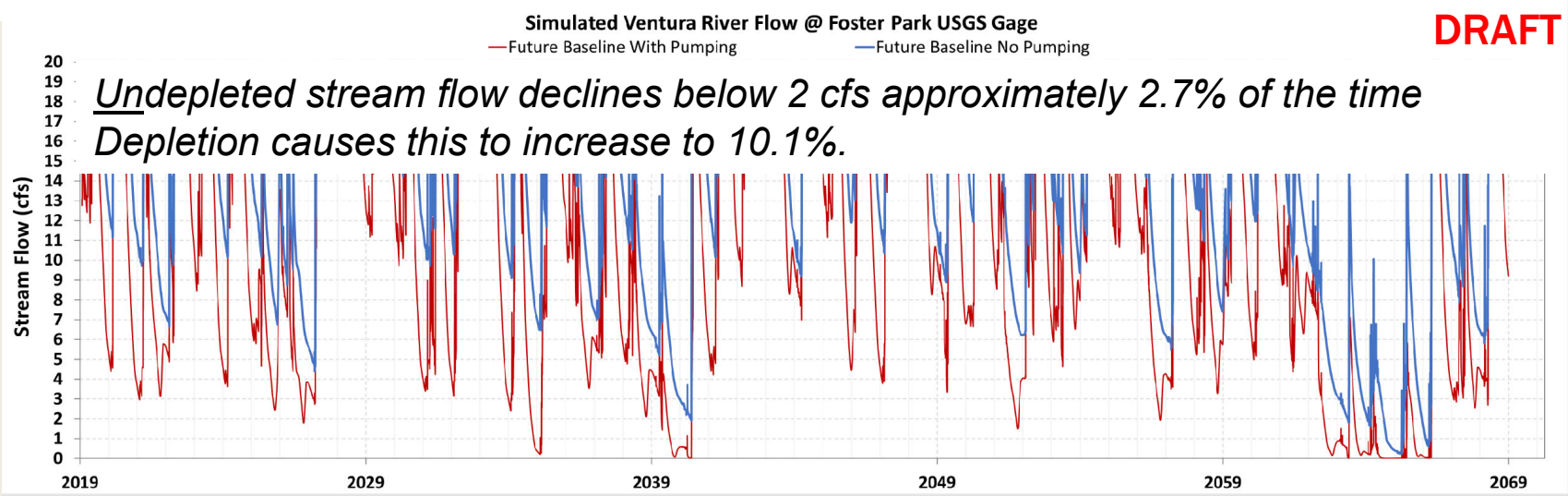

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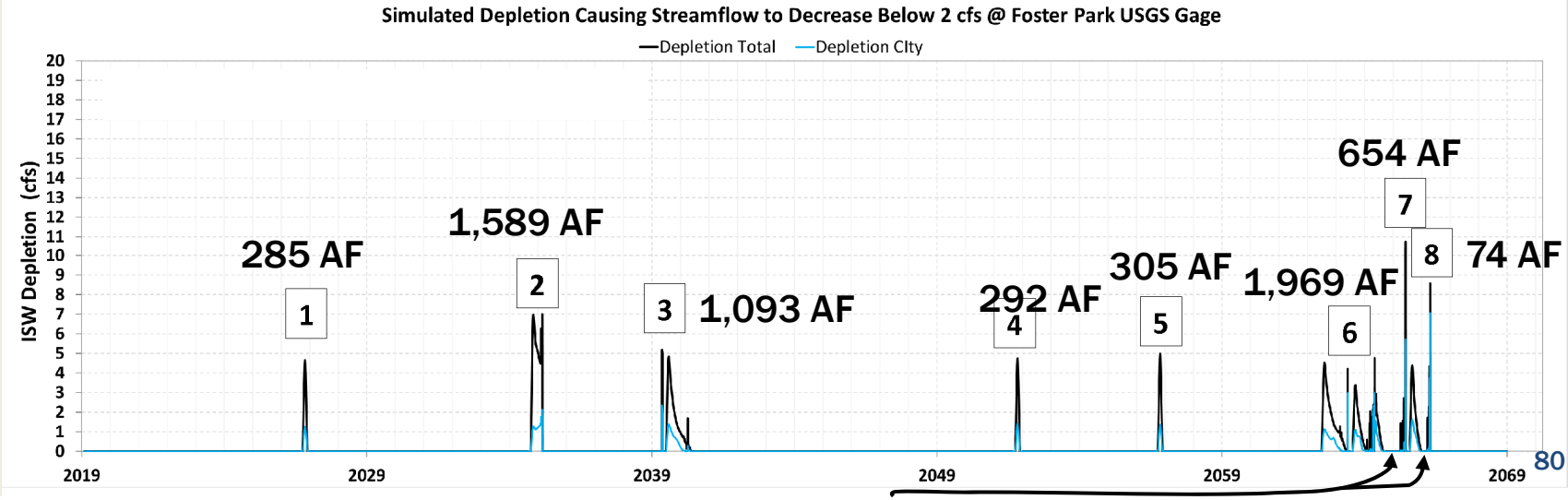
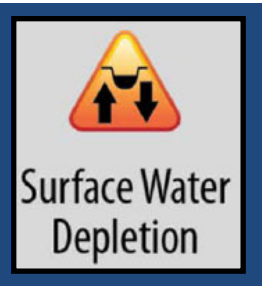
Undepleted stream flow declines below 2 cfs approximately 2.7% of the time
Depletion causes this to increase to 10.1%.



