# UPPER VENTURA RIVER GROUNDWATER AGENCY GROUNDWATER SUSTAINABILITY PLAN WORKSHOP NO. 3

Upper Ventura River GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

## APRIL 29, 2021
## 6:30 PM

CASITAS Municipal Water District

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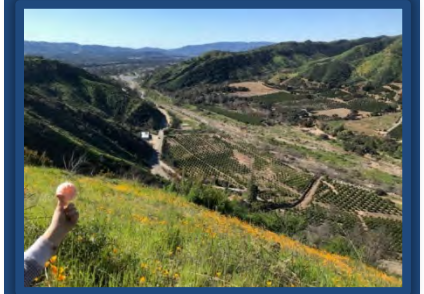
VENTURA COUNTY SINCE 1949

COUNTY OF VENTURA CALIFORNIA

VENTURA WATER



# WORKSHOP AGENDA

| No. | TIME | TOPIC |
|---|---|---|
| 1 | 6:30 – 6:35 pm | Meeting Call to Order, Roll Call, and Public Comments |
| 2 | 6:35 – 6:40 pm | Welcome, Overview of Zoom Features, Agenda Review |
| 3 | 6:40 – 6:45 pm | Get to Know the Stakeholders |
| 4 | 6:45 – 6:55 pm | Overview of Sustainable Management Criteria Requirements |
| 5 | 6:55 – 7:30 pm | Groundwater Dependent Ecosystems Identification<br>• Presentation<br>• Q & A |
| 6 | 7:30 – 8:05 pm | GSP Technical Team's Sustainable Management Criteria Proposals<br>• Presentation<br>• Q & A |
| 7 | 8:05 – 8:20 pm | Stakeholder Questions and Feedback |
| 8 | 8:20 – 8:30 pm | UVRGA Director Comments |
| 9 | 8:30 pm | Wrap-up |

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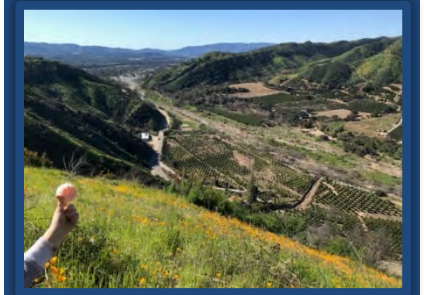
# ATTENDEE POLL NOS. 1 - 3



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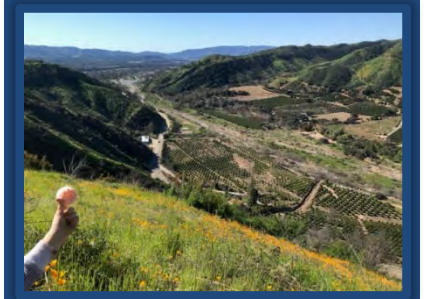
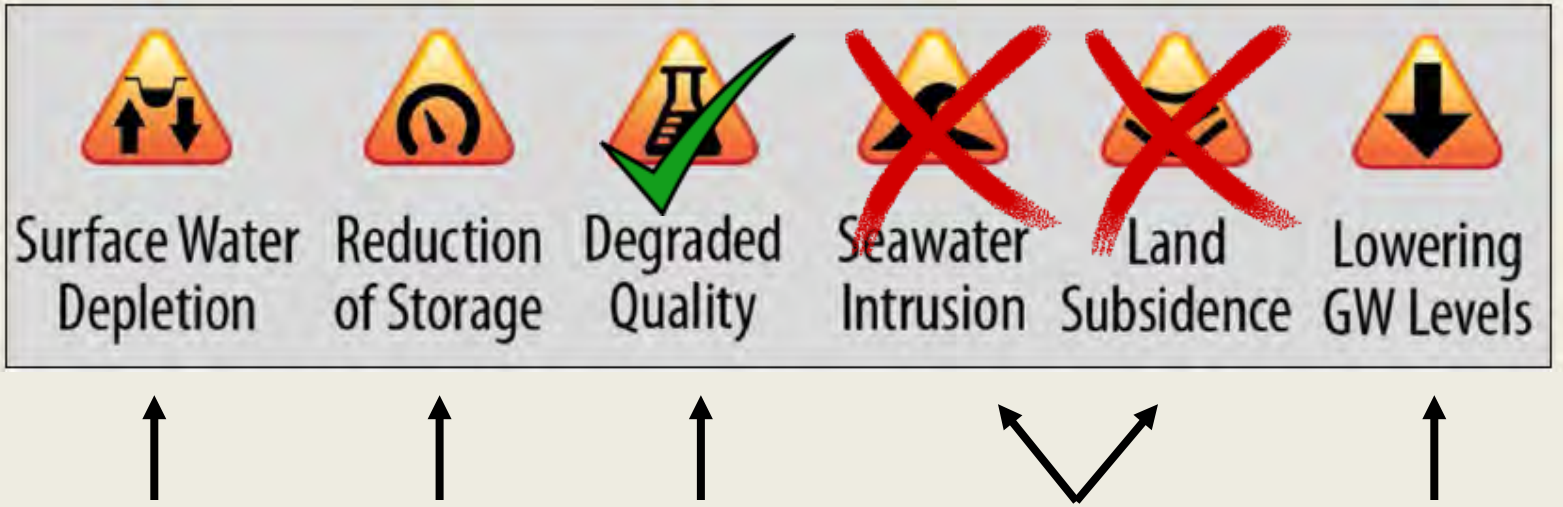
# OVERVIEW OF SUSTAINABLE MANAGEMENT CRITERIA REQUIREMENTS



# SUSTAINABILITY INDICATORS

***The GSP will use four sustainability indictors to define sustainable management of the Upper Ventura River Basin***

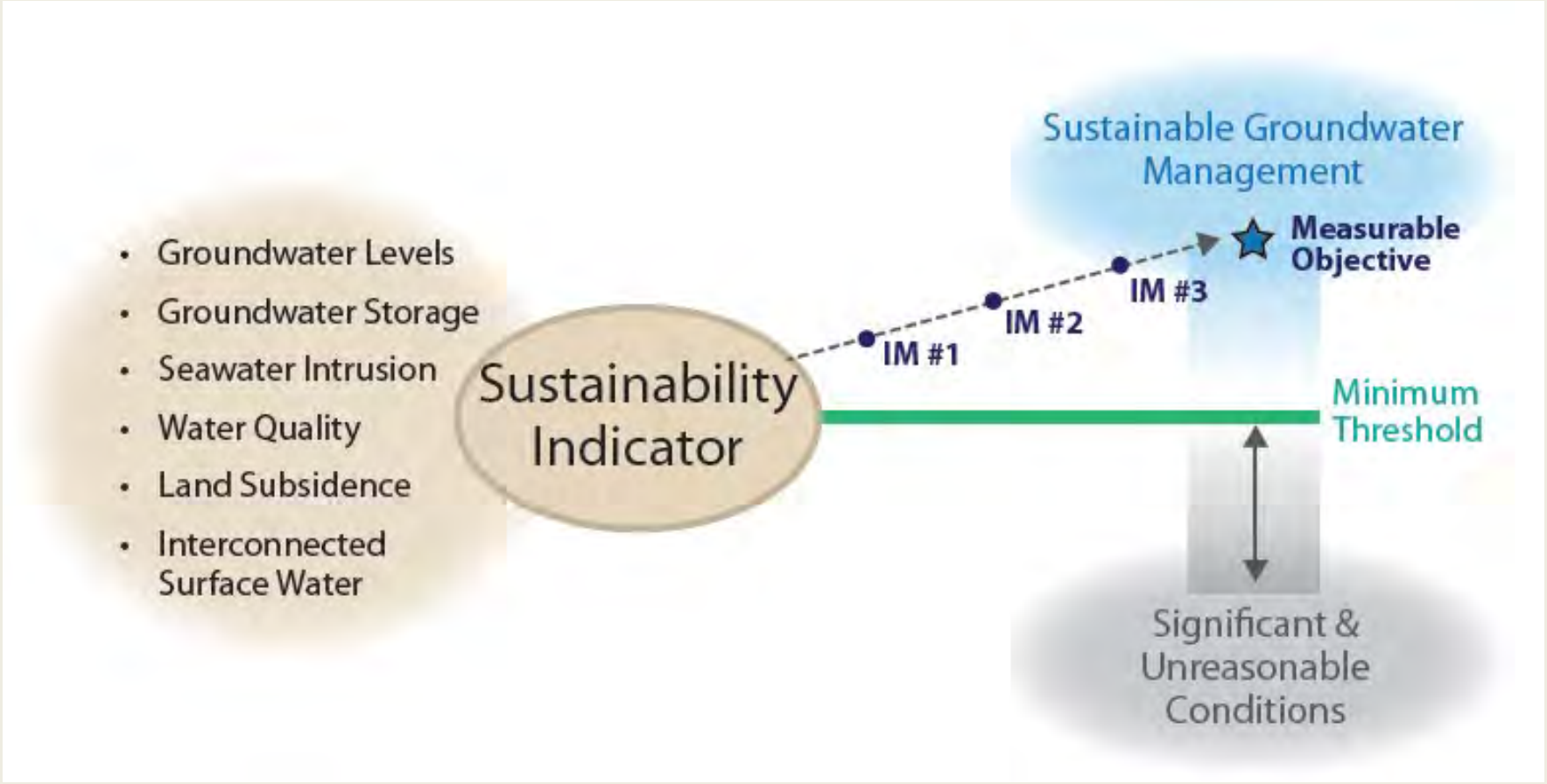


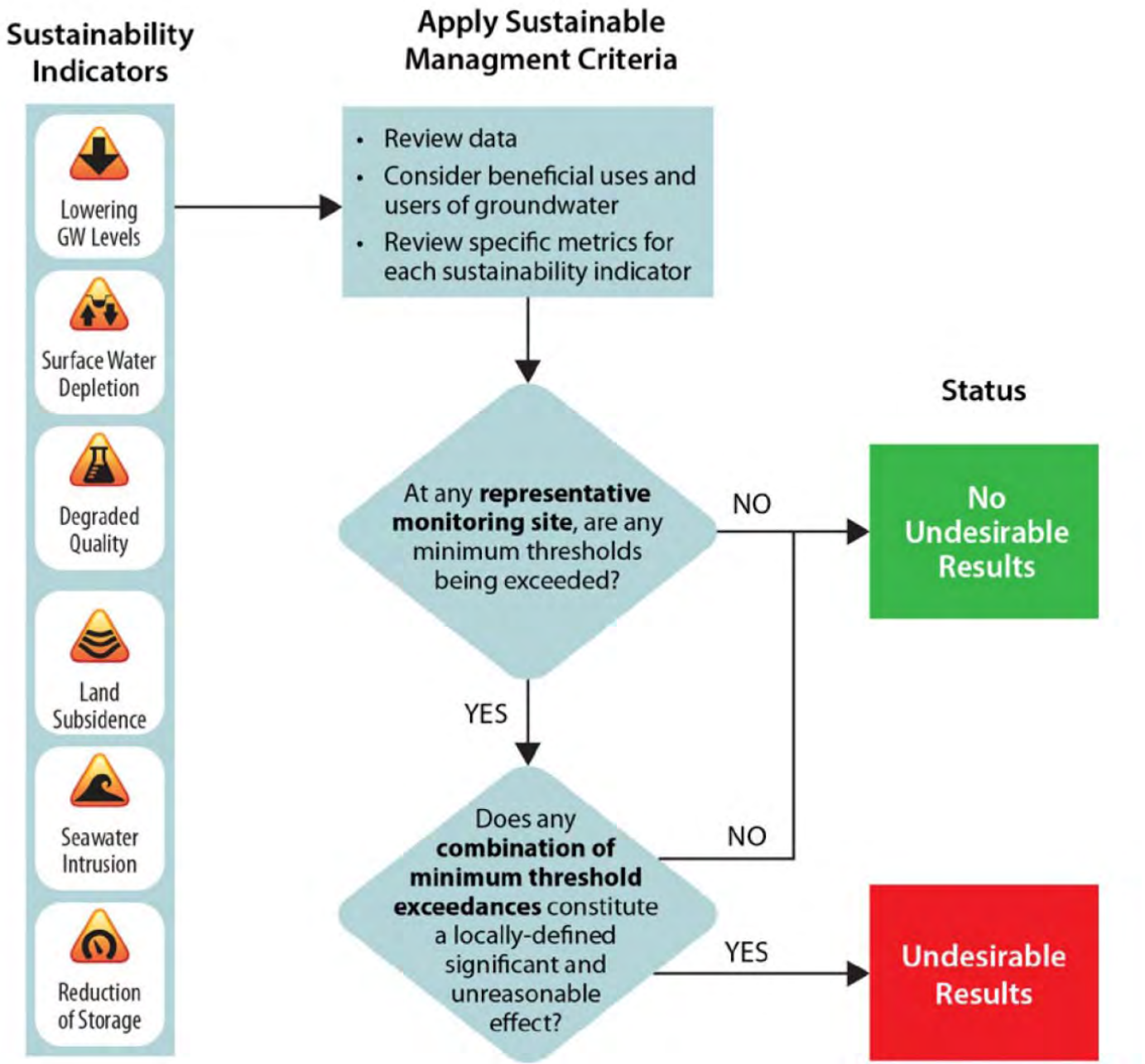
# SUSTAINABLE MANAGEMENT CRITERIA

- The following criteria must be developed for each applicable sustainability indicator:
  - Undesirable Results
    - Significant and unreasonable effects for sustainability indicators caused by groundwater conditions occurring throughout the basin that the GSA seeks to avoid
  - Minimum Thresholds
    - Quantitative metrics indicating significant and unreasonable effects likely exist in a particular area
  - Measureable Objectives
    - Quantitative metrics that provide a margin of operational flexibility to prevent minimum threshold exceedances

# SUSTAINABLE MANAGEMENT CRITERIA

***The overarching goal of SGMA is to avoid undesirable results***






# 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***

# DEFINING UNDESIRABLE RESULTS

- 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*

# BENEFICIAL USERS

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





# WHAT ARE 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*

# QUESTIONS

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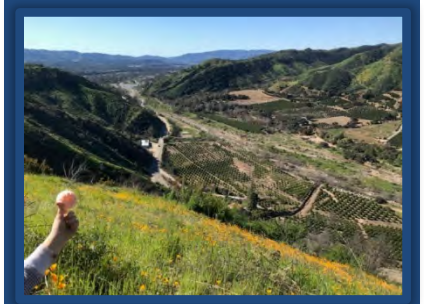
# GROUNDWATER DEPENDENT ECOSYSTEMS IDENTIFICATION



# Riparian GDE Identification

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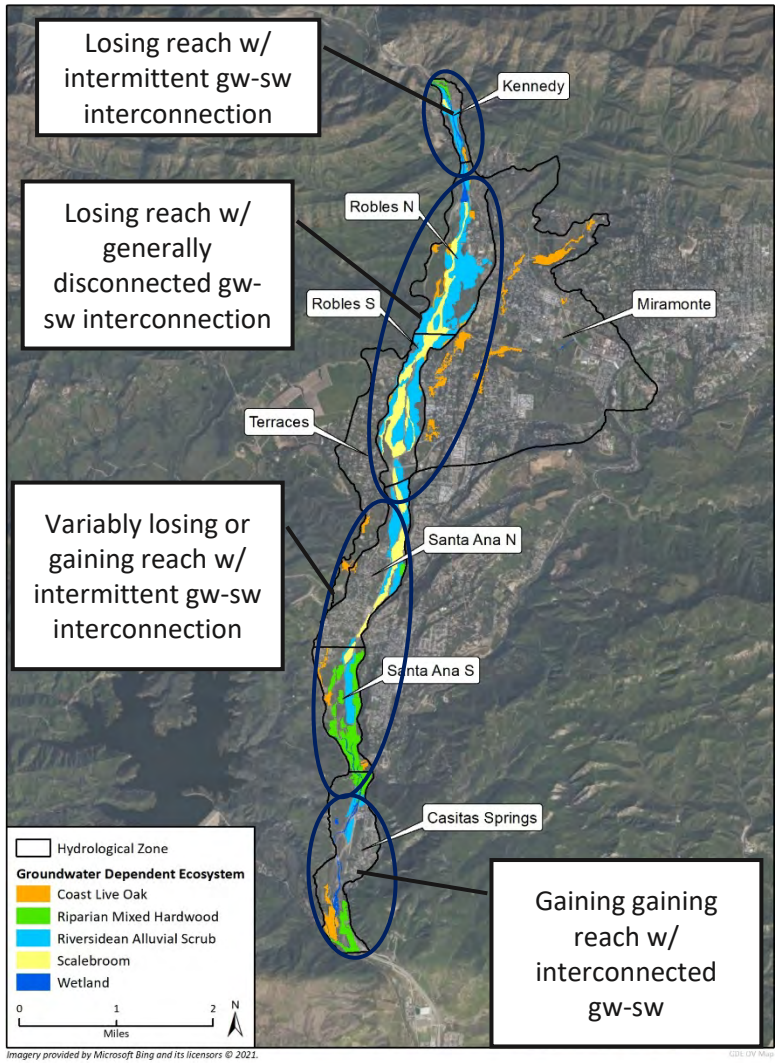
# Introduction: Riparian GDE Identification

- Groundwater Dependent Ecosystem:
  - Ecological communities of species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface - SGMA, 23 CCR § 351(m)
- The Nature Conservancy Guidance
  - Potential GDEs, rooting depths, groundwater levels, group and characterize

# Riparian GDE Screening Methods

- Potential Riparian GDEs
  - Initial visual analysis of Natural Communities Commonly Associated with Groundwater (NCCAG) dataset
- Maximum rooting depths
  - Literature review and community/species-specific depths
- Groundwater levels
  - Three water years to model depth to water (DTW) for wet, average, and dry conditions
  - High and low DTW for each year
- Spatial analysis
  - Intersection of rooting depths and groundwater level
- Additional assessment
  - Additional analysis of results (imagery and intersected data)
- Group Riparian GDEs into “units”

# NCCAG Potential Riparian GDEs

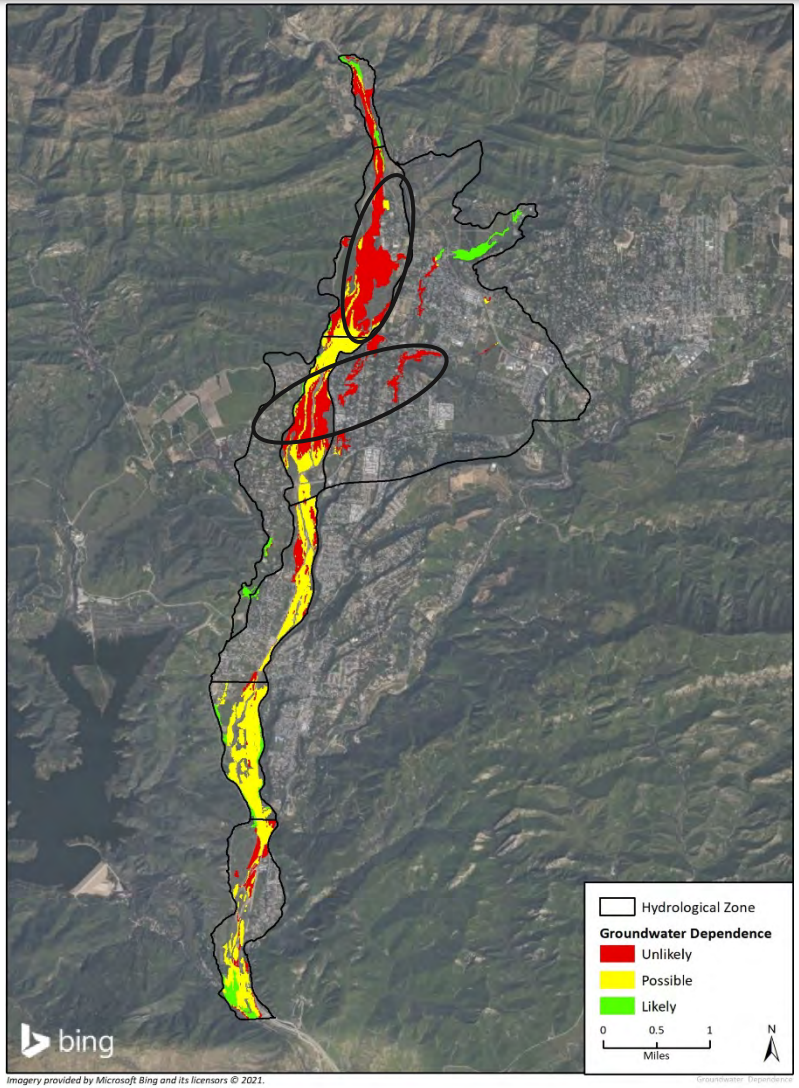



- Losing reaches dominated by Scalebroom and Riversidean Alluvial Scrub
- Areas known as interconnected groundwater and surface water dominated by Riparian Mixed Hardwood

# Screening Methods – Spatial Analysis Criteria

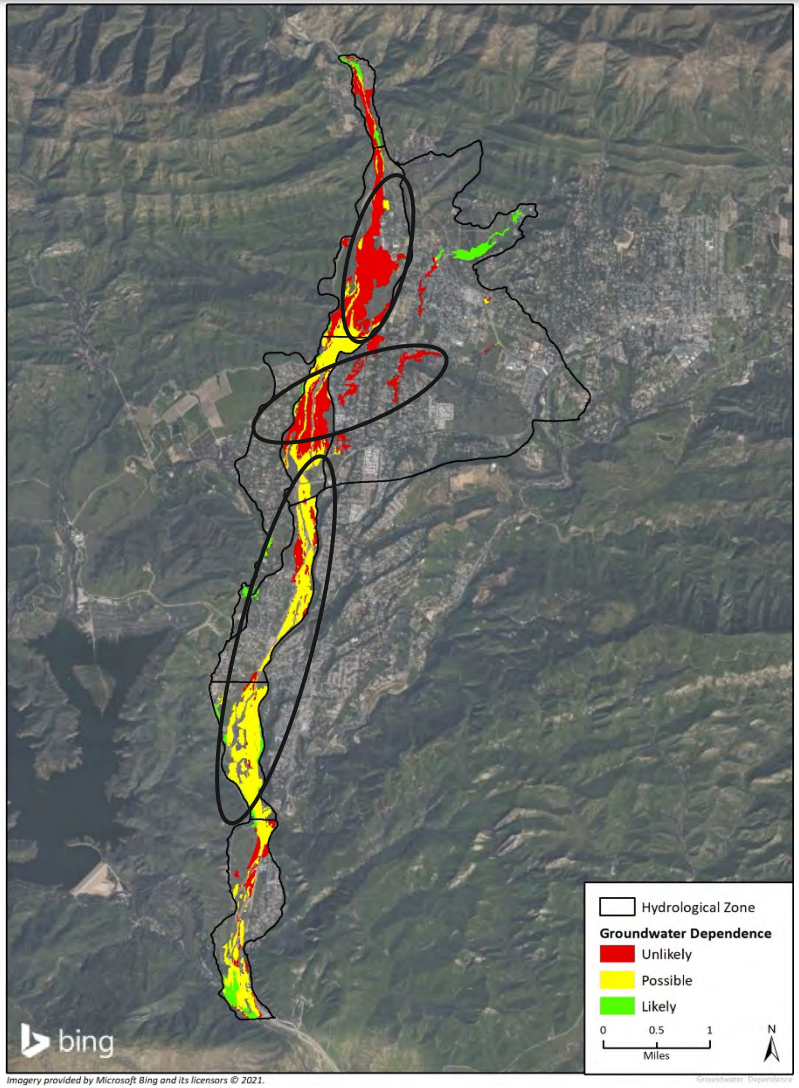
| | | |
|---|---|---|
| Unlikely groundwater dependent | Rooting depth never deeper than highest GW Levels | Exclude from Riparian GDE map |
| Possible groundwater dependent | Rooting depth deeper than DTW for any high GW Levels | Further evaluation of GW level and root depth |
| Likely groundwater dependent | Rooting depth deeper than DTW for all low GW Levels | Verify groundwater dependency |

# Potential Riparian GDEs – Screening Results



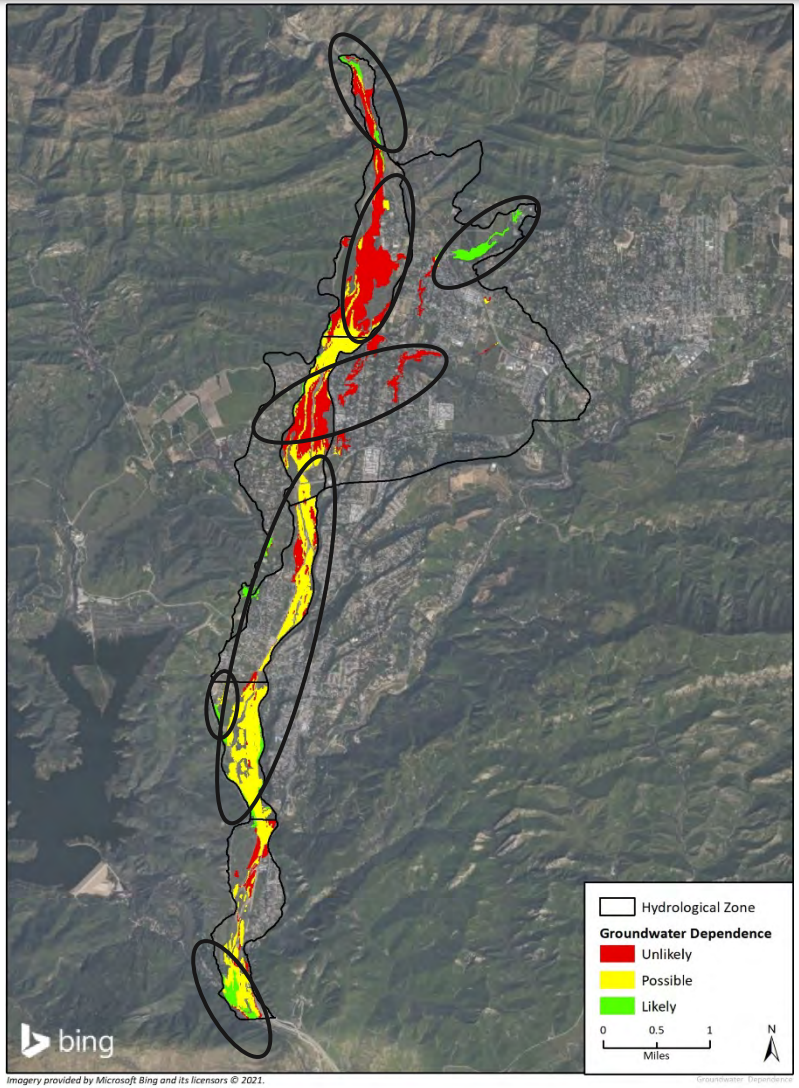

- "Unlikely" (red areas) indicates no root-groundwater intersection

# Potential Riparian GDEs – Screening Results



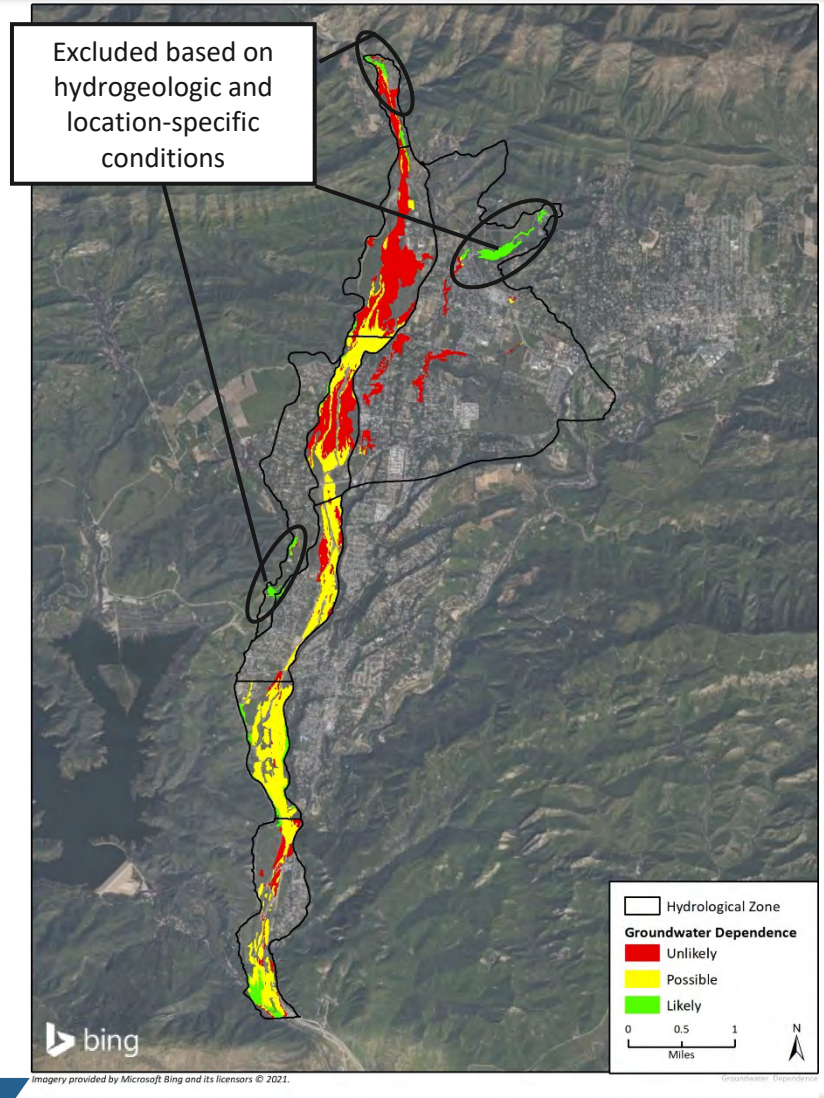

- "Unlikely" (red areas) indicates no root-groundwater intersection
- "Possible" (yellow areas) indicates at least 1 root-groundwater intersection

# Potential Riparian GDEs – Screening Results



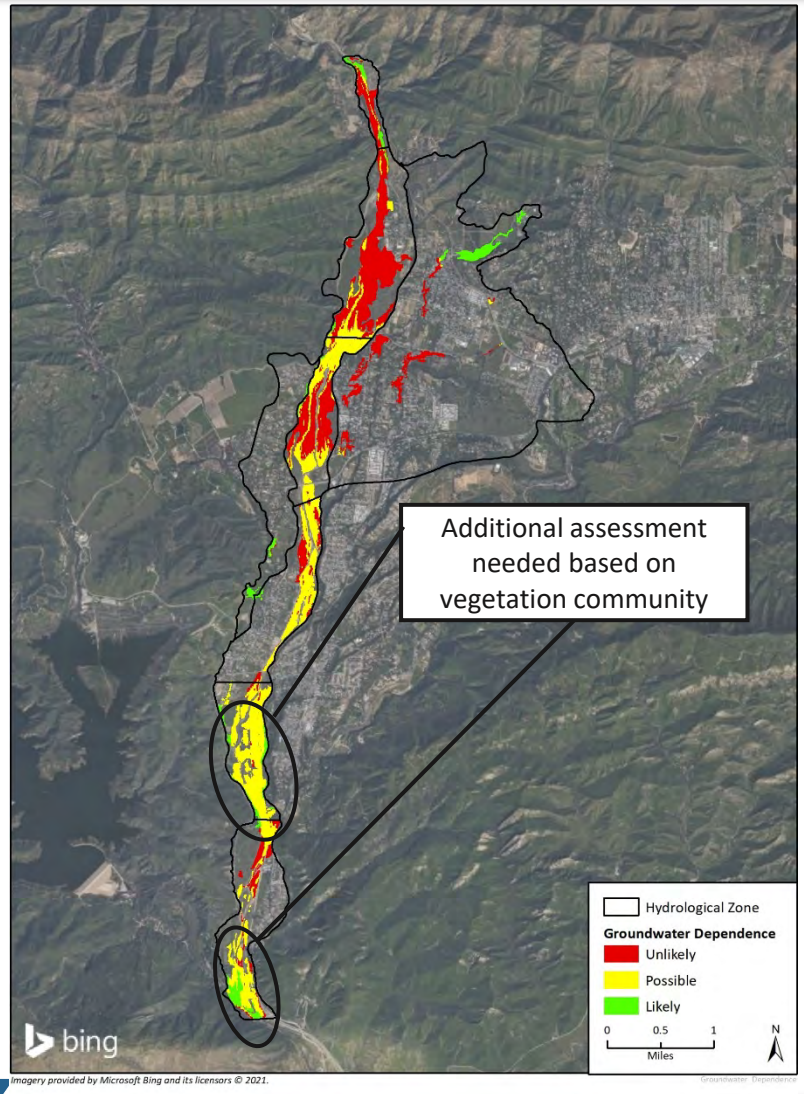

- "Unlikely" (red areas) indicates no root-groundwater intersection
- "Possible" (yellow areas) indicates at least 1 root-groundwater intersection
- "Likely" (green areas) indicate root-groundwater intersection during all low GW levels

# Potential Riparian GDEs – Screening Results



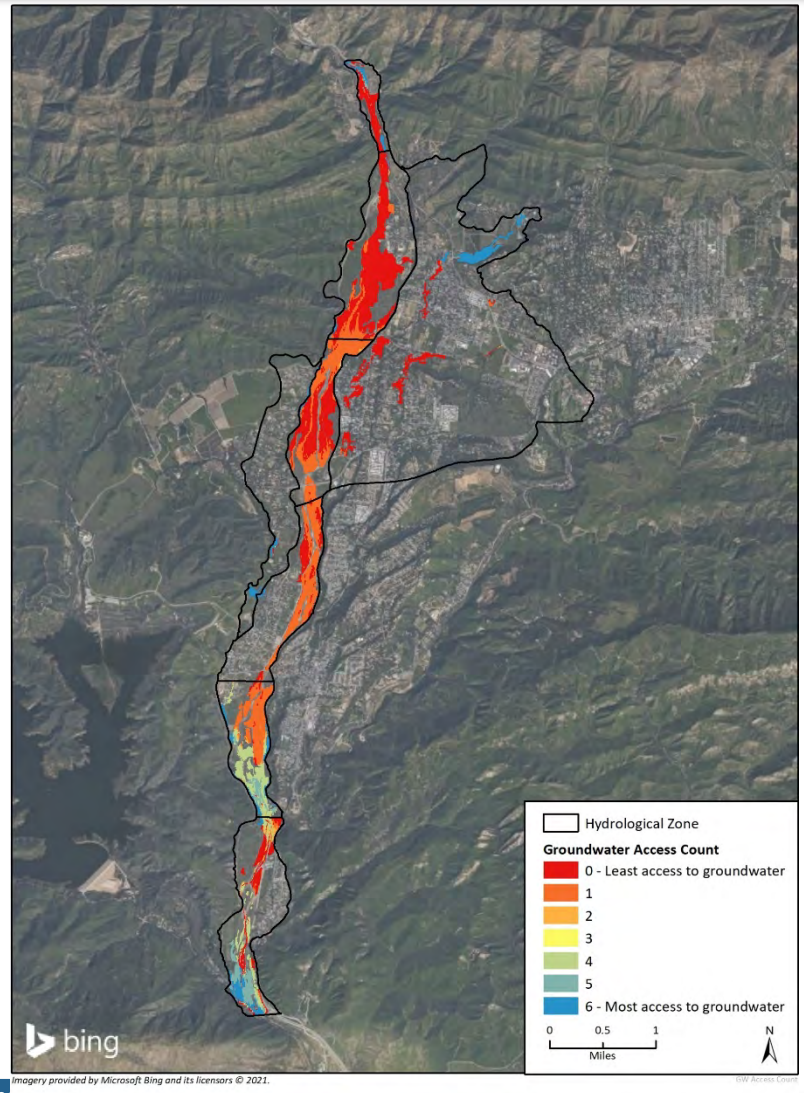

- Exclusion of Coast Live Oak in Mira Monte, Kennedy, and Terraces hydrogeologic areas
  - Surface water, irrigation, or perched groundwater
- Exclusion of Riparian Mixed Hardwood in Kennedy hydrogeologic area
  - Surface water dependence

# Potential Riparian GDEs – "Possible" Evaluation



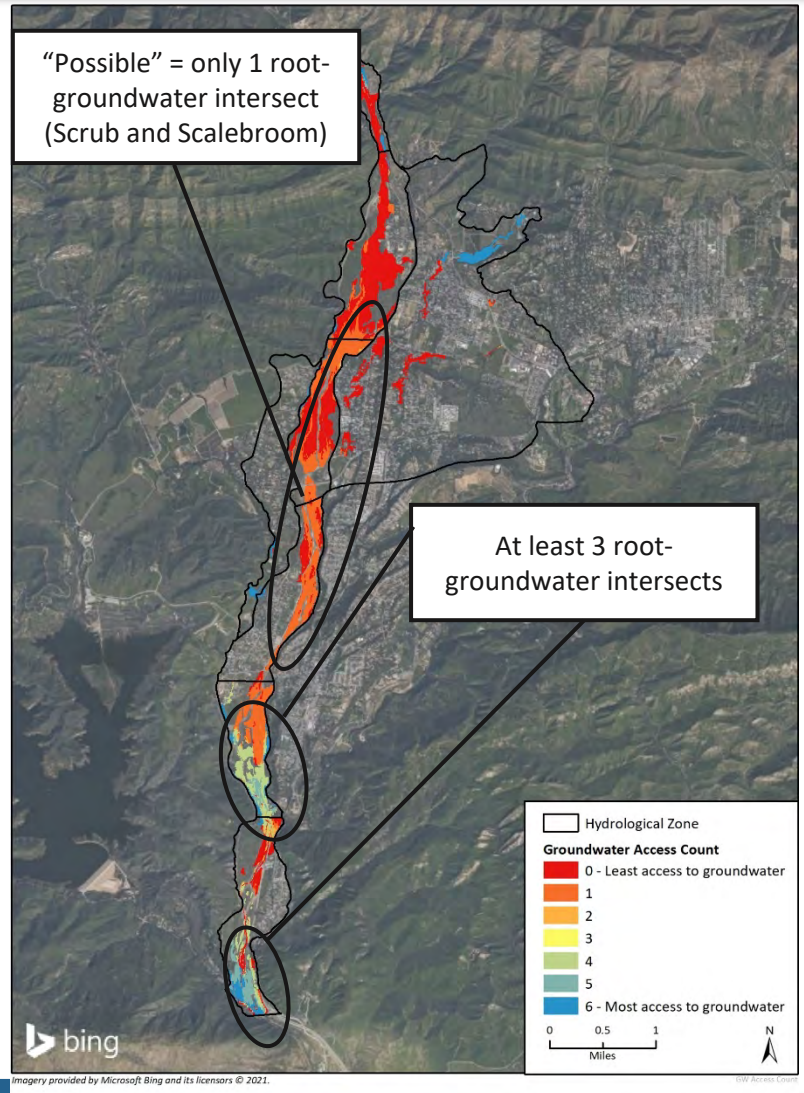

- Additional assessment needed based on vegetation communities
  - Especially in South Santa Ana area
  - Note DTW were modeled