Values above do not include ~960 of depletion when undepleted flows are <2cfs

Note: Model is Daily Nov - March & Monthly April - Oct

FOSTER PARK HABITAT AREA WHAT DON'T WE KNOW?



- How representative the Hopkins 2013 study is over a longer period and with different antecedent conditions
- Groundwater levels between Foster Park and upstream portions of Basin – currently only one monitoring well between Foster Park and HWY 150
- Uncertainty in model estimates of indirect depletion in the habitat area

Hopkins, 2013 available at: https://uvrgroundwater.org/library/

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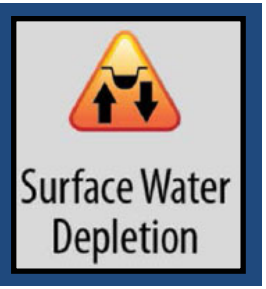
FOSTER PARK HABITAT AREA WHAT IS PROPOSED?



- Establish initial SCM to prevent depletions of interconnected surface water that cause a degradation in habitat conditions that lead to substantial stress and/or potential mortality for steelhead
- Biological monitoring (collaborate with others)
- Review results of City of Ventura implementation of "Foster Park Protocols" and monitoring
- Additional groundwater level monitoring via existing wells in Foster Park area
- Address groundwater level & stream flow data gaps
- Update modeling to better assess indirect depletion
- Revisit SMC during 5-year GSP assessments

Hopkins, 2013 available at: https://uvrgroundwater.org/library/

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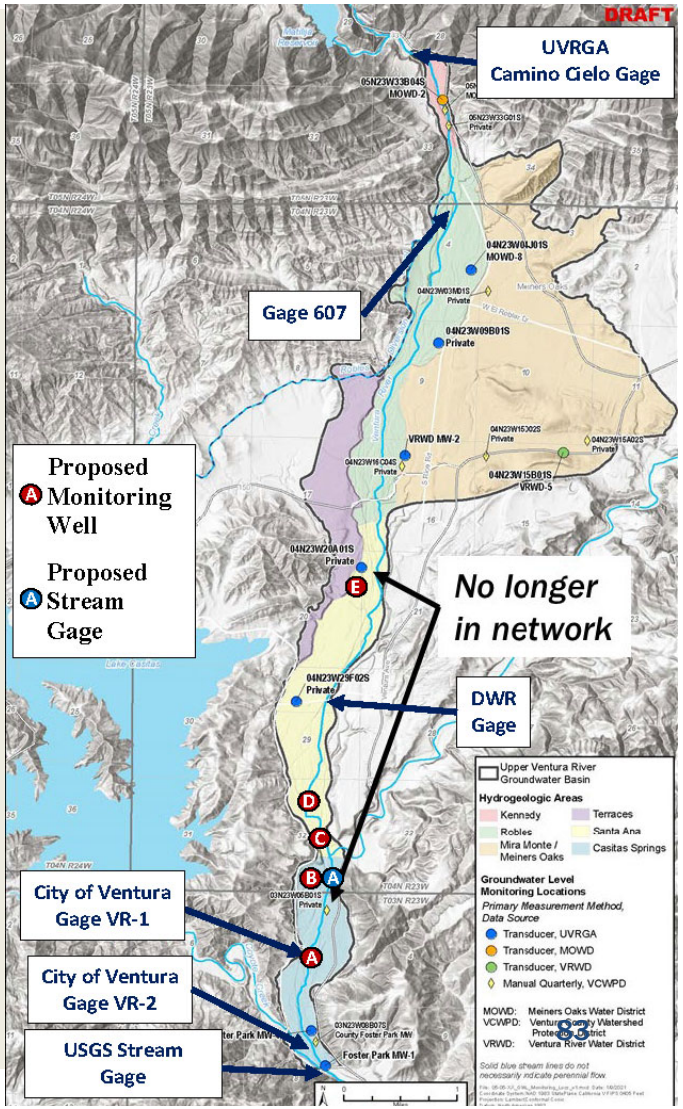
FOSTER PARK HABITAT AREA WHAT IS PROPOSED?

Surface Water Depletion

- Data Gaps
  - Construct monitoring wells upstream of Foster Park in data gap areas (Sites A – E)
    - Couple Site A with City gage VR-1
    - Facilitate model updates to better estimate indirect depletion
  - Construct stream flow gage near confluence (Site A)
    - Understand surface water inflow to Foster Park



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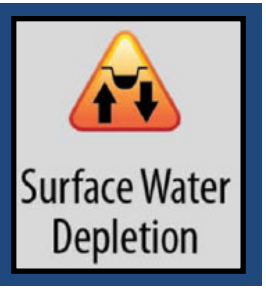
FOSTER PARK HABITAT AREA PROPOSED INITIAL ISW SMC



- Hopkins 2013 indicates potential significant and unreasonable results may occur if depletion causes depletion to or below a critical stream flow rate of 2 cfs (at USGS gage)
- Minimum Threshold based on Hopkins 2013:
  - Avoid causing stream flow to drop below critical flow (2cfs at USGS gage) when undepleted flow would not otherwise fall below 2 cfs
  - Avoid depletion when undepleted flows would be below 2cfs at USGS gage to avoid exacerbating critical conditions for aquatic species