# Potential Riparian GDEs – "Possible" Evaluation



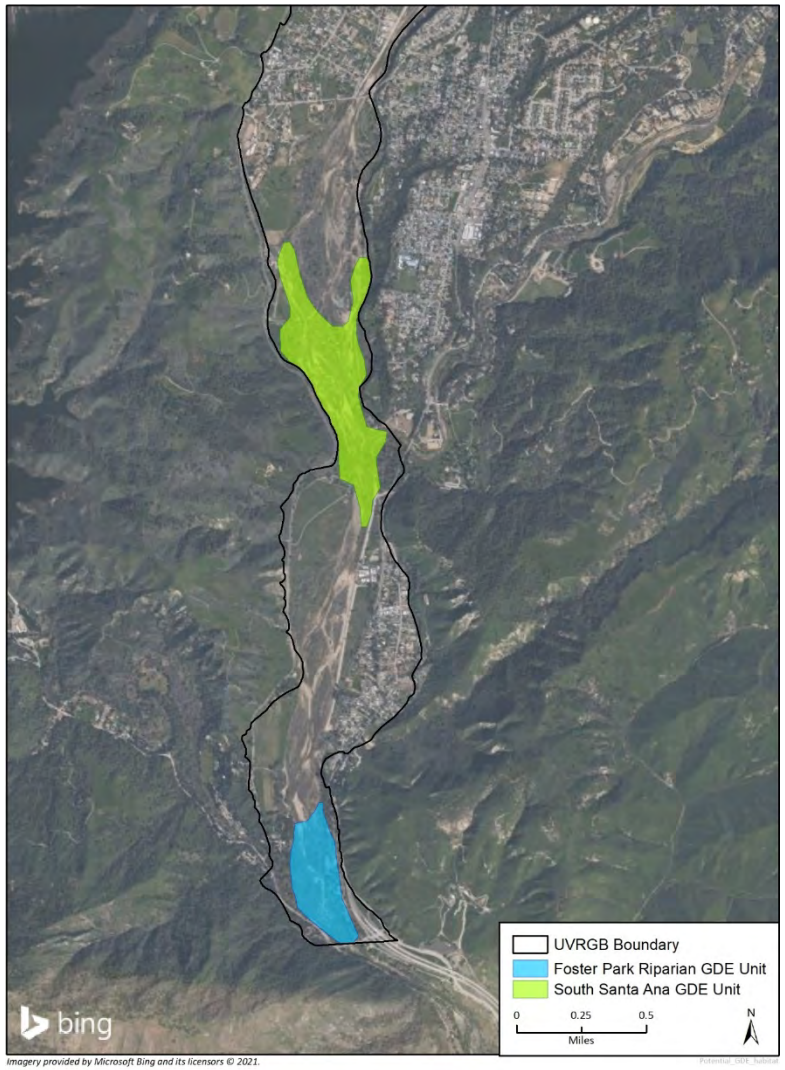

- Groundwater access counts
- Wet, average, and dry water years
  - High and low for each

# Potential Riparian GDEs – "Possible" Evaluation




- 1 root-groundwater intersect for the Robles North, Robles South, and Santa Ana North hydrogeologic areas
  - DTW was well below roots in most hydrologic conditions
- >3 root-groundwater intersects for the Santa Ana South and Casitas Springs hydrogeologic areas
- Inclusion of all Riparian Mixed Hardwood GDEs

# UVRGB Riparian GDE Units




- Grouped Riparian GDEs into 2 units
- South Santa Ana Riparian GDE Unit
  - Coast Live Oak, Riparian Mixed Hardwood, Wetland, Riversidean Alluvial Scrub
- Foster Park Riparian GDE Unit
  - Coast Live Oak, Riparian Mixed Hardwood, Wetland
- Uncertain of groundwater dependency of Coast Live Oak

# Riparian GDE Characterization

Composition and ecological value of Riparian GDE units

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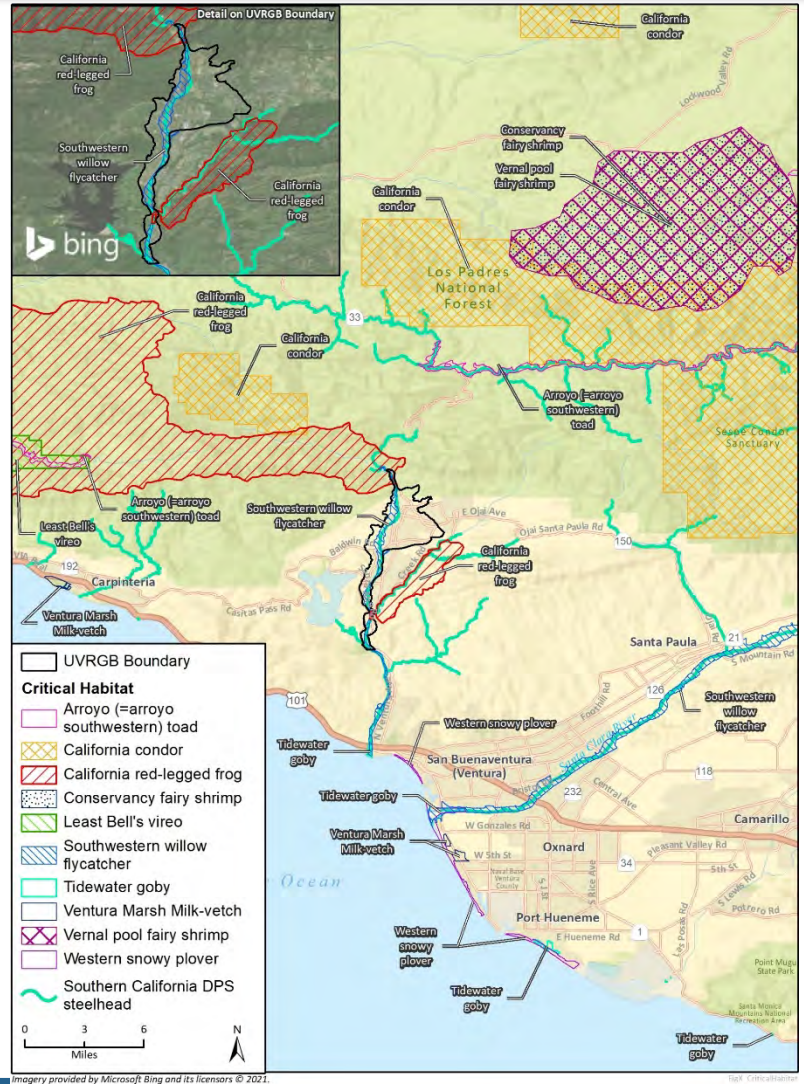
# Riparian GDE Unit Characterization

- Special Status Species:
  - Pacific Lamprey
  - Southern California DPS Steelhead
  - California red-legged frog
  - Southwestern pond turtle
  - Two-striped gartersnake
  - Southwestern willow flycatcher
  - Least bell's vireo
  - Yellow Warbler
- Critical Habitat:
  - Southwestern willow flycatcher
  - Southern California DPS Steelhead
  - California red-legged frog
- Sensitive Natural Communities:
  - Southern California Steelhead Stream
  - Southern Sycamore Alder Riparian Woodland

# Riparian GDE Unit Ecological Value




- Regionally important habitat
- Riparian GDE units provide habitat beyond that designated as “critical habitat”

# Aquatic GDE Identification

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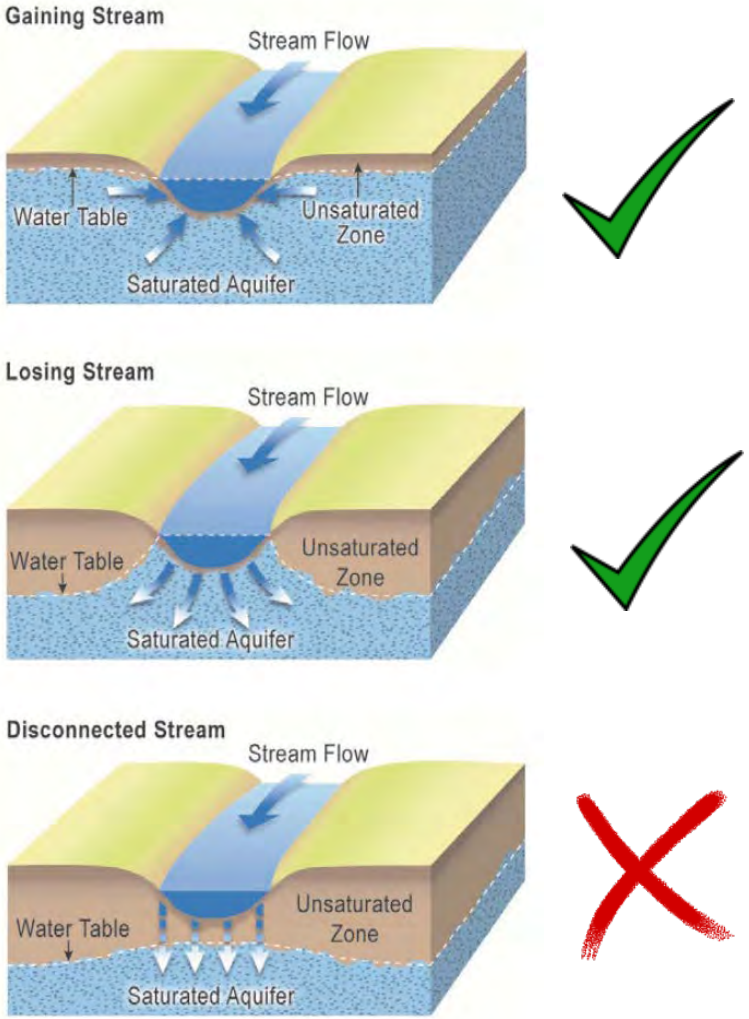
# Aquatic GDE Introduction

- Aquatic GDEs: important instream habitat areas with *interconnected surface water*

Ventura River near Meiners Oaks, UVRGA



# Aquatic GDE Introduction

Aquatic GDEs are used in a variety of ways by fish and aquatic wildlife species.

- Passage (critical riffles)
- Refuge (shade/structure)
- Rearing
- Spawning/breeding
- Dispersal/migration

California red-legged frog egg mass

Courtesy of Steve Howard

Steelhead redd (spawning bed)

Matilija Creek, Courtesy of Paul Jenkin

# Aquatic GDE Introduction

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Many factors within the watershed can influence Aquatic GDEs.

| Natural Climatic Factors | Anthropogenic Factors | Hydrogeologic Factors |
|---|---|---|
| Storm pulses | Groundwater Pumping | Losing/Gaining Reaches |
| Drought | Surface Water Diversion | Depth to Groundwater |

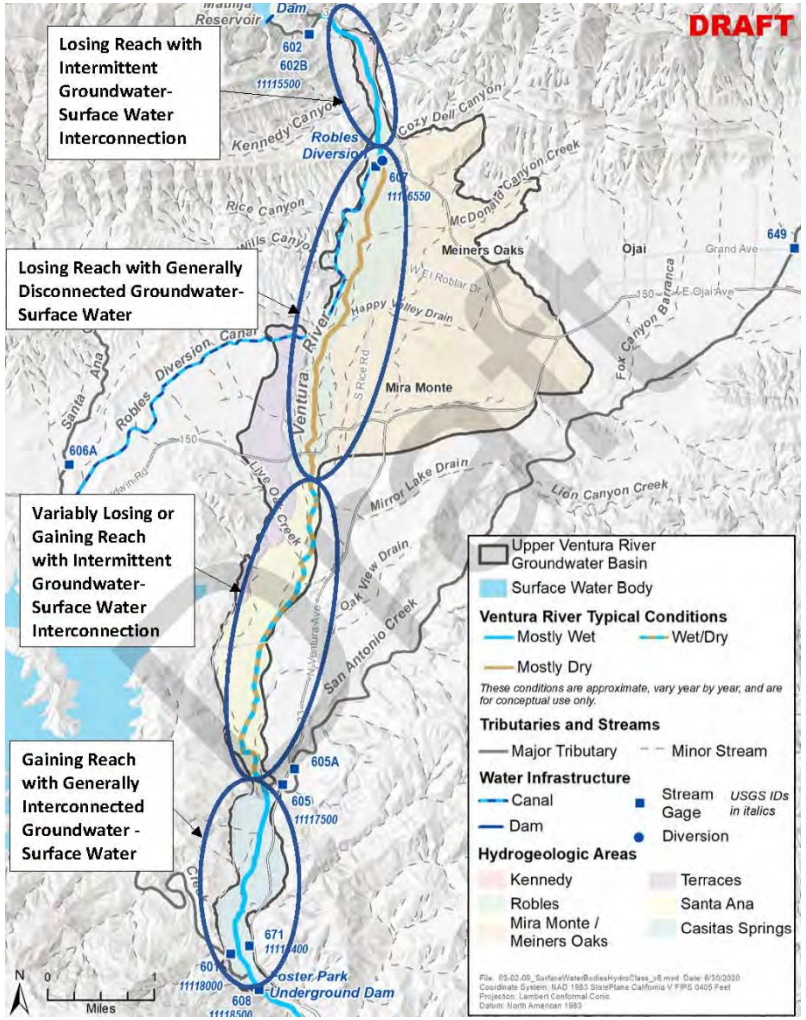
# Aquatic GDE Assessment Overview

- Identify Aquatic GDEs
  - Determine important aquatic habitat areas within the UVRGB
  - Evaluate groundwater dependency of these areas
- Characterize Aquatic GDEs
  - Habitat characteristics and ecological value
  - Critical habitat
  - Special status species
- Determine potential effects on Aquatic GDEs
  - Assess hydrologic data (rates of depletion of ***interconnected surface water)***

# Aquatic GDE Identification Methods

| | |
|---|---|
| Potential Aquatic GDEs | All reaches of the Ventura River within the UVRGB |
| Evaluate Groundwater Dependency | Hydrogeologic data<br>Site-specific knowledge of surface water-groundwater interactions |
| Identify Important Aquatic Habitat | Literature review<br>Knowledge of local experts |

# Aquatic GDE Identification Methods

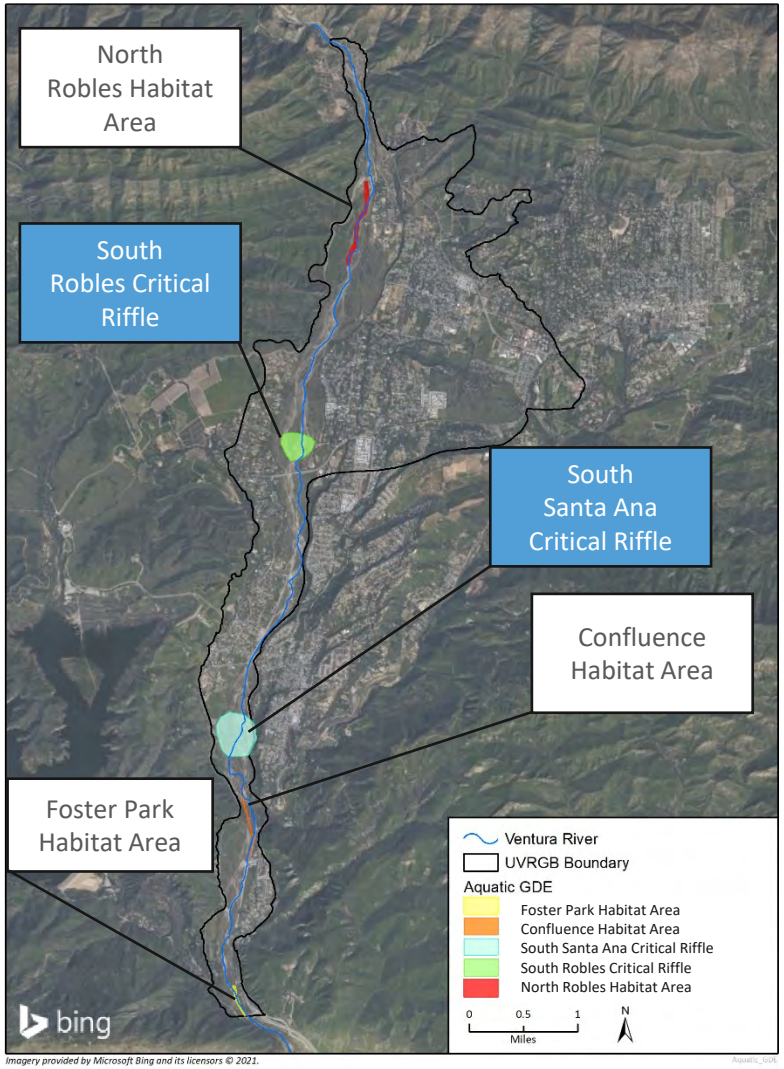



All reaches of the Ventura River within the UVRGB were considered.

Reaches were evaluated based on Aquatic GDE uses.

# Aquatic GDE Identification: Passage and Habitat

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



# Critical Riffle Photographs

South Robles Critical Riffle
(facing north)

South Santa Ana Critical Riffle
(facing north)

Photos by S. Howard, April 13, 2021

# Habitat Area Photographs (Robles Habitat Area)

Northern portion of North Robles Habitat Area (looking south)

Southern portion of North Robles Habitat Area (looking south)

Photos by S. Howard, April 13, 2021

# Habitat Area Photographs: Confluence Habitat Area

Confluence Habitat Area (looking north)

Confluence Habitat Area (looking north)

Photos by S. Howard, April 19, 2021

# Habitat Area Photographs: Foster Park Habitat Area

Foster Park Habitat Area (looking north)

Foster Park Habitat Area (looking north)

Photos by S. Howard January 22,2020 and April 19, 2020

# Aquatic GDE Characterization

Composition and ecological value of Aquatic GDEs

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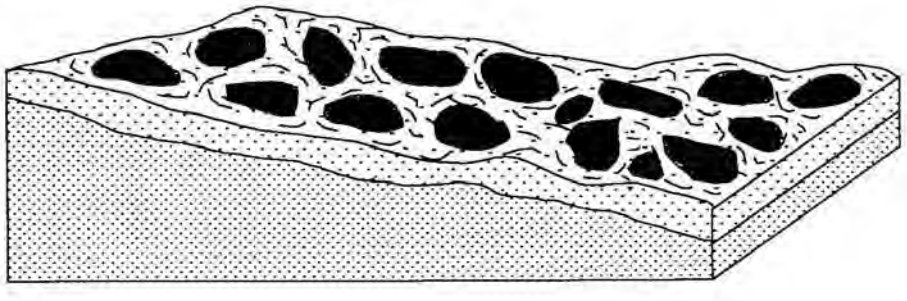
# Aquatic GDE Characterization of Critical Riffles

- Limiting passage for migration of Steelhead



Riffle Habitat Diagram

Critical Riffle Assessment (CDFW 2017)

# Aquatic GDE Characterization of Habitat Areas

Special Status Species


Pacific Lamprey


Southern California DPS Steelhead


California Red-legged frog tadpole


Southwestern Pond Turtle


Two-striped Gartersnake

Photos by S. Howard

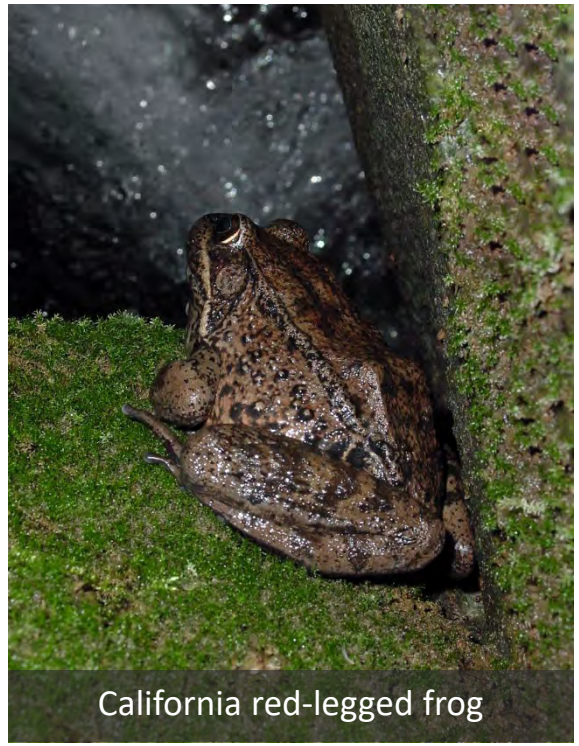
# Aquatic GDE Characterization

All five Aquatic GDES have **High Ecological Value.**

- Important Habitat for Special Status Species
- Federally Designated Critical Habitat
  - California red-legged frog
  - Southern California DPS Steelhead

Steelhead

Courtesy of Steve Howard



California red-legged frog

Courtesy of Steve Howard

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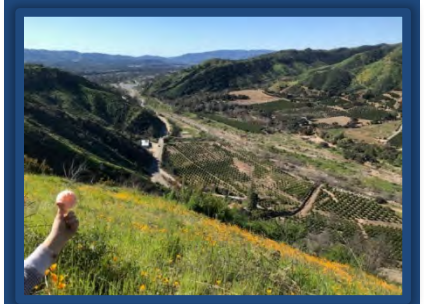
# GSP TECHNICAL TEAM SUSTAINABLE MANAGEMENT CRITERIA PROPOSALS