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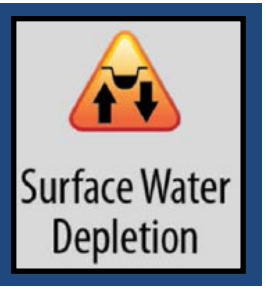
FOSTER PARK HABITAT AREA PROPOSED INITIAL ISW SMC



Undepleted Flow (without groundwater pumping – derived from groundwater model)	Depletion Minimum Threshold and Measurable Objective	Goal
> 2 cfs	Undepleted flow minus 2 cfs	The minimum threshold and measurable objective seek to prevent depletions of surface water flow caused by groundwater pumping that would cause surface water flow to be less than 2 cfs when surface water flow would not be less than 2 cfs without pumping.
< = 2 cfs	0 cfs	The minimum threshold and measurable objective seek to prevent depletions of surface water flow caused by groundwater pumping when surface water would already be 2 cfs or less without groundwater pumping.

- Undepleted flow and depletion to be determined via modeling as provided for by SGMA
- Note: UVRGA is not responsible for maintaining 2 cfs of stream flow at Casitas Vistas Road bridge.

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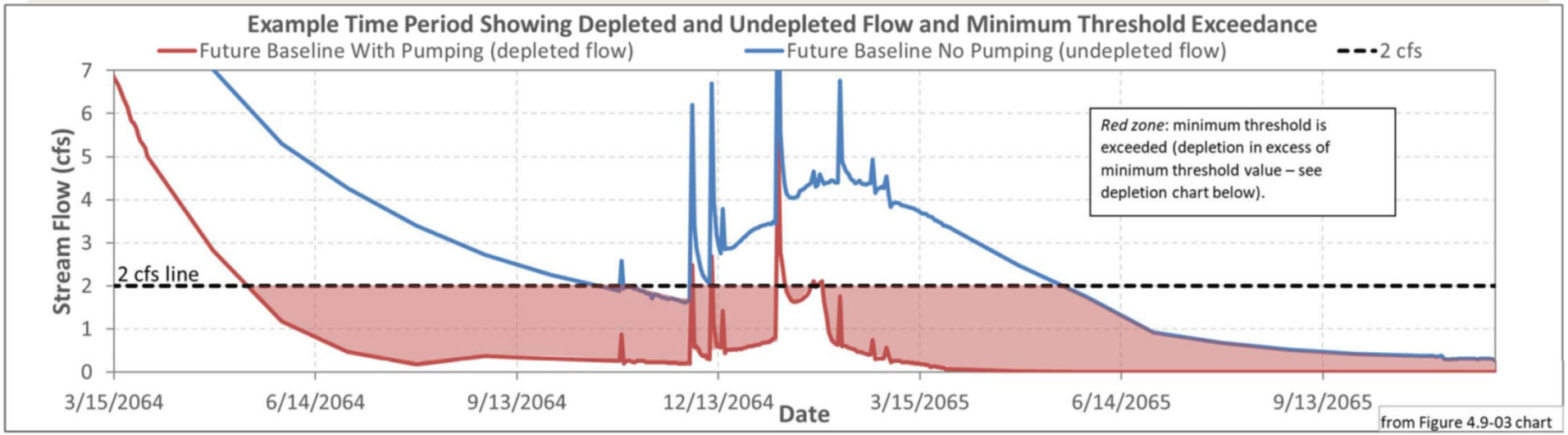
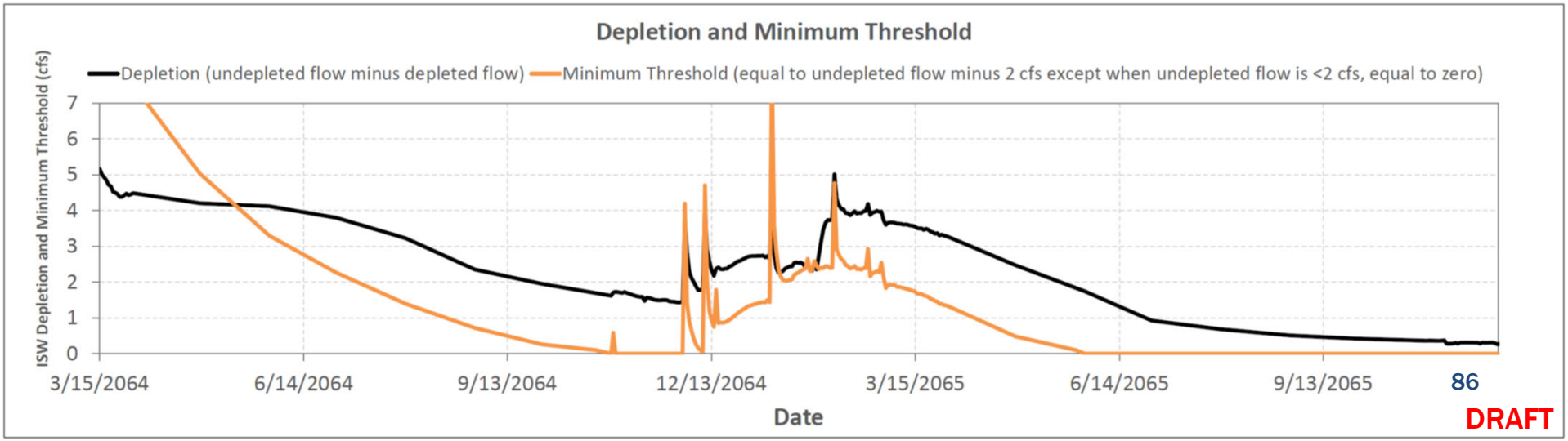
FOSTER PARK HABITAT AREA PROPOSED INITIAL ISW MT