# SMC PROPOSALS


***Disclaimer***

*The following SMC proposals have not been approved by the UVRGA Board.*

*UVRGA is seeking your feedback prior to incorporating SCM into the draft GSP.*

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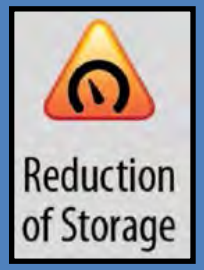
# GROUNDWATER LEVELS AND STORAGE SMC PROPOSAL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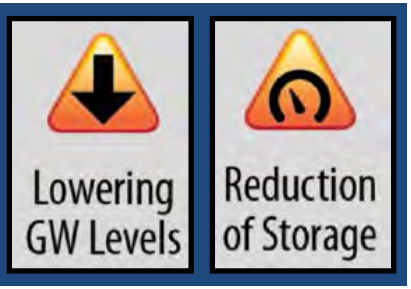
MEINERS OAKS WATER DISTRICT
VENTURA COUNTY SINCE 1949

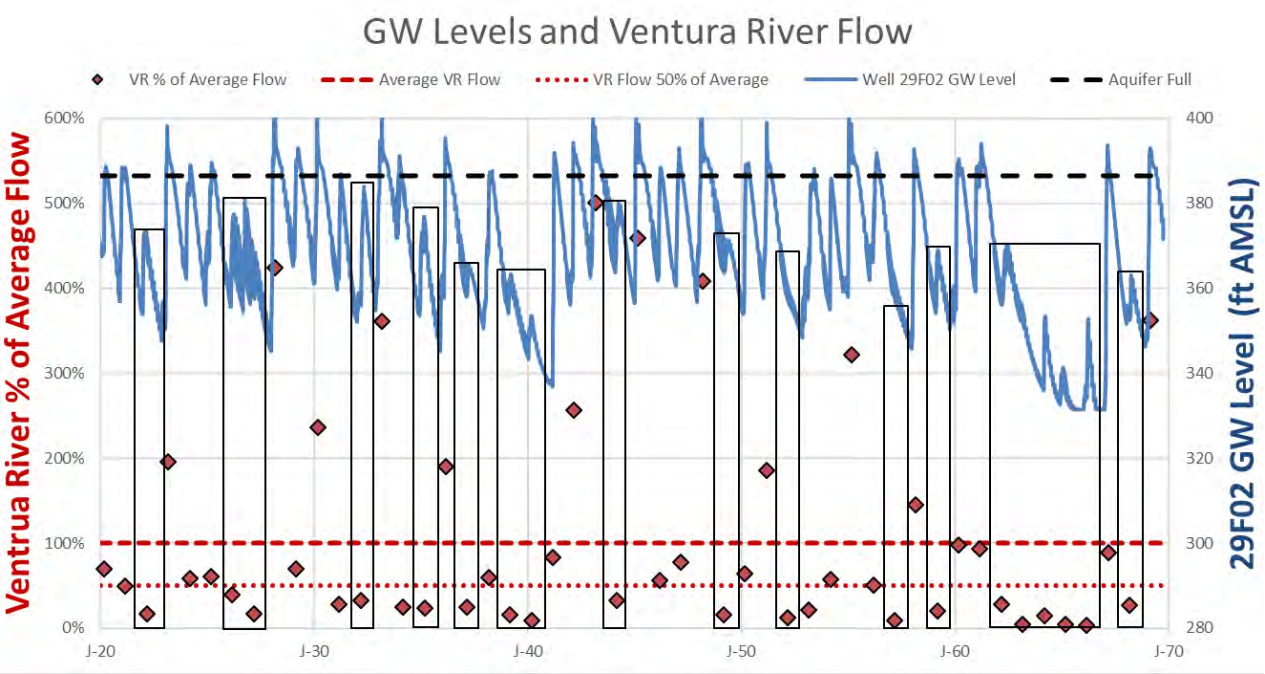
COUNTY OF VENTURA CALIFORNIA

VENTURA WATER

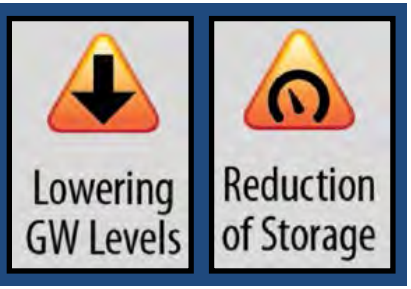
# GROUNDWATER LEVELS & STORAGE SMC



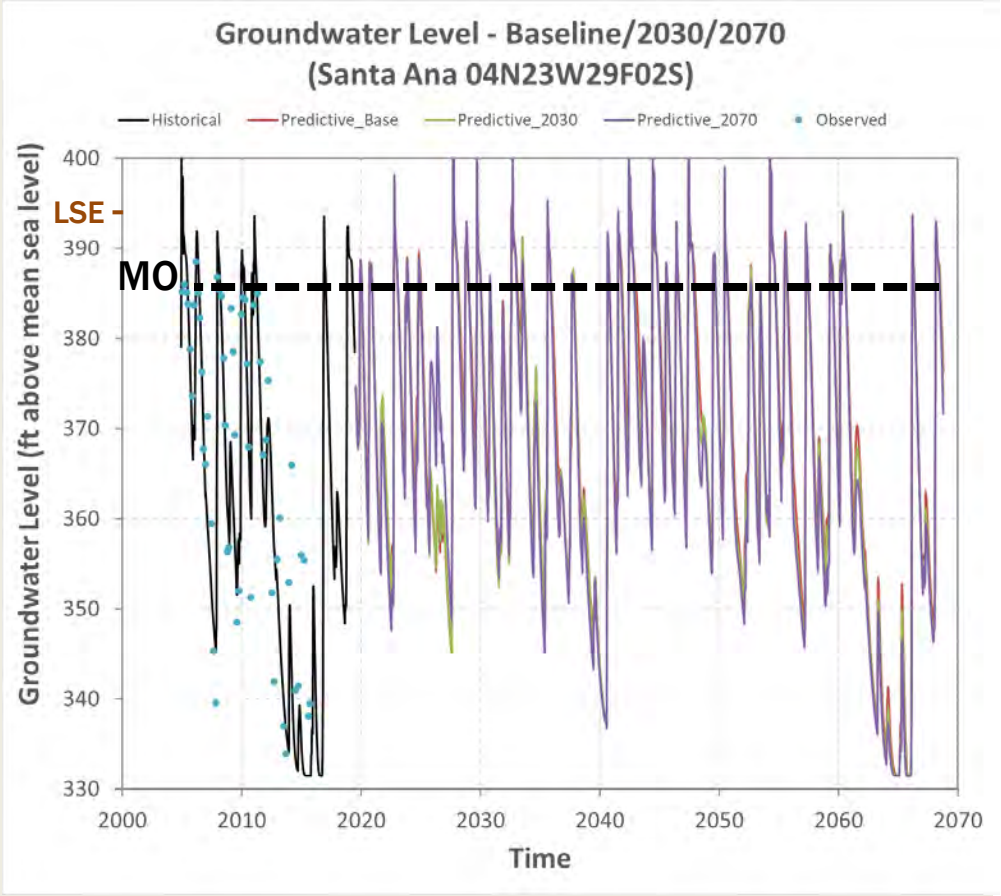

- Basin refills in years when Ventura River flow is ~>=50% of average flow
- Must address pumping effects during periods of low GW levels



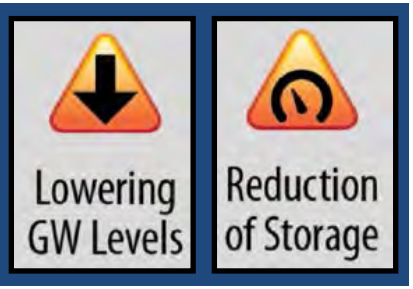
# GROUNDWATER LEVELS & STORAGE SMC




- Measurable Objective is logically 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 Threshold: must evaluate impacts on beneficial users



# GROUNDWATER LEVELS & STORAGE SMC




- Potential Significant and Unreasonable Effects:
  - Reduced well yields / dry wells
    - No reported S&U effects with low GW levels
    - Domestic wells likely susceptible at lower GW levels
  - Impacts to riparian GDEs (following slides)

# Riparian GDE Susceptibility

Potential effects caused by changing groundwater conditions

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# Riparian GDE Susceptibility – NDVI, NDMI, and Level

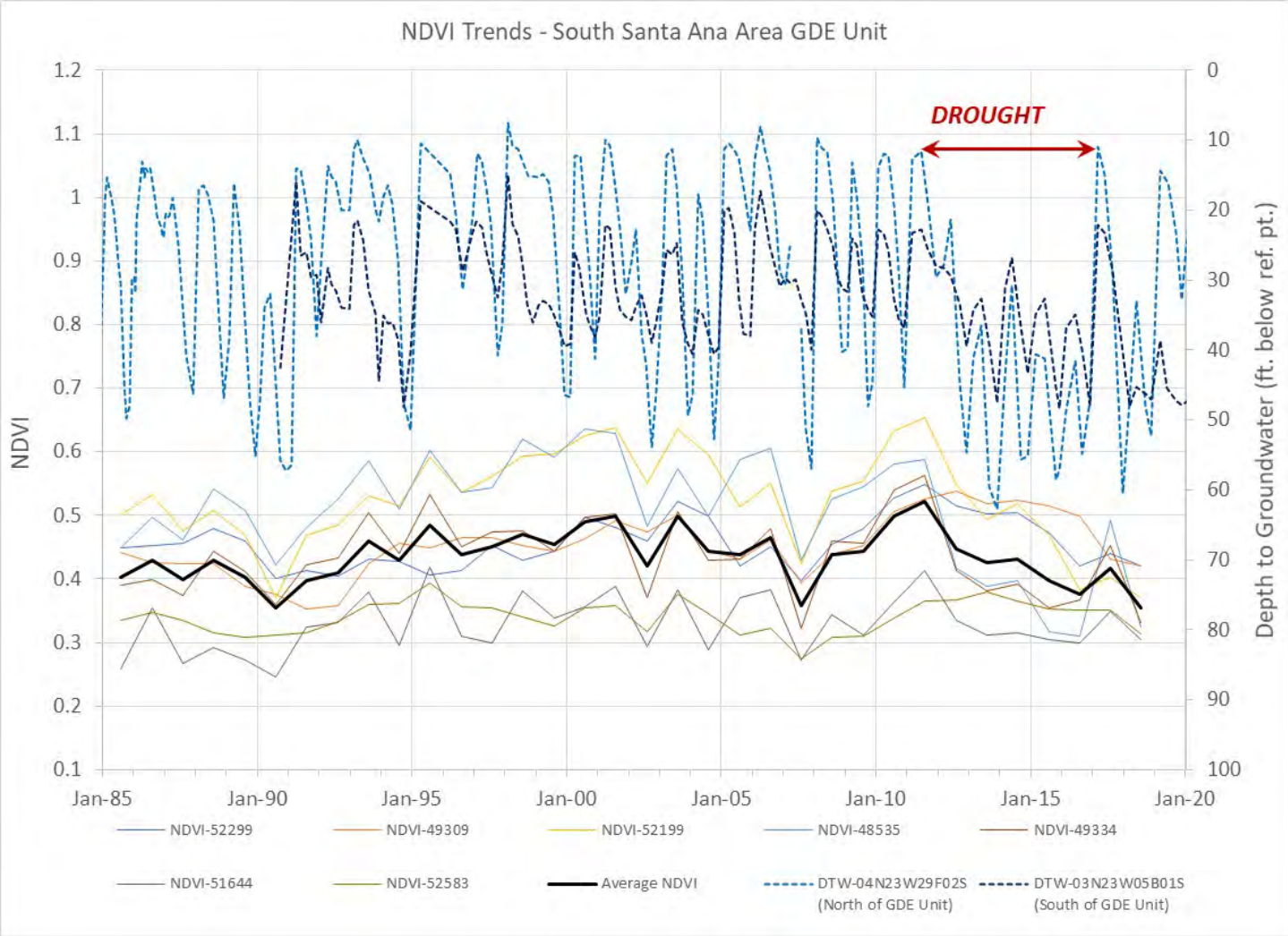
**Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI)**

- Satellite-derived index that represents the greenness and water content of vegetation
- Increase in values indicates increase in vegetative growth, and a decrease indicates a decrease in vegetative growth

**Groundwater Levels**

- Available DTW from monitoring wells in or close to the Riparian GDE units

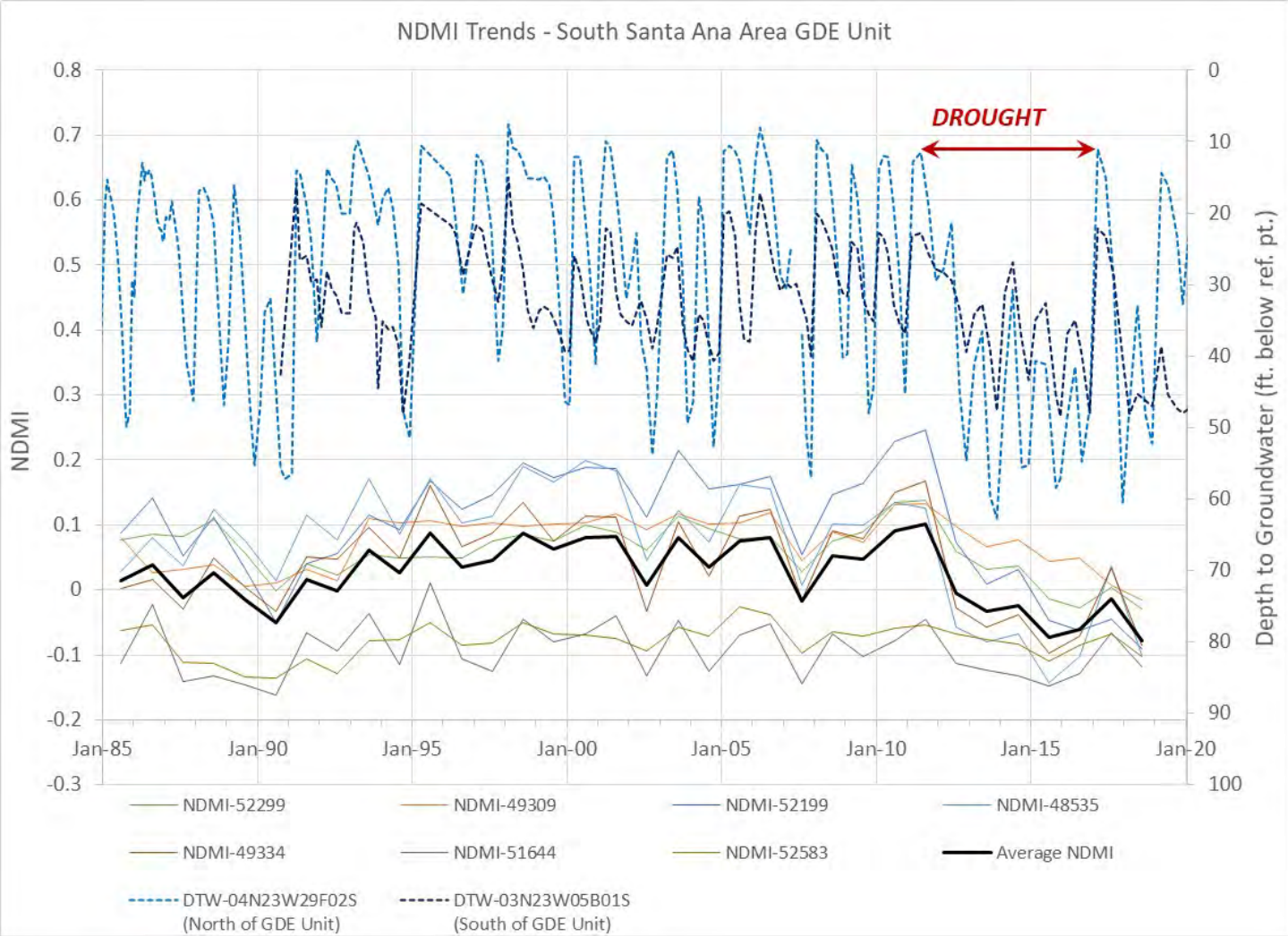
# Riparian GDE Susceptibility – South Santa Ana Riparian GDE Unit




## South Santa Ana NDVI

- Close correlation with DTW
- Low values in recent drought like historic dry periods
- Noticeable decline in drought with signs of rebound

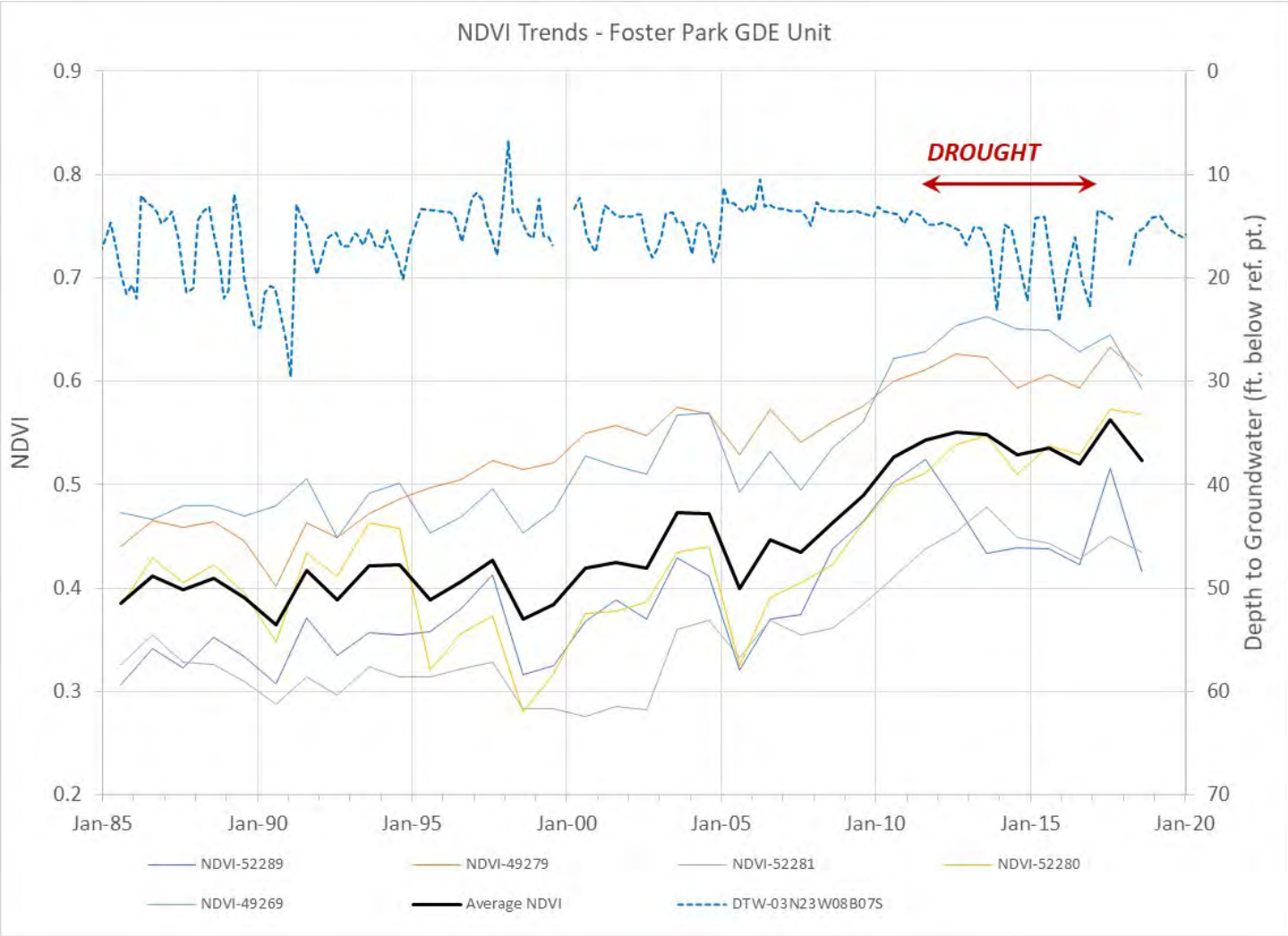
# Riparian GDE Susceptibility – South Santa Ana Riparian GDE Unit