Surface Water Depletion





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ANALYSIS OF PROPOSED SMC

Surface Water Depletion

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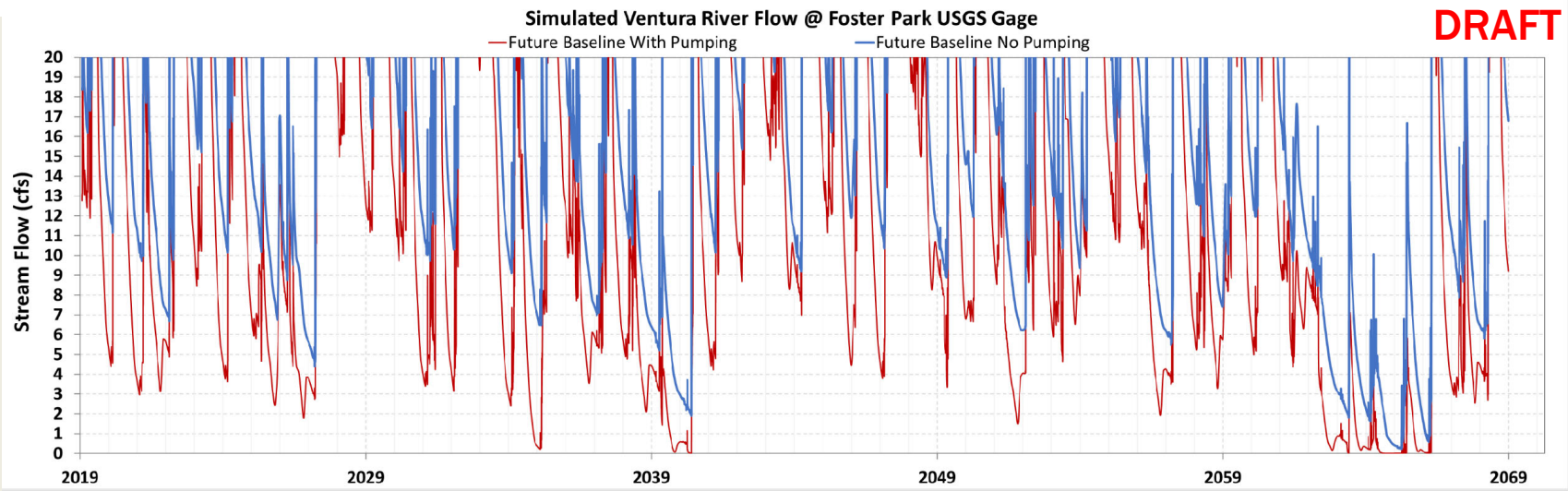

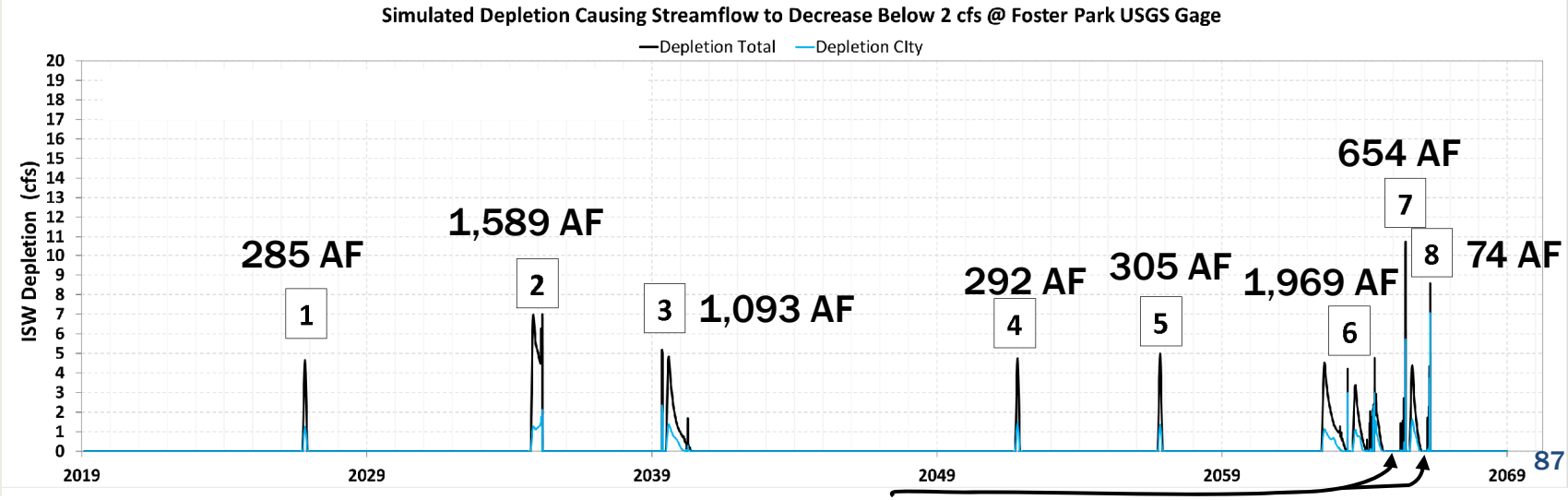

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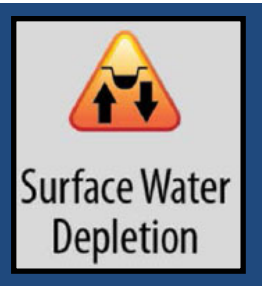
Values above do not include ~960 of depletion when undepleted flows are <2cfs