## South Santa Ana NDMI

- Similar trends to NDVI

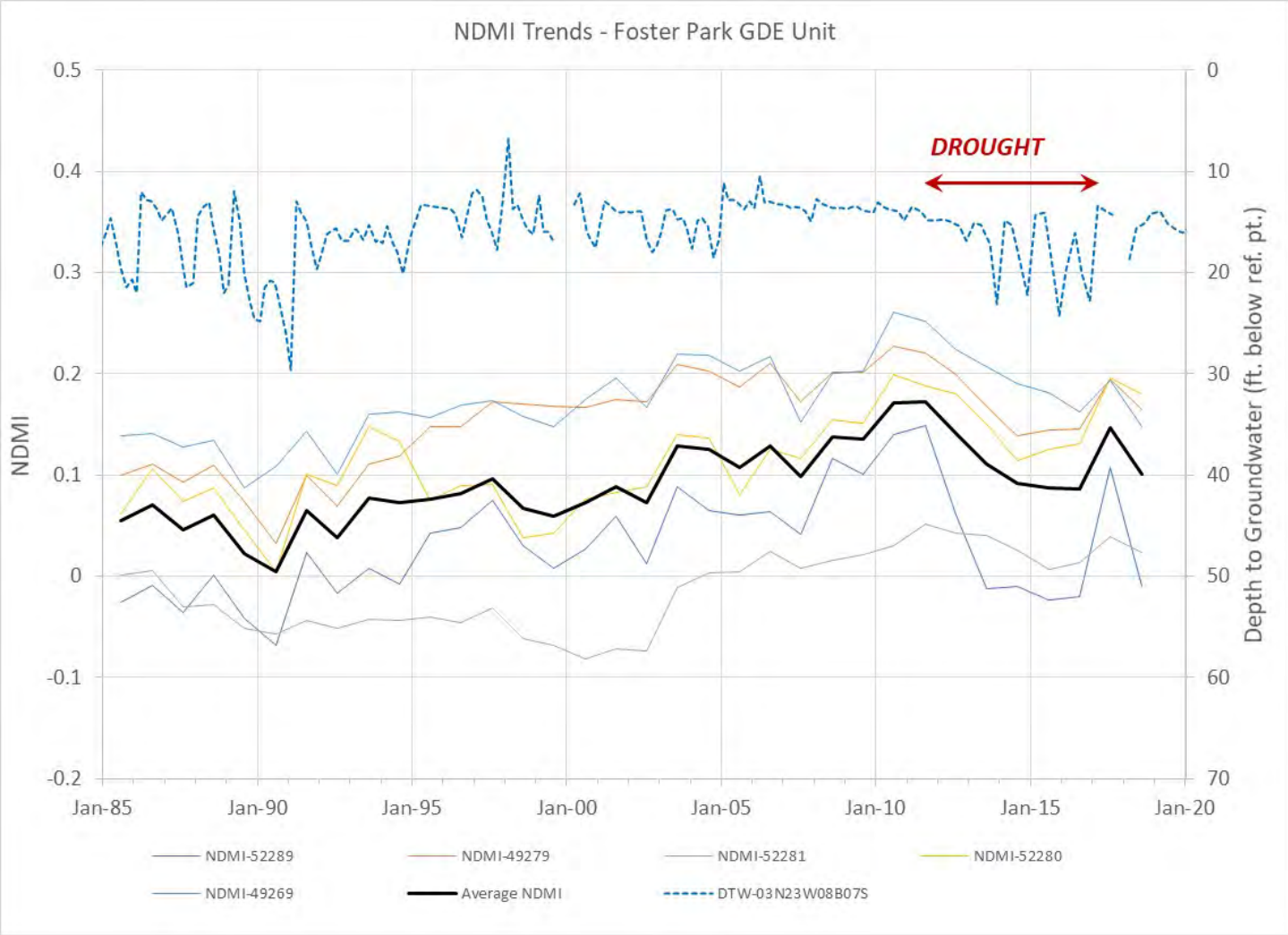
# Riparian GDE Susceptibility – Foster Park Riparian GDE Unit




## Foster Park NDVI

- Long-term rising trend
- Close correlation with DTW
- High values recently

# Riparian GDE Susceptibility – Foster Park Riparian GDE Unit




## Foster Park NDMI

- Similar trend to NDVI
- Recent drought more pronounced

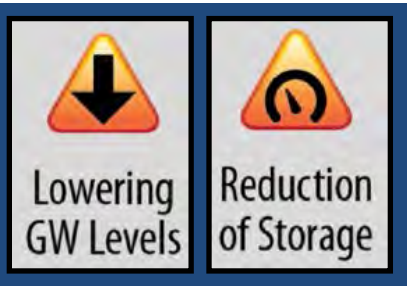
# Findings

- Data indicate historic impacts to Riparian GDEs are not permanent or prolonged
  - NDVI and NDMI rebound following drought
  - Visual analysis confirms rebound with no noticeable density or plant composition changes
  - Quickly rebounding groundwater level and NDVI/NDMI follow hydrologic conditions (i.e., precipitation in the watershed)
- *To the extent pumping and hydrologic conditions are similar going forward, we do not expect there to be significant effects to Riparian GDEs*

# Monitoring Considerations

- Monitor:
  - Groundwater elevations in Riparian GDE Units
  - NDVI and NDMI data
  - Aerial imagery of vegetation communities
- Be aware of stakeholder monitoring and implementation programs
  - e.g., restoration projects, invasive species removal, etc.

# GROUNDWATER LEVELS & STORAGE SMC




## Basis for Minimum Thresholds:

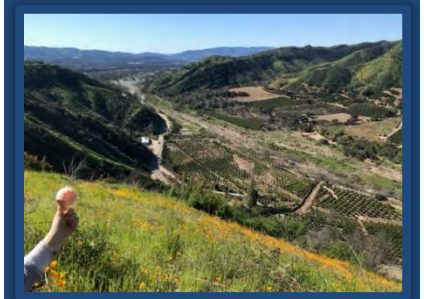
- No reported S&U effects with low GW levels
- Wells may be impacted at lower GW levels
- Impacts to riparian GDEs - Deeper groundwater levels could lead to more widespread or longstanding effects.

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

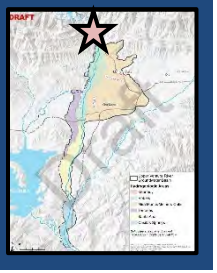
Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

# EXAMPLE SMC

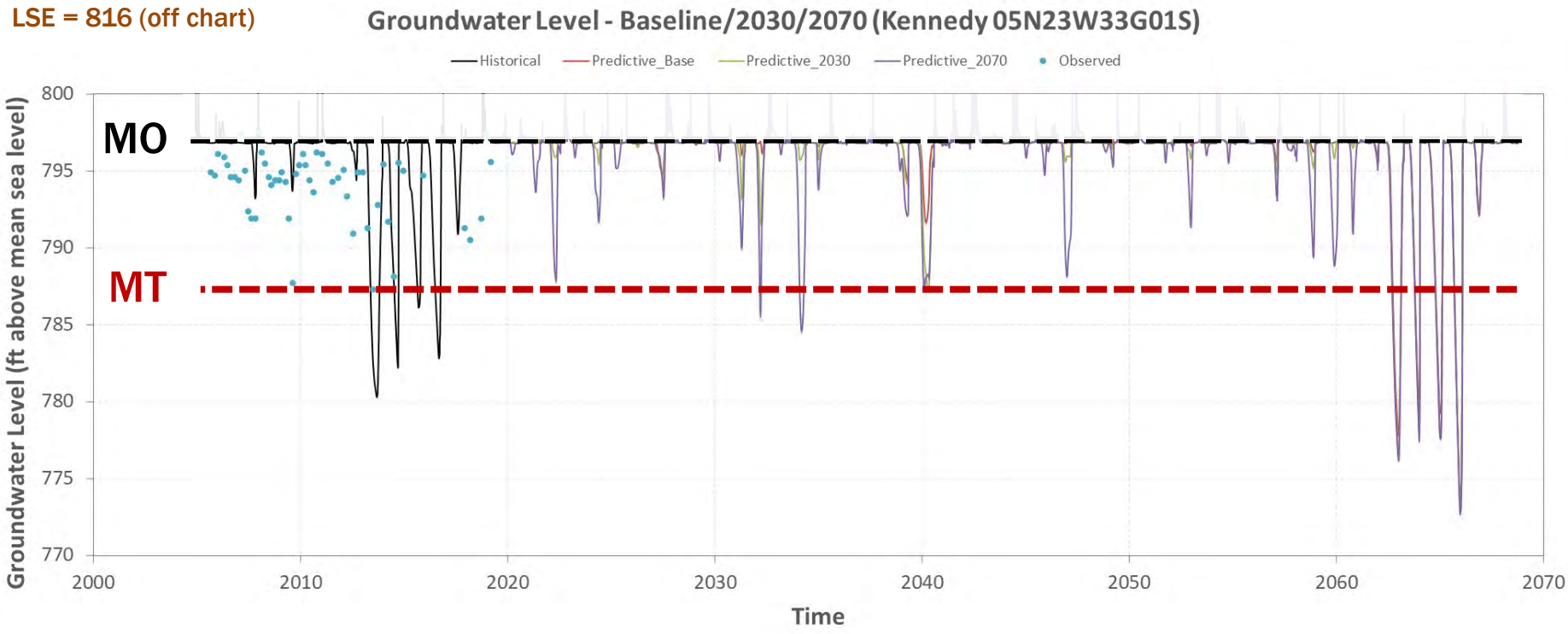
*The following charts show the proposed MO and MT superimposed on historical groundwater level data and projected future groundwater levels with current climate change conditions (baseline), 2030 climate change conditions, and 2070 climate change conditions.*



# EXAMPLE SMC: KENNEDY AREA WELL



LSE = 816 (off chart)

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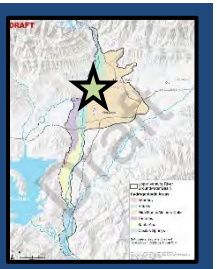
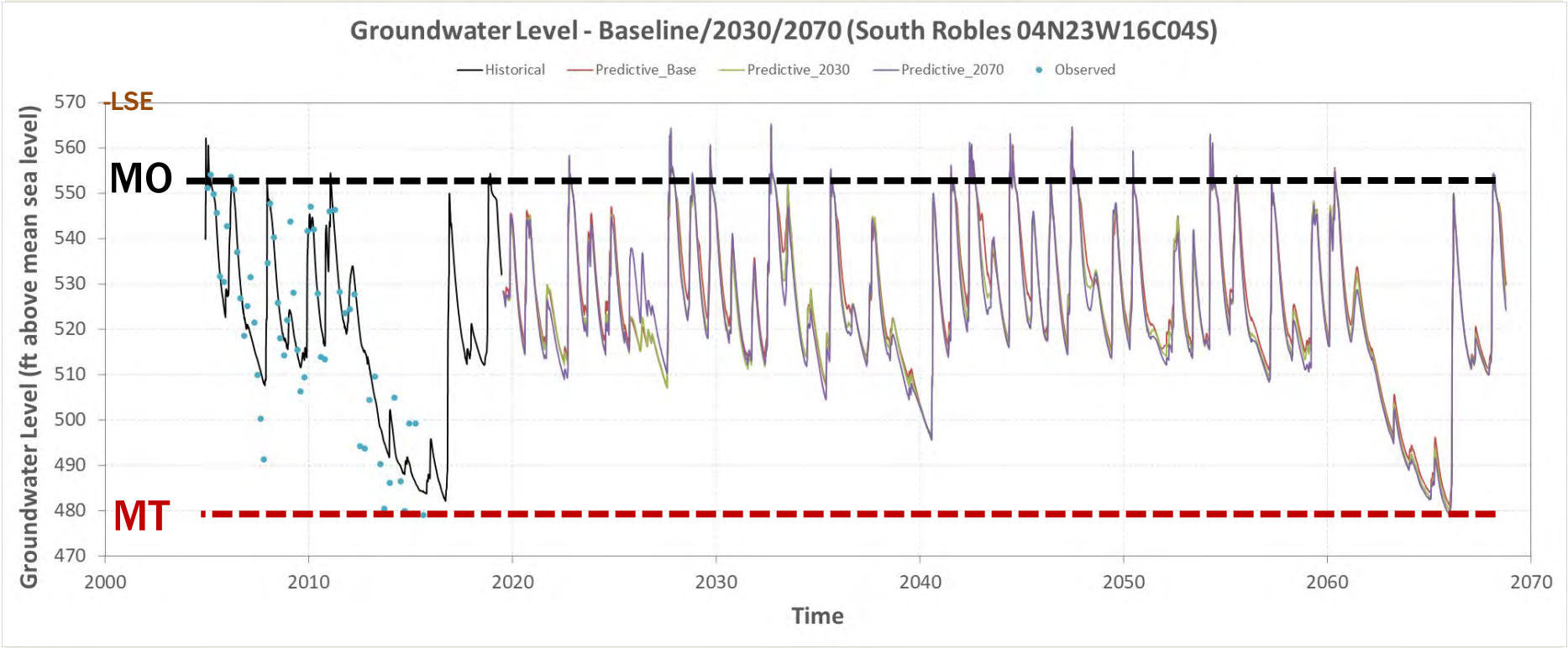
# EXAMPLE SMC: SOUTHERN ROBLES AREA WELL



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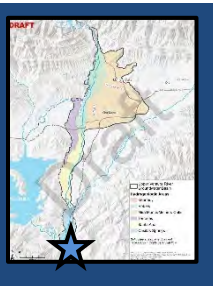
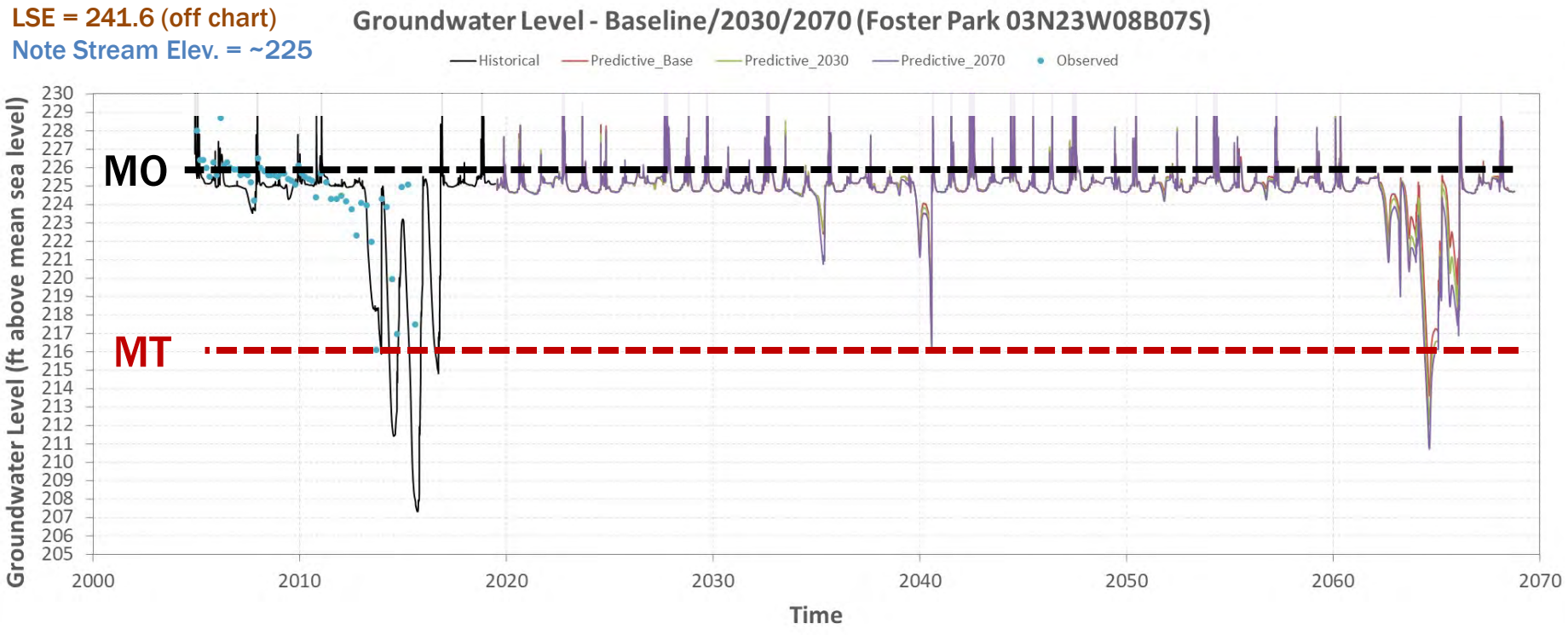
# EXAMPLE SMC: FOSTER PARK WELL



LSE = 241.6 (off chart)

Note Stream Elev. = ~225

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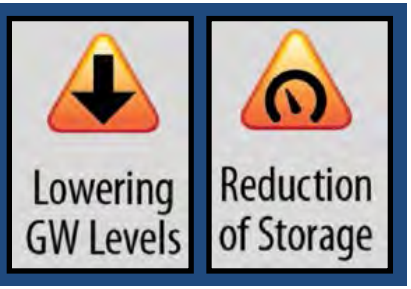
# GROUNDWATER LEVELS & STORAGE SMC



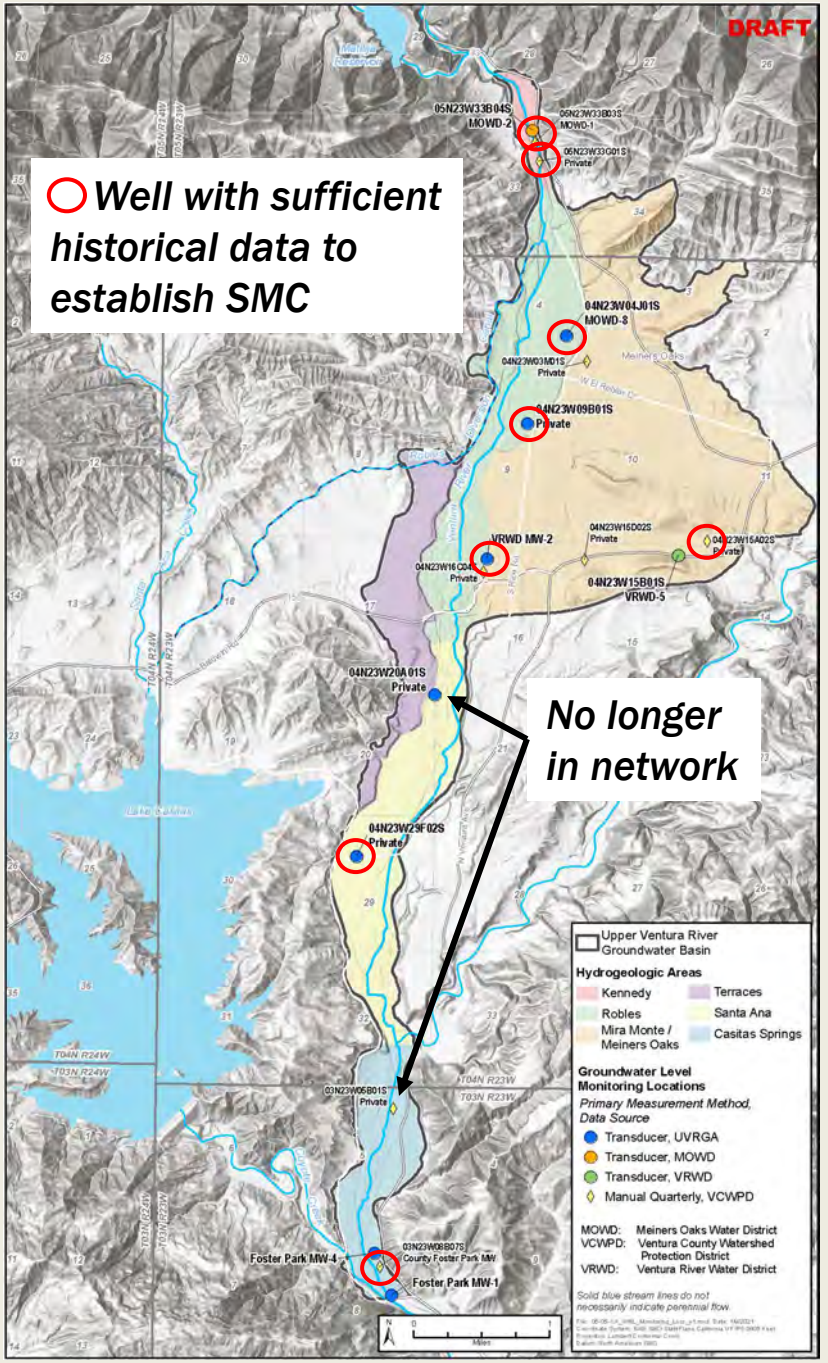

- Undesirable results must be defined quantitatively as:

  *"The combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin."*

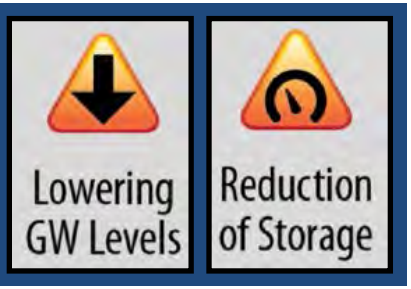
Degraded Quality

# GROUNDWATER LEVEL MONITORING LOCATIONS

- *15 wells*
- *8 wells have sufficient historical data to establish SMC*
- *Gaps in monitoring network to be addressed during GSP implementation*



# GROUNDWATER LEVELS & STORAGE SMC



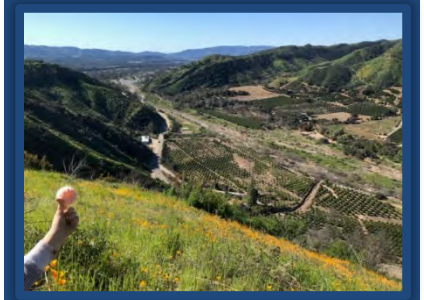

- Undesirable Results:
  - Groundwater levels below MT in the 7 wells outside of the Mira Monte Area

# CHRONIC LOWERING OF GW LEVELS SMC IMPLEMENTATION


- MOs are expected to be met without GSP projects or management actions
- MTs may be exceeded, but infrequently
  - Not required to meet MTs until 2042
- Recommend further analysis and planning after GSP adoption:
  - Additional monitoring and modeling
  - Domestic well survey
  - Revisit SMC in 1st 5-year GSP update
  - If needed, contingency plan to address potential URs

Upper Ventura River
GROUNDWATER AGENCY
SUSTAINABLE MANAGEMENT

# DEPLETION OF INTERCONNECTED SURFACE WATER SMC PROPOSAL

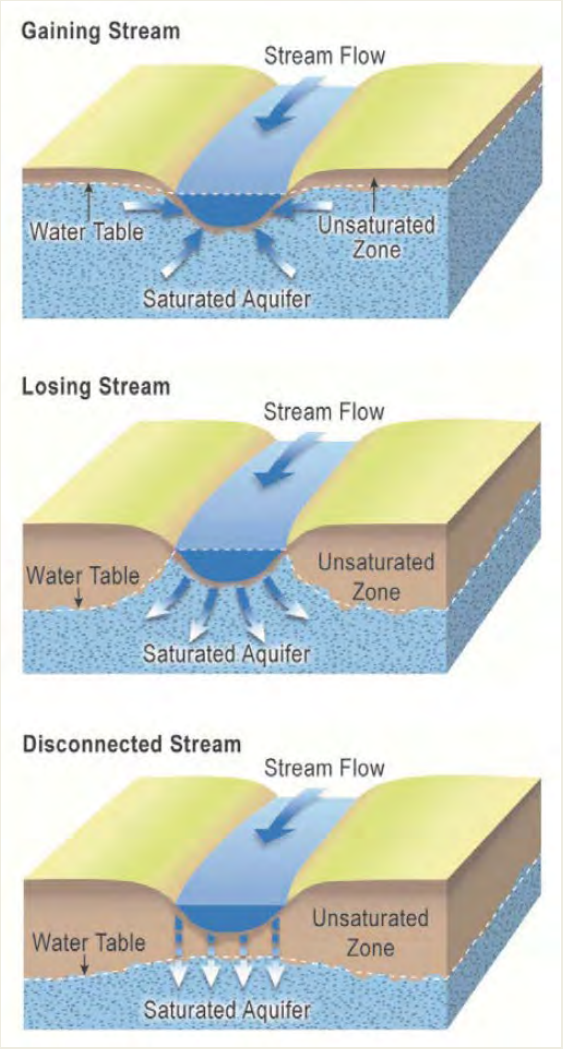



# WHAT IS ISW?

## 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)***

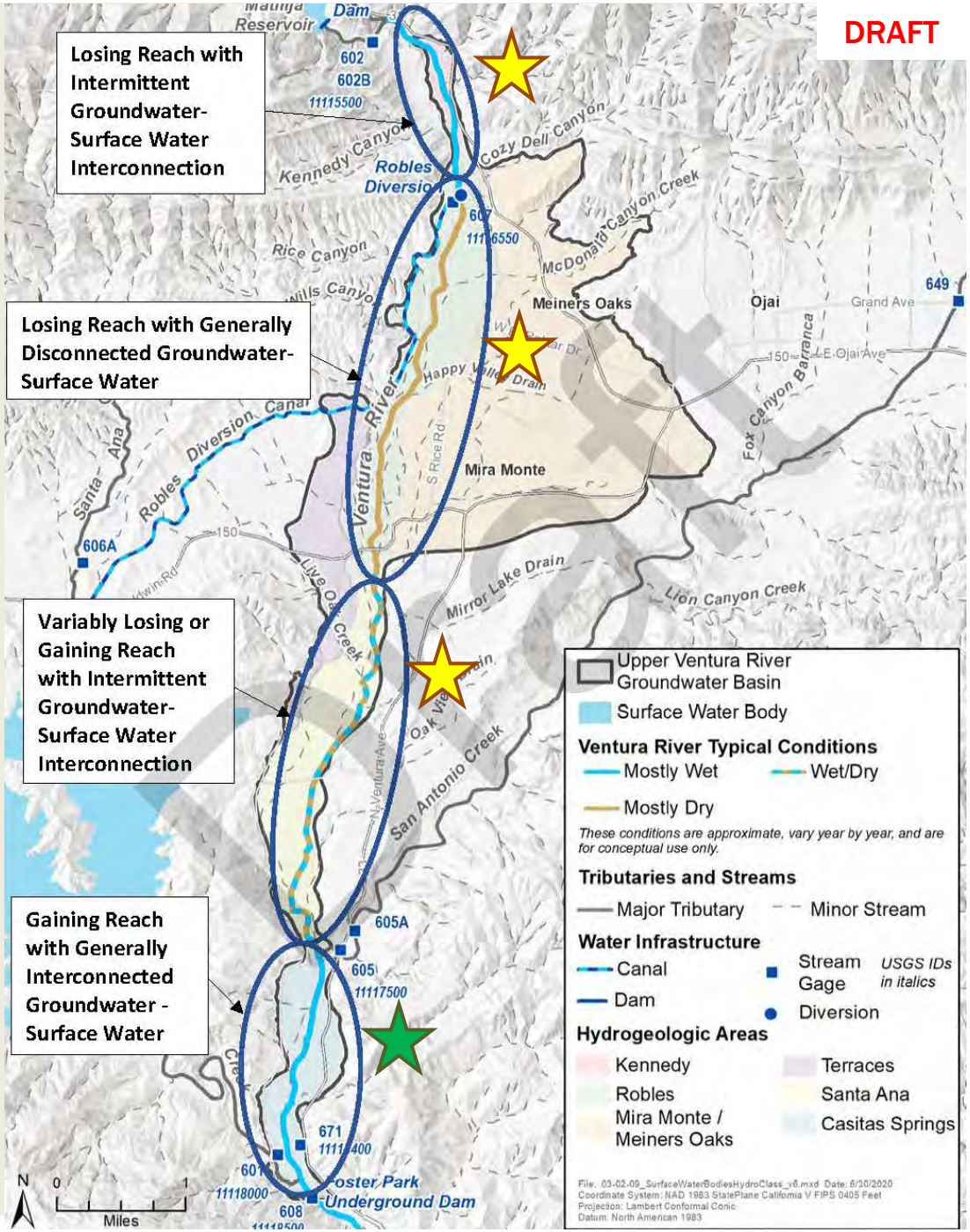


# GROUNDWATER SURFACE WATER INTERACTION

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

★ Consistently interconnected

★ Interconnection is transient and spatially variable



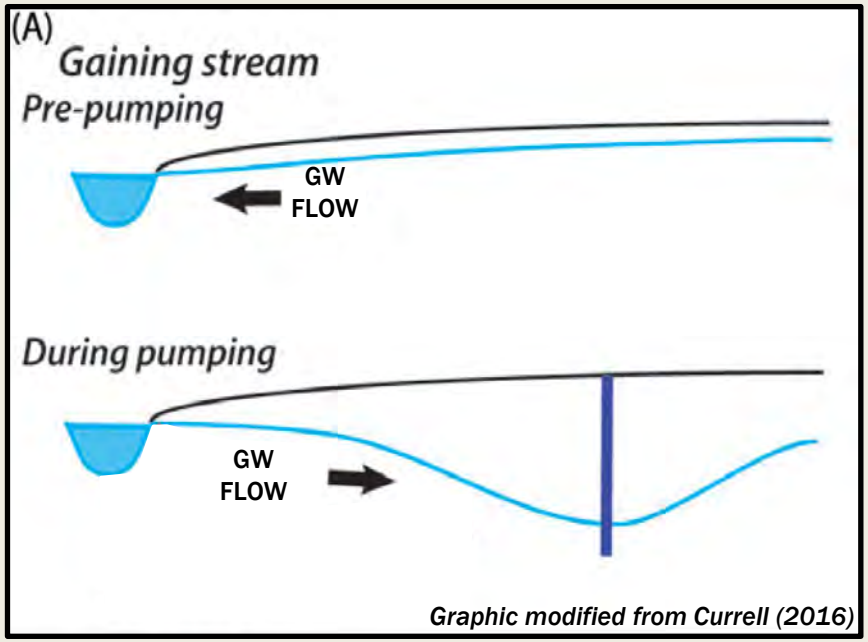
# ISW DEPLETION MECHANISMS

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. Lower the water table causing more streamflow percolation, decreasing streamflow in downstream areas
   b. Capture groundwater flow that would otherwise have discharged to the surface water system in the future.

*GSP must address both types of depletion*

# 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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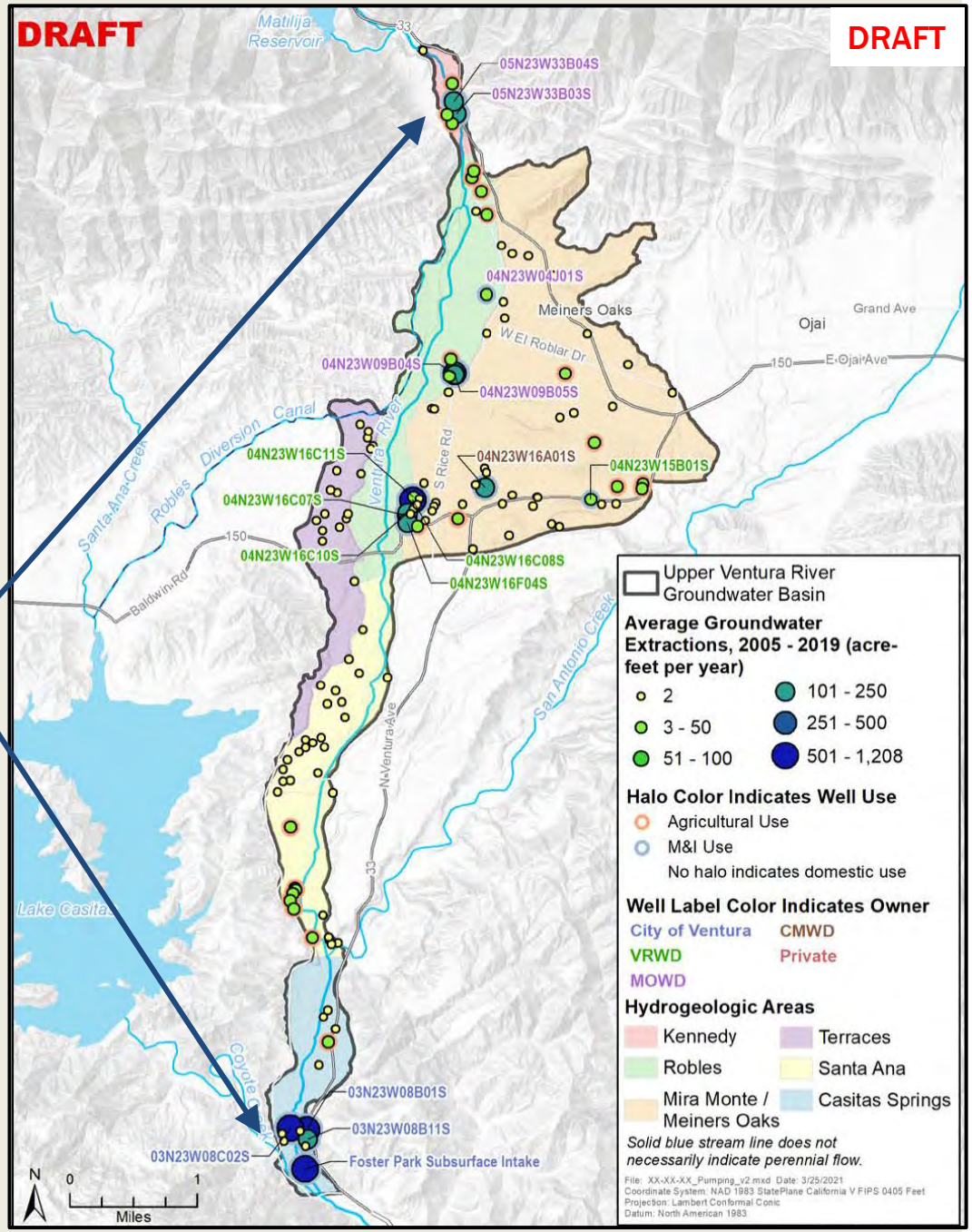
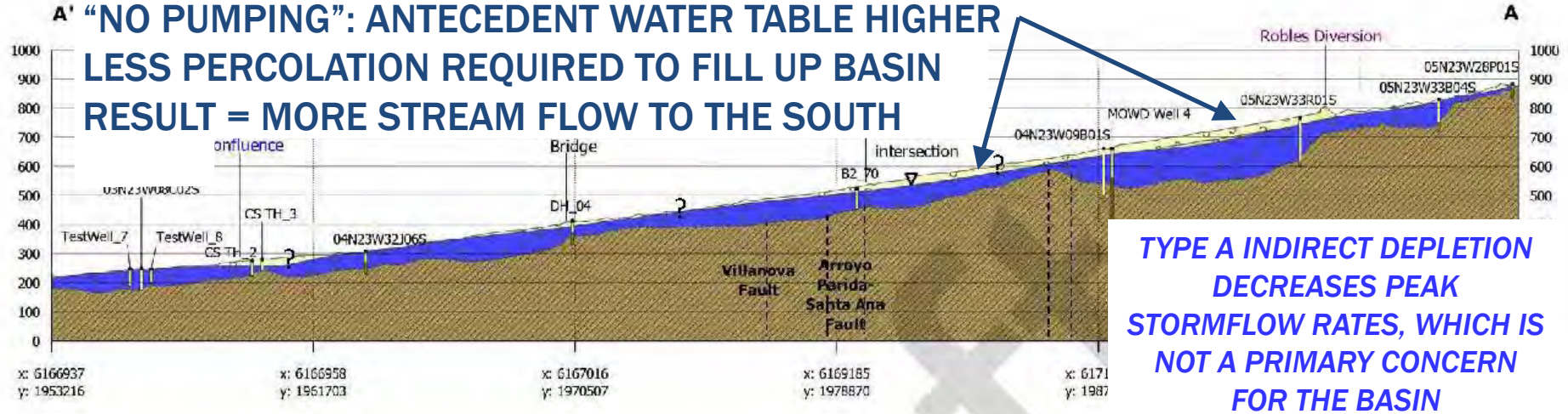
# POTENTIAL AREAS OF DIRECT DEPLETION

- Interconnected with Pumping Proximal to Ventura River
- Elsewhere pumping is either not proximate to Ventura River or the river is not interconnected

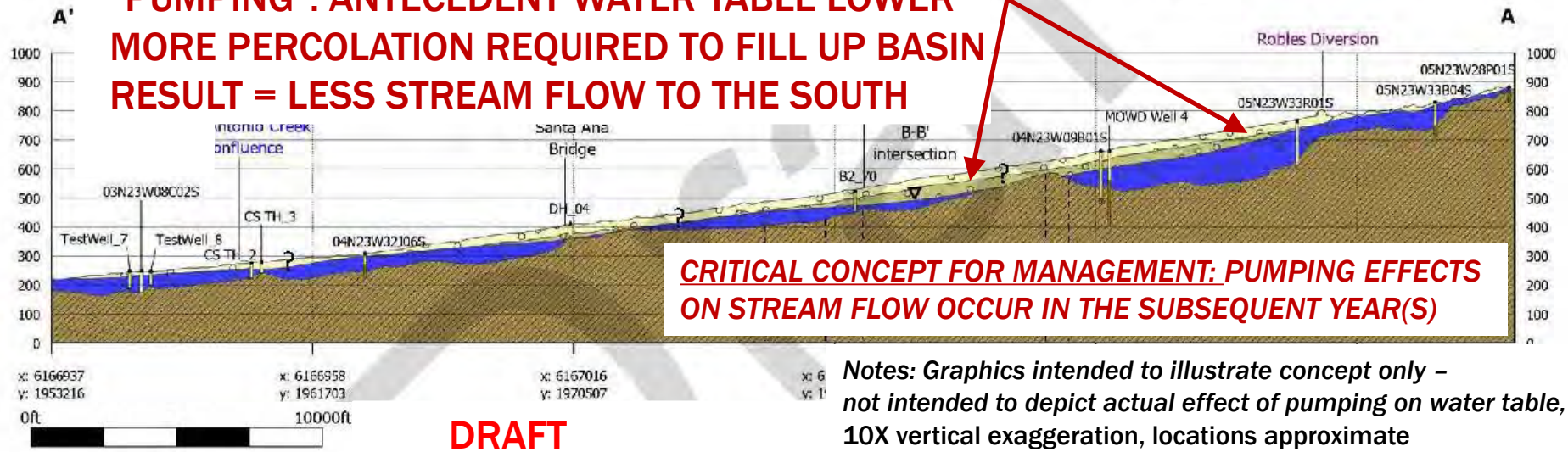


# INDIRECT DEPLETION (A) – PUMPING CREATES AQUIFER STORAGE SPACE THAT INCREASES SURFACE WATER PERCOLATION




**A' "NO PUMPING": ANTECEDENT WATER TABLE HIGHER**
**LESS PERCOLATION REQUIRED TO FILL UP BASIN**
**RESULT = MORE STREAM FLOW TO THE SOUTH**

***TYPE A INDIRECT DEPLETION DECREASES PEAK STORMFLOW RATES, WHICH IS NOT A PRIMARY CONCERN FOR THE BASIN***




**"PUMPING": ANTECEDENT WATER TABLE LOWER**
**MORE PERCOLATION REQUIRED TO FILL UP BASIN**
**RESULT = LESS STREAM FLOW TO THE SOUTH**