Note: Model is Daily Nov - March & Monthly April - Oct

PROPOSED SMC IMPLEMENTATION



- Modeling suggests that minimum thresholds will be exceeded 7.5% of the time
  - During multi-year dry periods
- It is anticipated that the Foster Park Flow Protocols will address direct depletion by the City of Ventura
- Measures would be needed to address indirect depletion caused by pumping wells located upstream of Foster Park.
- Proposed actions to achieve the measurable objective are outlined on next slide

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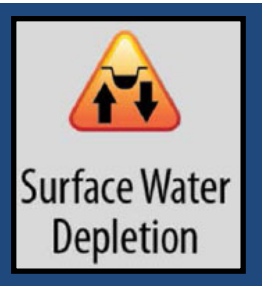
FOSTER PARK HABITAT AREA PROPOSED INITIAL ISW SMC



- Interim Milestones:

IM	Year	Measurable Objective	Depletion in Excess of Measurable Objective	Comment
1	2027	Same as Minimum Threshold	10.7 cfs	Maximum depletion rate from model simulation
2	2032		10.7 cfs	
3	2037		10.7 cfs	
4	2042		0 cfs (attain MO)	Implement project(s) or management action(s) to achieve MO

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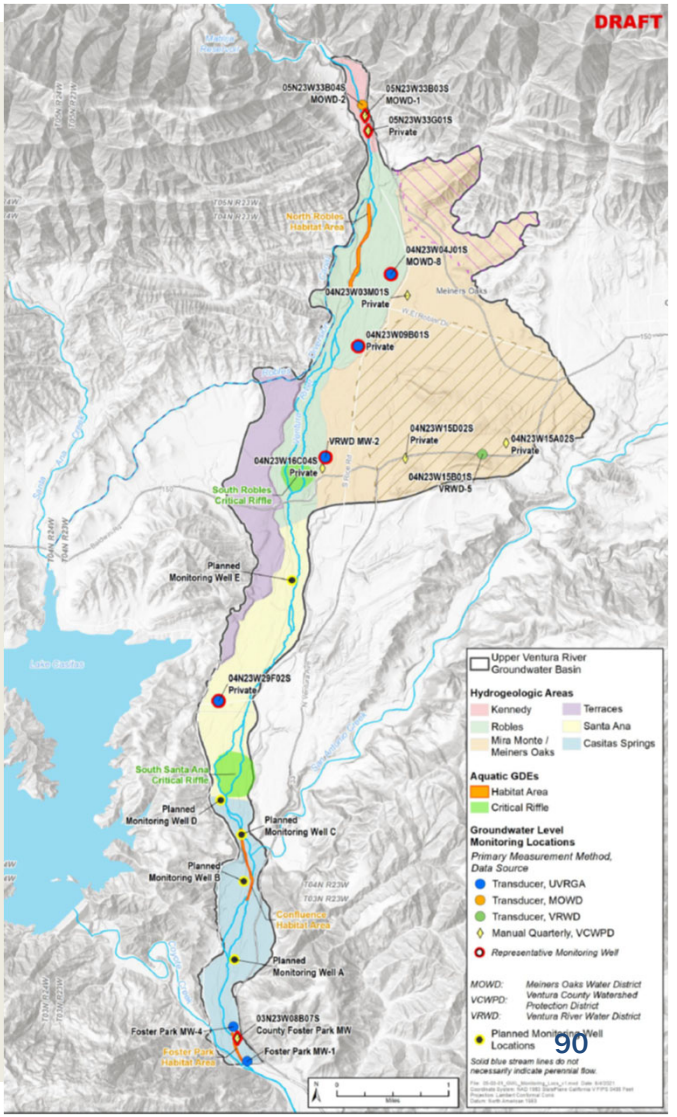
SECTION 5
GW LEVEL MONITORING NETWORK

- Combination of existing and future sites
- Existing sites
  - 6 by UVRGA
  - 1 by MOWD
  - 2 by VRWD
  - 7 by VCWPD
- 5 future sites to address data gaps



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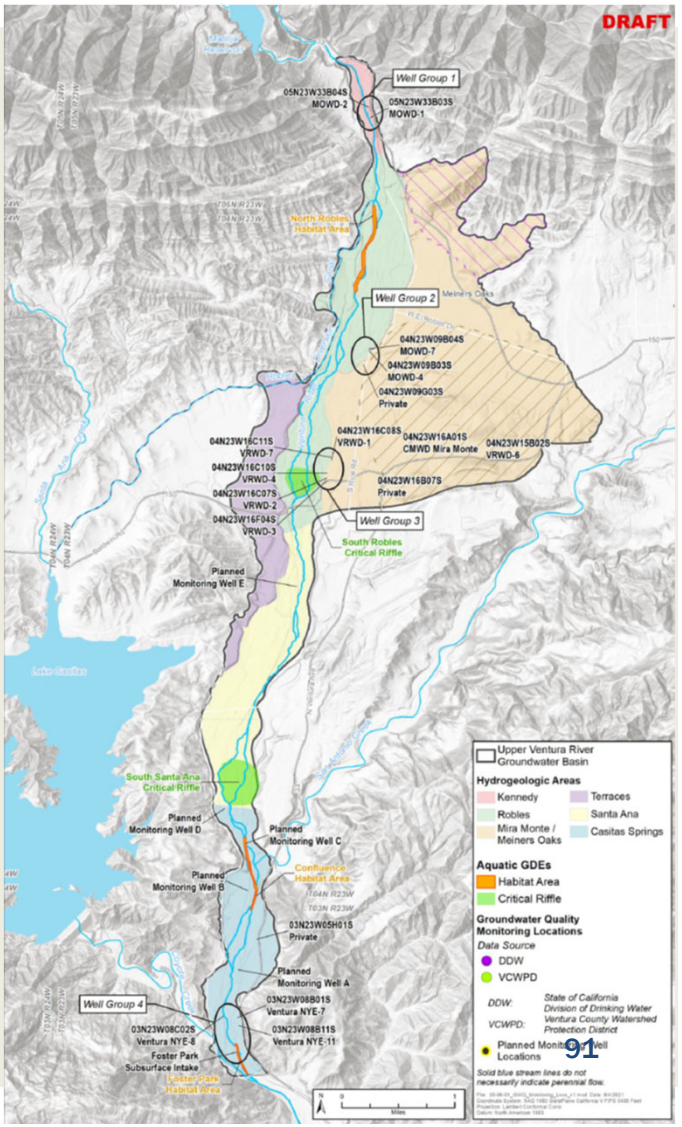
SECTION 5
GW QUALITY MONITORING NETWORK

- Combination of existing and future sites
- Existing Sites
  - Well Groups 1 & 2 by MOWD
  - Well Group 3 by VRWD
  - Well Group 4 by City of Ventura
  - Misc. wells by VCWPD
- Incorporate 5 future GW level monitoring sites and other wells as needed to address data gaps



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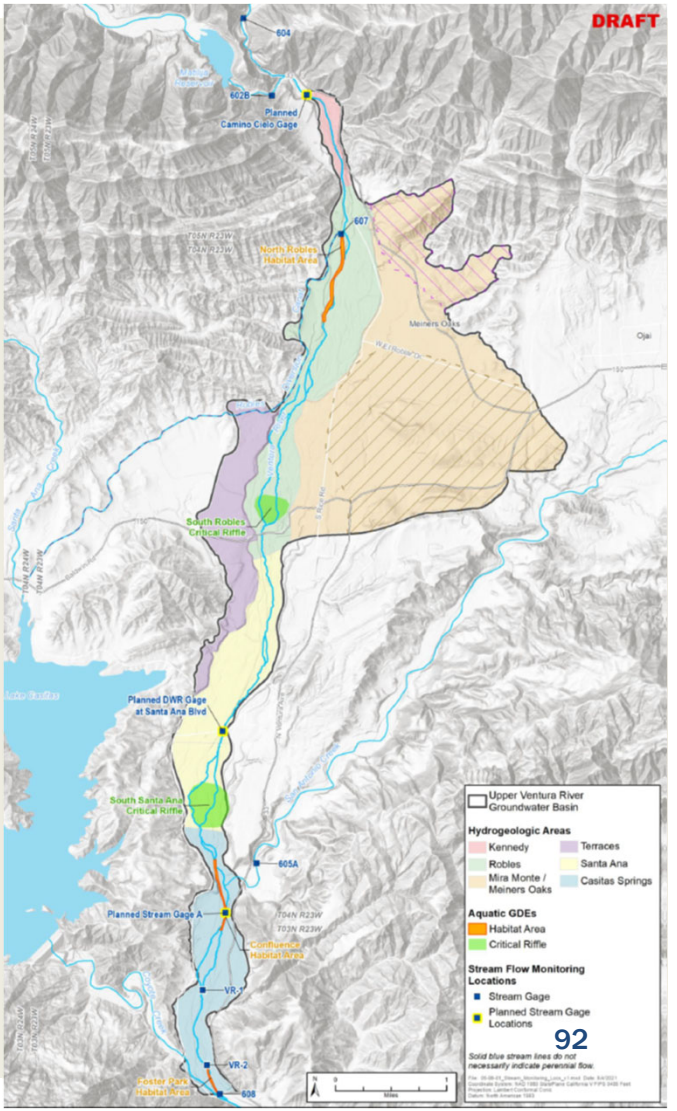
SECTION 5
SURFACE WATER MONITORING NETWORK

- Combination of existing and future sites
- Existing Sites
  - DWR – Santa Ana Blvd.
  - VCWPD – 5 location
  - City of Ventura – 2 locations
- Incorporate 2 future gages:
  - UVRGA – Camino Cielo
  - UVRGA – Confluence Area



SECTION 6
PROJECTS AND MANAGEMENT ACTIONS

- Domestic Well Survey
  - Better understand potential effects on domestic wells
  - Update GSP, as needed, based on findings
- Foster Park Protocols
  - City of Ventura will implement operational rules to address direct depletion of interconnected surface water
- Actions to Address Indirect Depletion of Interconnected Surface Water
  - Series of planning and implementation actions to address indirect depletion no later than year 20 of GSP implementation