***CRITICAL CONCEPT FOR MANAGEMENT: PUMPING EFFECTS ON STREAM FLOW OCCUR IN THE SUBSEQUENT YEAR(S)***

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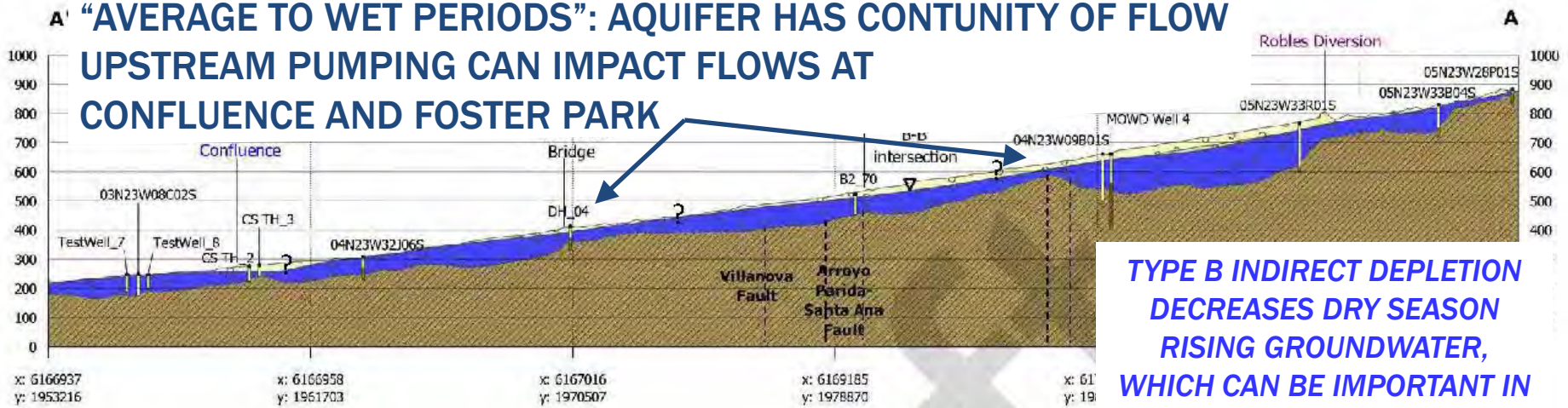
*Notes: Graphics intended to illustrate concept only – not intended to depict actual effect of pumping on water table,* 10X vertical exaggeration, locations approximate

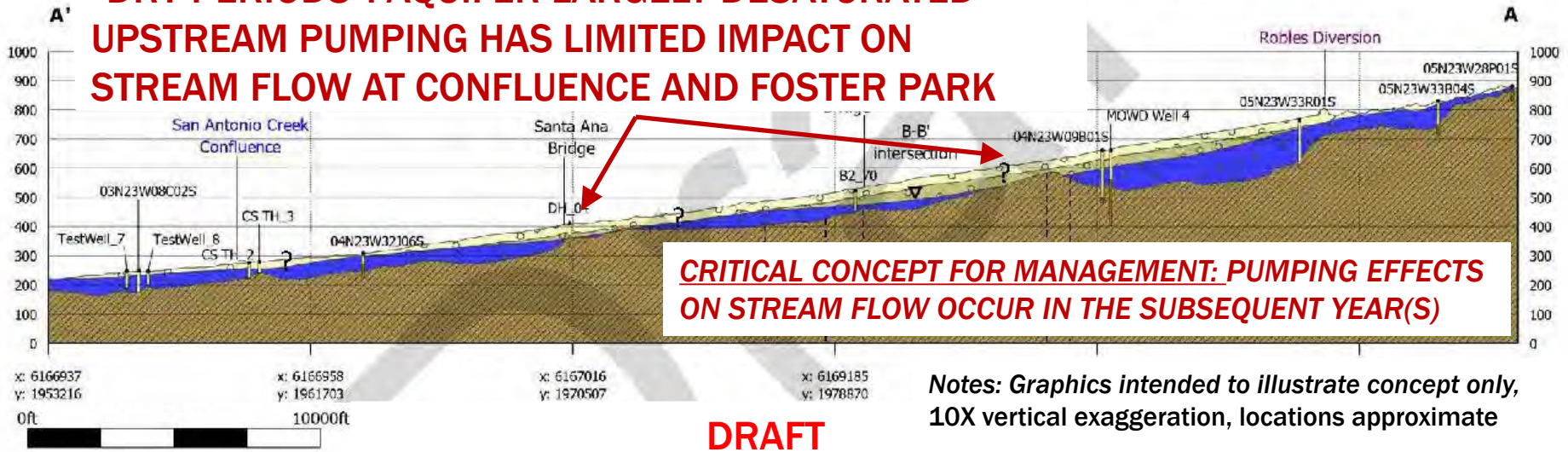
# INDIRECT DEPLETION (B) - PUMPING CAPTURING GW THAT WOULD HAVE FED BECOME SURFACE WATER DOWNSTREAM

## "AVERAGE TO WET PERIODS": AQUIFER HAS CONTUNITY OF FLOW UPSTREAM PUMPING CAN IMPACT FLOWS AT CONFLUENCE AND FOSTER PARK




***TYPE B INDIRECT DEPLETION DECREASES DRY SEASON RISING GROUNDWATER, WHICH CAN BE IMPORTANT IN SOME YEARS***

## "DRY PERIODS": AQUIFER LARGELY DESATURATED UPSTREAM PUMPING HAS LIMITED IMPACT ON STREAM FLOW AT CONFLUENCE AND FOSTER PARK




***CRITICAL CONCEPT FOR MANAGEMENT: PUMPING EFFECTS ON STREAM FLOW OCCUR IN THE SUBSEQUENT YEAR(S)***

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

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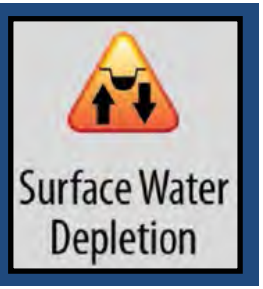
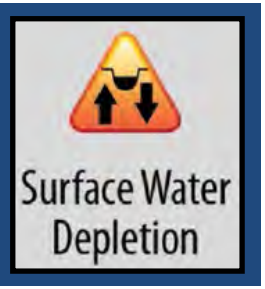
# ISW DEPLETION SMC



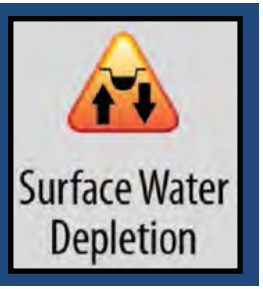

- GSA must address pumping–related significant and unreasonable impacts (depletion) on beneficial uses:
  - Recreation
  - Surface water diversions
  - Aquatic GDEs

# 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

# 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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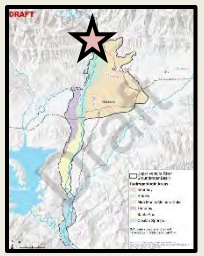
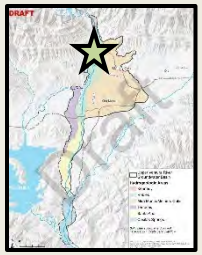
# ISW DEPLETION EFFECTS ON DIVERSIONS

Surface Water Depletion

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



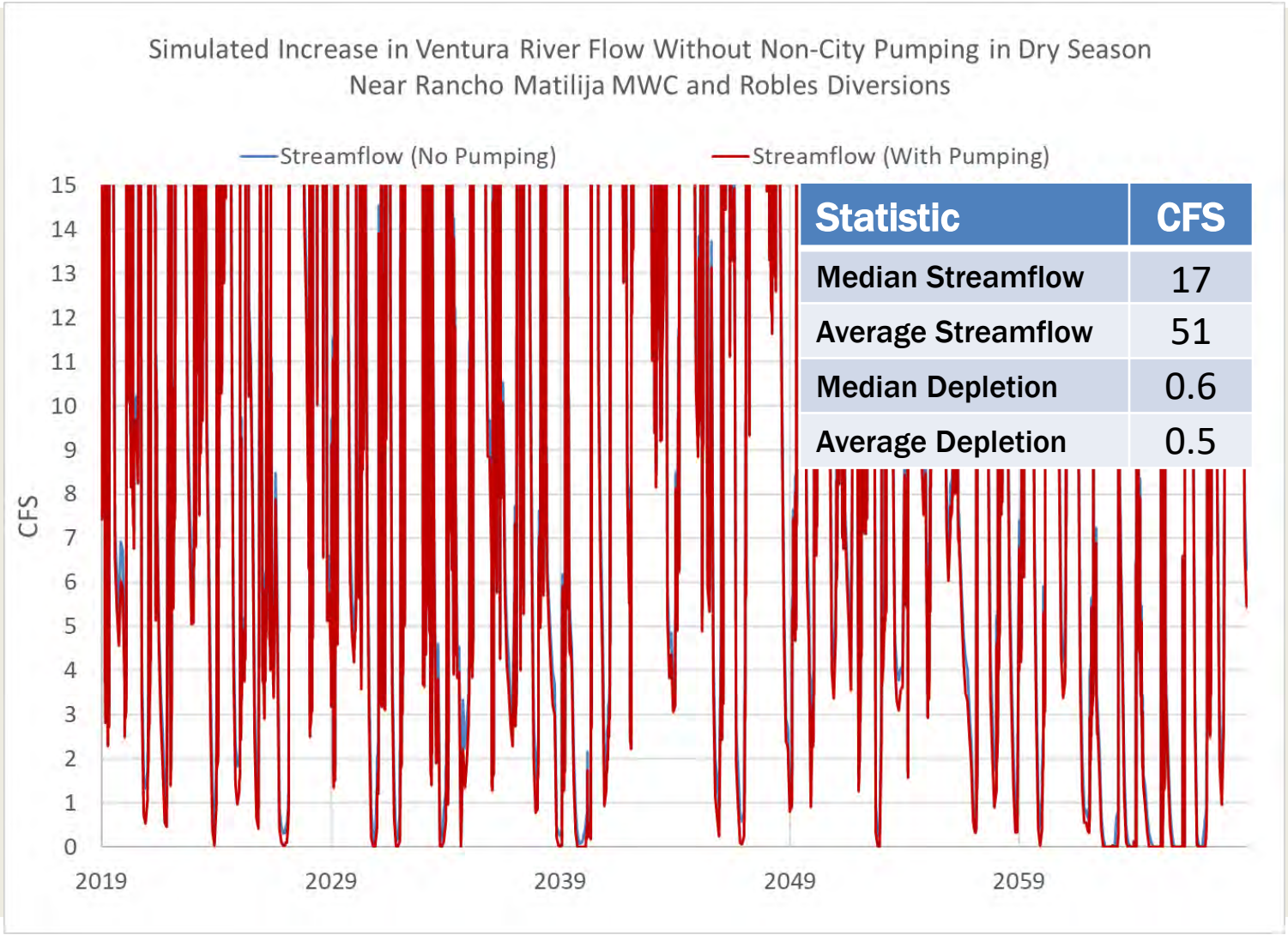
  - Robles Diversion (Robles Area)



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

# ISW DEPLETION EFFECTS ON DIVERSIONS

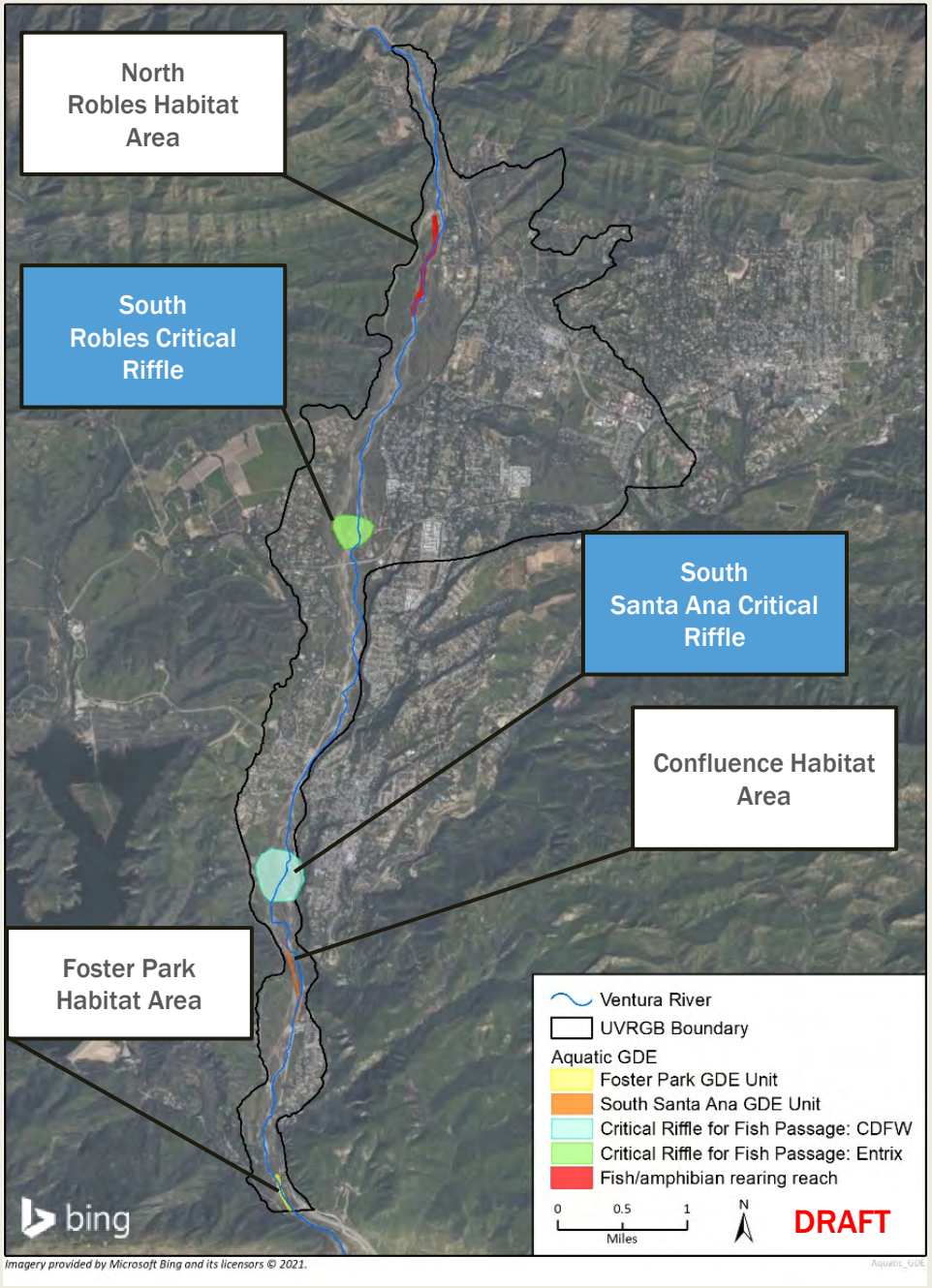
Surface Water Depletion



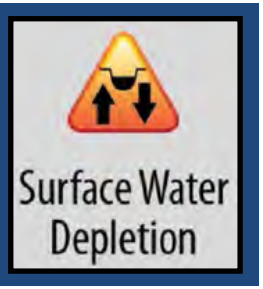

| Statistic | CFS |
|---|---|
| Median Streamflow | 17 |
| Average Streamflow | 51 |
| Median Depletion | 0.6 |
| Average Depletion | 0.5 |

# IMPORTANT AQUATIC GDE AREAS

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



# STREAMFLOW DEPLETION SUMMARY TABLES




| *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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# STREAMFLOW DEPLETION
# SOUTH ROBLES CRITICAL RIFFLE

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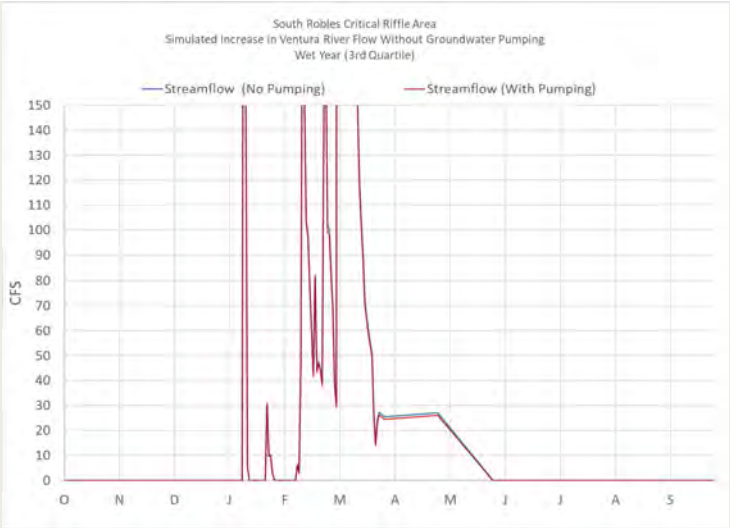
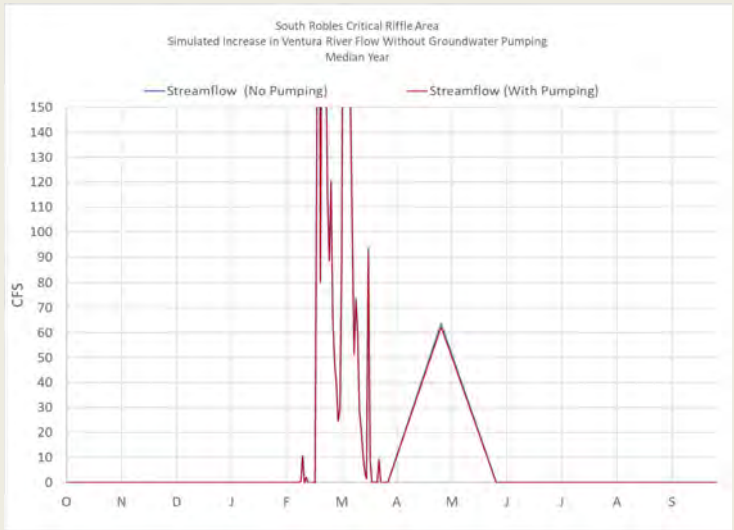
## Streamflow Depletion Example Water Years

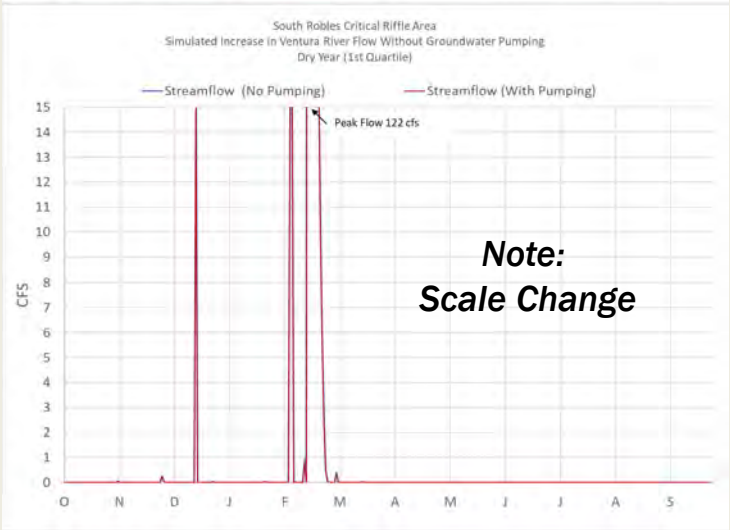
Wet

Median

Dry




***Note:***
***Scale Change***

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

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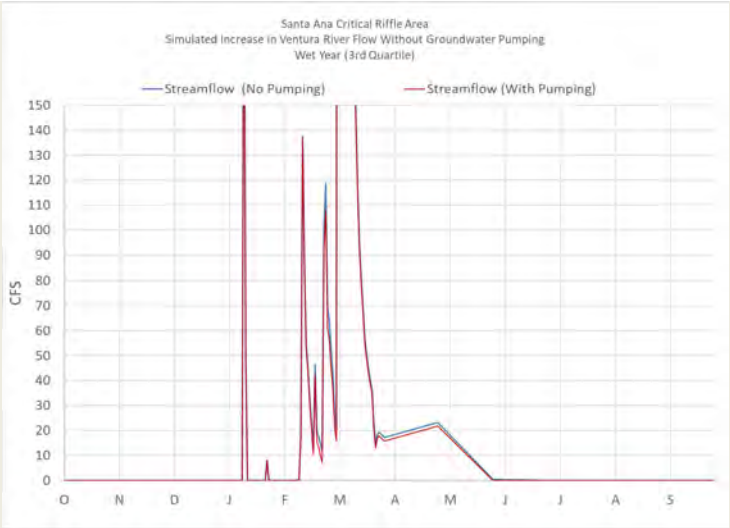
# STREAMFLOW DEPLETION
# SANTA ANA CRITICAL RIFFLE