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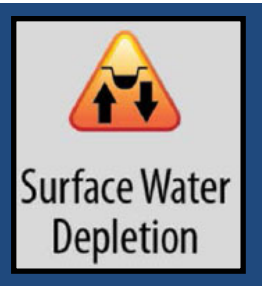
OUTLINE OF PROPOSED ACTIONS TO ADDRESS ISW DEPLETION



Action No.	Action Description	Milestone	Target Date
IM #1 Period: 0-5 years (2022 – 2027)			
1-1	Develop Foster Park Habitat Area Monitoring Plan - work with other entities to develop a coordinated monitoring program for the Foster Park Habitat Area	Foster Park Habitat Area Monitoring Plan and cost sharing agreements adopted by coordinating entities	1/31/2024
1-2	Initiate Foster Park Habitat Area Monitoring Program	Initiate monitoring activities; annual monitoring data published in GSP annual reports	6/30/2024
1-3	Add monitoring wells and stream gauge to monitoring networks	Access agreements or constructed monitoring wells and stream gage installation	6/30/2025
1-4	Add new monitoring wells to groundwater level and quality monitoring networks	Initiate monitoring of new wells	6/30/2025
1-5	Update numerical model calibration and ISW depletion estimates	Model update tech memo and updated depletion simulation results	6/30/2026
1-6	Begin planning for project(s) and/or management action(s) to achieve measurable objective.	Memo: preliminary feasibility analysis of project(s) and/or management action(s) to achieve measurable objective	6/30/2026
1-7	5-year GSP assessment. Update SMC, if appropriate.	GSP assessment document and GSP update	1/31/2027
IM #2 Period: 5-10 years (2027 – 2032)			
2-1	Continued monitoring	Annual monitoring data published in GSP annual reports	Annually by April 1
2-2	Update numerical model calibration, update depletion simulations, simulate potential project(s) and/or management action(s)	Model update and simulations tech memo	6/30/2029
2-3	Feasibility study of project(s) and/or management action(s) to achieve measurable objective	Feasibility study report	12/31/2030
2-4	Select project(s) and/or management action(s) to achieve measurable objective	UVRGA Board-approved project(s) and/or management actions for inclusion in GSP update.	6/30/2031
2-5	5-year GSP assessment and update. Include updated SMC, if appropriate. Add projects and/or management actions selected to achieve measurable objective.	GSP assessment document and GSP update	1/31/2032
IM #3 Period: 10-15 years (2032 – 2037)			
3-1	Continued monitoring	Annual monitoring data published in GSP annual reports	Annually by April 1
3-2	Develop project(s) and/or management action(s)	Progress toward ordinance(s), agreement(s), or design, as appropriate, based on selected project(s) and/or management action(s).	1/31/2037
3-3	5-year GSP assessment. Update GSP, as needed	GSP assessment document and GSP update	1/31/2037
IM #4 Period: 15-20 years (2037 – 2042)			
4-1	Continued monitoring	Annual monitoring data published in GSP annual reports	Annually by April 1
4-2	Implement project(s) and/or management action(s)	Completed ordinance(s), agreement(s), or construction, as appropriate, based on selected project(s) and/or management action(s).	1/31/2040
4-3	5-year GSP assessment. Update GSP, as needed	GSP assessment document and GSP update	1/31/2042

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SECTION 7
GSP IMPLEMENTATION

Costs and Schedule

Fiscal Year	Agency Administration	Legal Counsel	GW Mgmt., Coord., & Outreach	Monitoring Programs	Annual Reports	Projects and Mgmt. Actions	Model Update and Simulations	GSP Evaluation	GSP Update	Respond to DWR Comments and Requests	Contingency Non-Capital	Monitoring Well Construction	Contingency Capital Projects	Totals	Extraction Fee ($/AF)	Ending Cash
2022	$ 61,050	$ 35,000	$ 55,000	$ 71,624	$ 45,000	$ -	$ -	$ -	$ -	$ -	$ 26,767	$ 17,537	$ 1,754	$ 313,732	$ 79.16	$ 262,463
2023	$ 62,602	$ 25,000	$ 30,900	$ 138,511	$ 32,500	$ 5,000	$ -	$ -	$ -	$ -	$ 29,451	$ 72,253	$ 7,225	$ 403,441	$ 111.17	$ 236,521
2024	$ 64,207	$ 25,750	$ 31,827	$ 125,815	$ 33,475	$ 5,000	$ -	$ -	$ -	$ 50,000	$ 33,607	$ 111,630	$ 11,163	$ 492,475	$ 111.17	$ 286,546
2025	$ 65,868	$ 26,523	$ 32,782	$ 137,805	$ 34,479	$ 10,000	$ 54,636	$ -	$ -	$ -	$ 36,209	$ 167,303	$ 16,730	$ 582,336	$ 108.39	$ 233,148
2026	$ 67,844	$ 27,318	$ 33,765	$ 131,465	$ 35,514	$ 10,000	$ 56,275	$ 25,000	$ 50,000	$ -	$ 43,718	$ -	$ -	$ 480,900	$ 102.83	$ 254,060
2027	$ 69,880	$ 28,138	$ 34,778	$ 146,132	$ 36,579	$ 10,000	$ -	$ 25,000	$ 100,000	$ -	$ 45,051	$ -	$ -	$ 495,557	$ 100.05	$ 246,753
2028	$ 71,976	$ 28,982	$ 35,822	$ 107,555	$ 37,676	$ 10,000	$ -	$ -	$ -	$ 28,138	$ 32,015	$ -	$ -	$ 352,164	$ 100.05	$ 382,839
2029	$ 74,135	$ 29,851	$ 36,896	$ 110,782	$ 38,807	$ 125,000	$ -	$ -	$ -	$ -	$ 41,547	$ -	$ -	$ 457,019	$ 100.05	$ 414,070
2030	$ 76,359	$ 30,747	$ 38,003	$ 114,105	$ 39,971	$ 125,000	$ -	$ -	$ -	$ -	$ 42,419	$ -	$ -	$ 466,604	$ 100.05	$ 435,716
2031	$ 78,650	$ 31,669	$ 39,143	$ 117,529	$ 41,170	$ -	$ 65,017	$ 28,982	$ 57,964	$ -	$ 46,012	$ -	$ -	$ 506,136	$ 100.05	$ 417,829
2032	$ 81,010	$ 32,619	$ 40,317	$ 121,055	$ 42,405	$ -	$ -	$ 28,982	$ 115,927	$ -	$ 46,232	$ -	$ -	$ 508,547	$ 100.05	$ 397,532
2033	$ 83,440	$ 33,598	$ 41,527	$ 124,686	$ 43,677	$ -	$ -	$ -	$ -	$ 32,640	$ 35,957	$ -	$ -	$ 395,525	$ 100.05	$ 490,258
2034	$ 85,943	$ 34,606	$ 42,773	$ 128,427	$ 44,988	$ -	$ -	$ -	$ -	$ -	$ 33,674	$ -	$ -	$ 370,410	$ 100.05	$ 608,098
2035	$ 88,521	$ 35,644	$ 44,056	$ 132,280	$ 46,337	$ -	$ -	$ -	$ -	$ -	$ 34,684	$ -	$ -	$ 381,522	$ 97.27	$ 701,263
2036	$ 91,177	$ 36,713	$ 45,378	$ 136,248	$ 47,727	$ -	$ 73,144	$ 33,598	$ 67,196	$ -	$ 53,118	$ -	$ -	$ 584,300	$ 97.27	$ 591,651
2037	$ 93,912	$ 37,815	$ 46,739	$ 140,335	$ 49,159	$ -	$ -	$ 33,598	$ 134,392	$ -	$ 53,595	$ -	$ -	$ 589,545	$ 97.27	$ 476,793
2038	$ 96,730	$ 38,949	$ 48,141	$ 144,545	$ 50,634	$ -	$ -	$ -	$ -	$ 37,862	$ 41,686	$ -	$ -	$ 458,548	$ 97.27	$ 492,933
2039	$ 99,632	$ 40,118	$ 49,585	$ 148,882	$ 52,153	$ -	$ -	$ -	$ -	$ -	$ 39,037	$ -	$ -	$ 429,406	$ 100.05	$ 551,777
2040	$ 102,621	$ 41,321	$ 51,073	$ 153,348	$ 53,718	$ -	$ -	$ -	$ -	$ -	$ 40,208	$ -	$ -	$ 442,289	$ 100.05	$ 597,738
2041	$ 105,699	$ 42,561	$ 52,605	$ 157,949	$ 55,329	$ -	$ 82,287	$ 38,949	$ 77,898	$ -	$ 61,328	$ -	$ -	$ 674,606	$ 105.61	$ 438,507
2042	$ 108,870	$ 43,838	$ 54,183	$ 162,687	$ 56,989	$ -	$ -	$ 38,949	$ 155,797	$ -	$ 62,131	$ -	$ -	$ 683,445	$ 105.61	$ 270,438
Yrs. 1-5	$ 321,571	$ 139,591	$ 184,274	$ 605,221	$ 180,968	$ 30,000	$ 110,912	$ 25,000	$ 50,000	$ 50,000	$ 169,754	$ 368,723	$ 36,872	$ 2,272,885		
Yrs. 6-20	$ 1,408,555	$ 567,169	$ 701,020	$ 2,146,545	$ 737,319	$ 270,000	$ 220,449	$ 228,058	$ 709,174	$ 98,640	$ 708,693	$ -	$ -	$ 7,795,622		
Total	$ 1,730,127	$ 706,759	$ 885,295	$ 2,751,766	$ 918,287	$ 300,000	$ 331,361	$ 253,058	$ 759,174	$ 148,640	$ 878,447	$ 368,723	$ 36,872	$ 10,068,507		

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SCHEDULE

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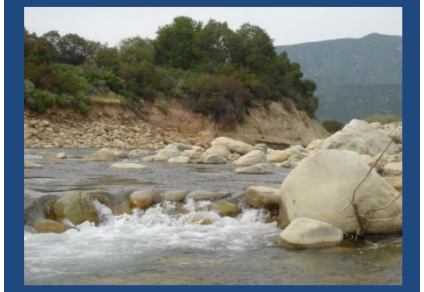
Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

STAKEHOLDER Q&A & FEEDBACK



PLEASE STAY ENGAGED!!!

- View GSP, Submit Comments, and track status at: https://uvrgroundwater.org/
- Join the UVRGA Interested Parties List: https://uvrgroundwater.org/join-interested-parties-list/
- Email inquiries to: bbondy@uvrgroundwater.org

Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

WRAP UP
THANK YOU FOR PARTICIPATING!