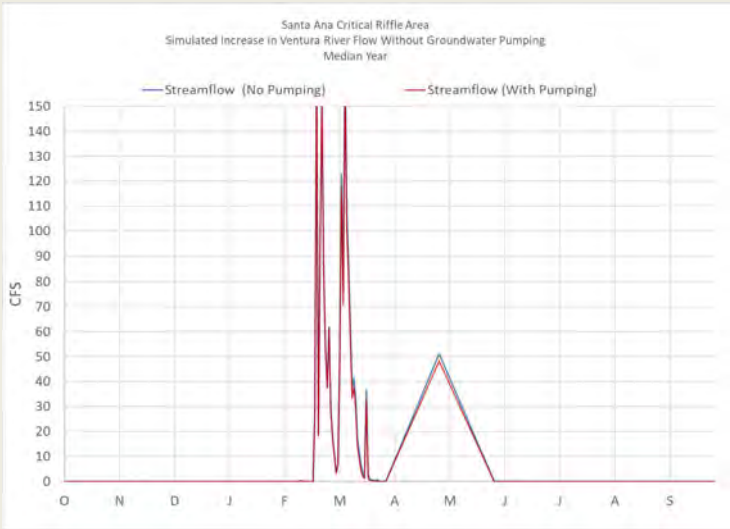

## Streamflow Depletion Example Water Years

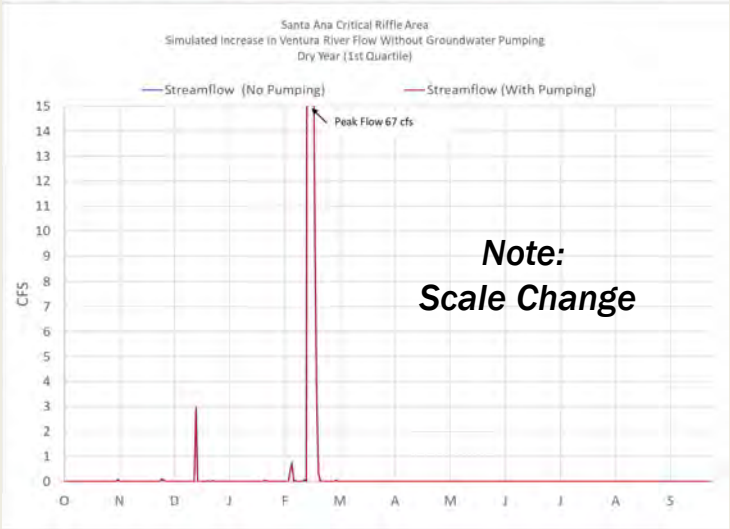
Wet →

Median

Dry →




***Note:***
***Scale Change***

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

# STREAMFLOW DEPLETION
# NORTH ROBLES HABITAT AREA

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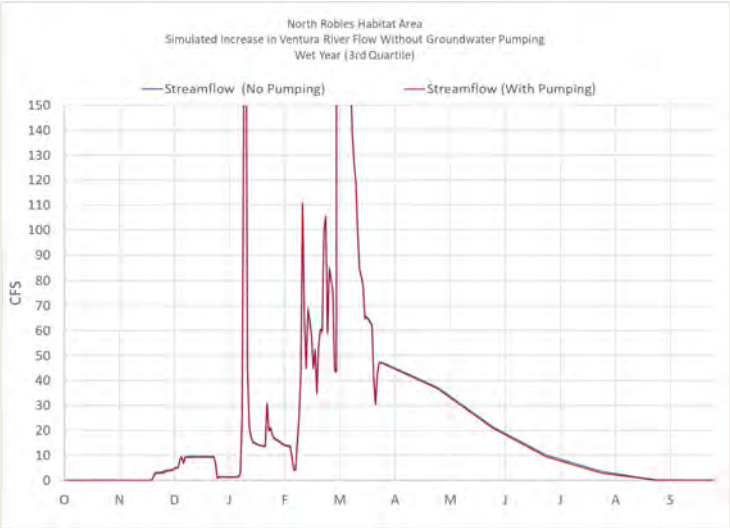
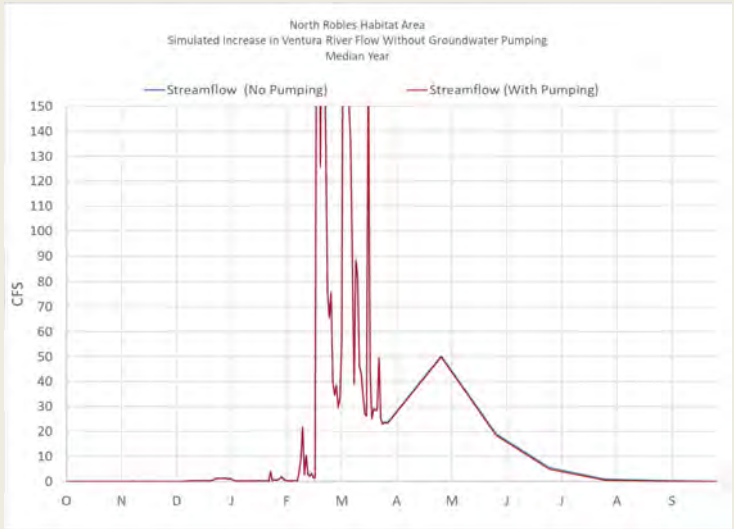
## Streamflow Depletion Example Water Years

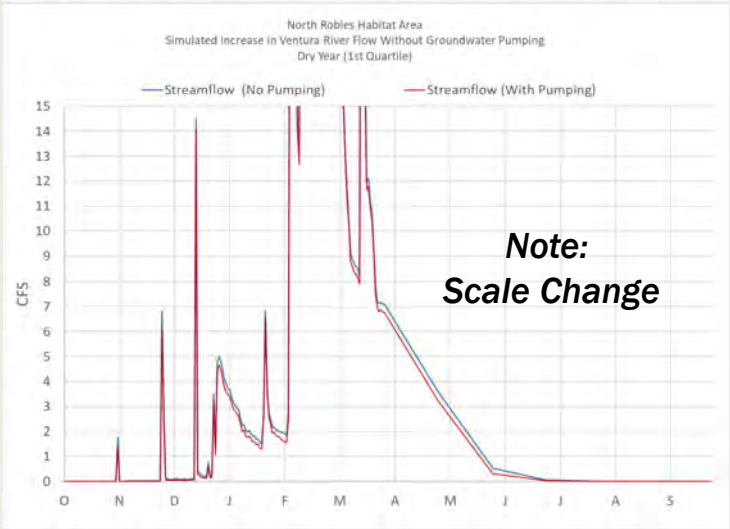
Wet

Median

Dry




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

# STREAMFLOW DEPLETION CONFLUENCE HABITAT AREA

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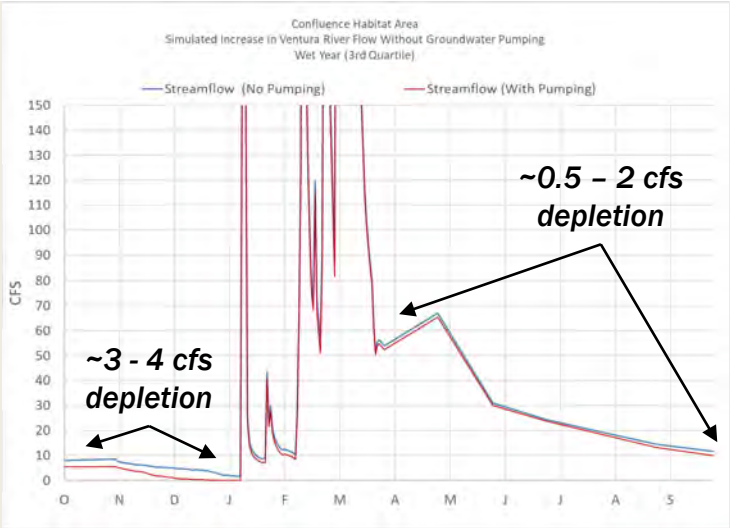
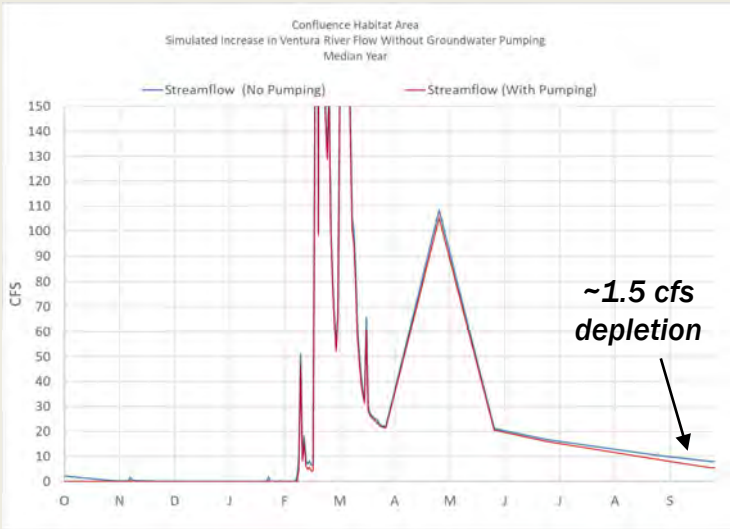
## Streamflow Depletion Example Water Years

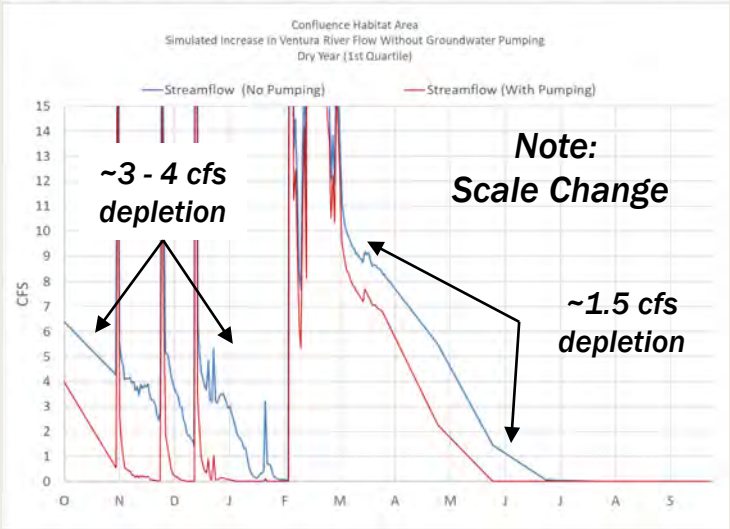
Wet

Median

Dry




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

# STREAMFLOW DEPLETION
# FOSTER PARK HABITAT AREA

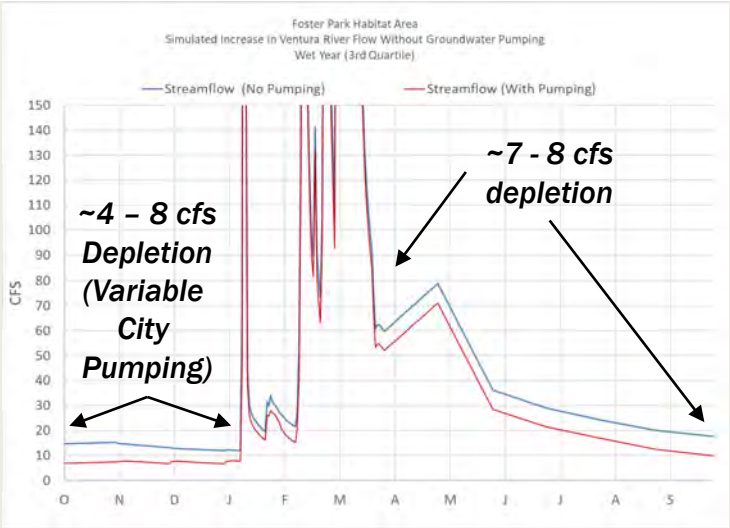
DRAFT

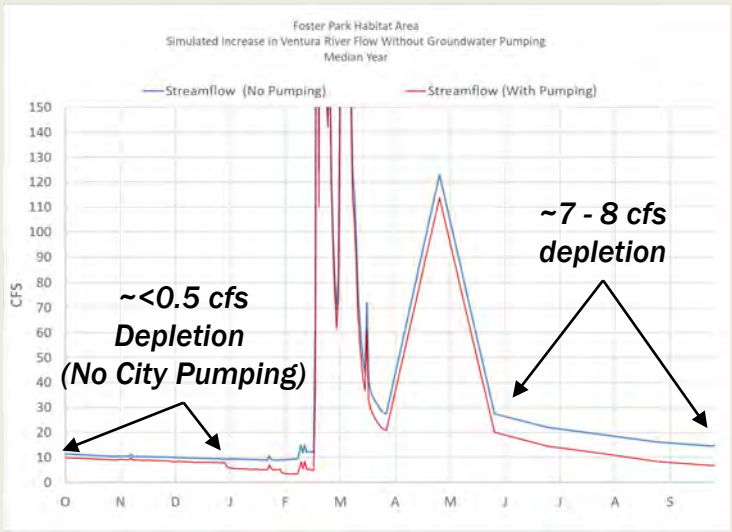

## Streamflow Depletion Example Water Years

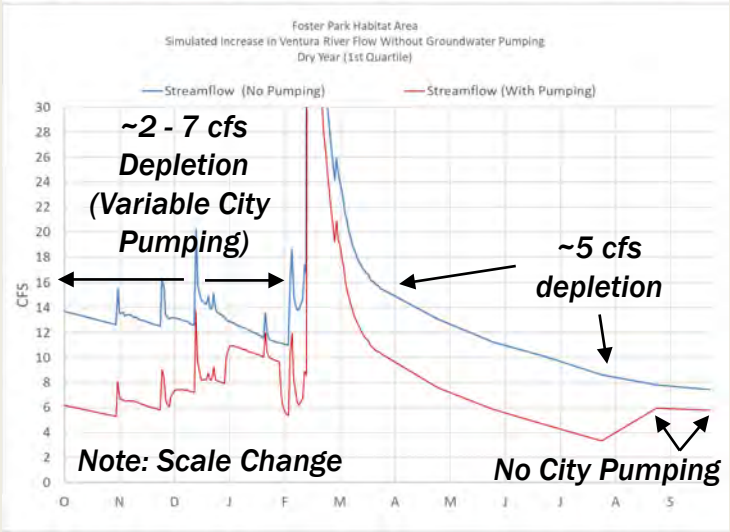
Wet

Median

Dry




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

# Impacts to Aquatic GDEs: Effects of Interconnected Surface Water Depletion

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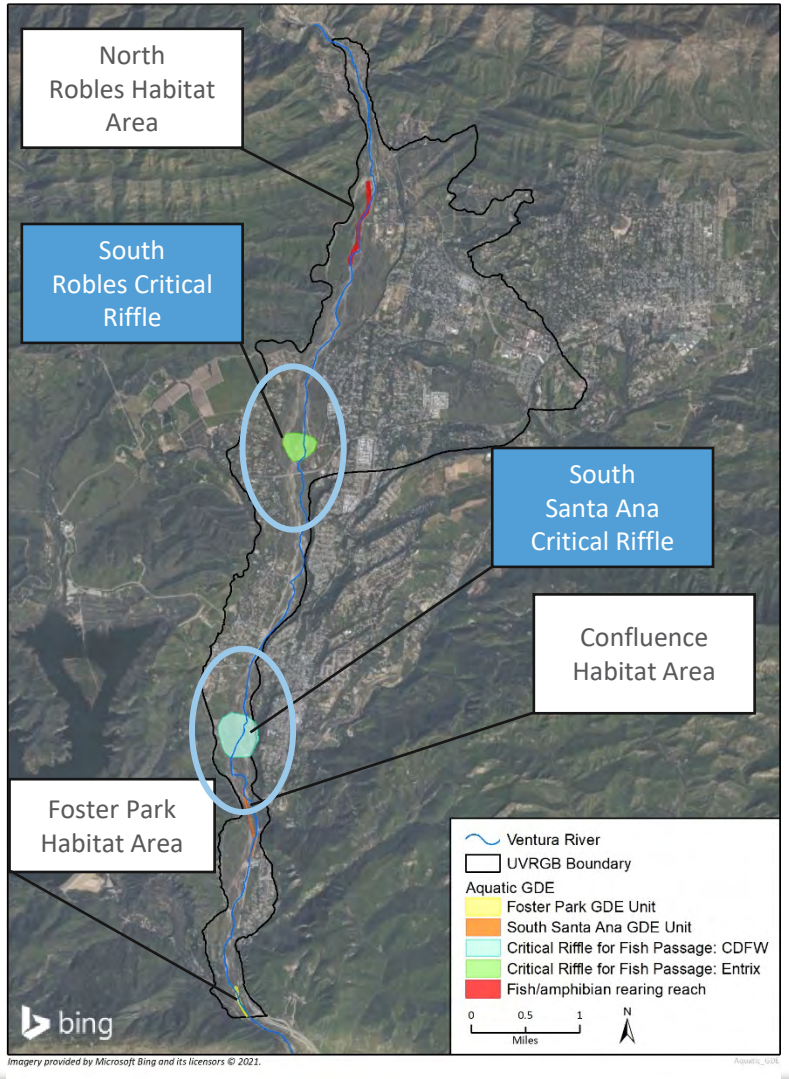
# Effects of ISW Depletion on Aquatic GDEs

- Streamflow was modeled for each Aquatic GDE for wet, median, and dry years.
  - Streamflow without pumping
  - Streamflow with pumping

- Depletion = difference between modeled streamflow

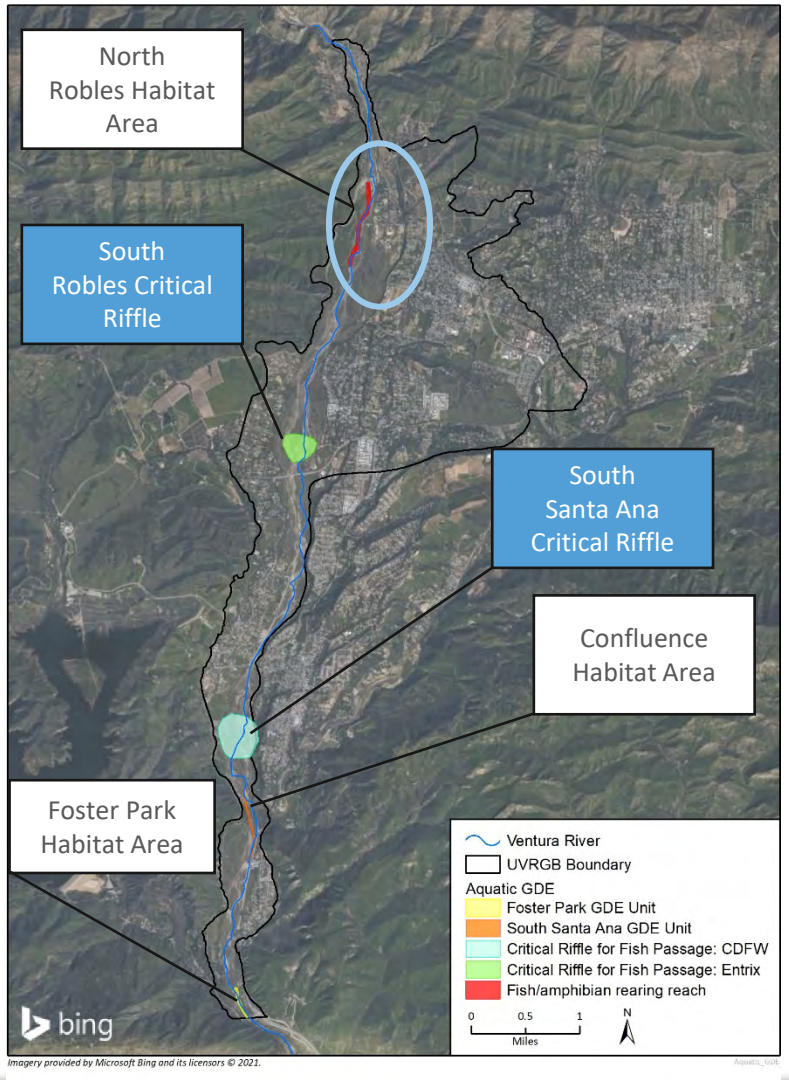
# Effects on Aquatic GDEs: Critical Riffles

- South Robles & South Santa Ana Critical Riffle
  - Limited effect
  - Migration occurs during and following peak flows



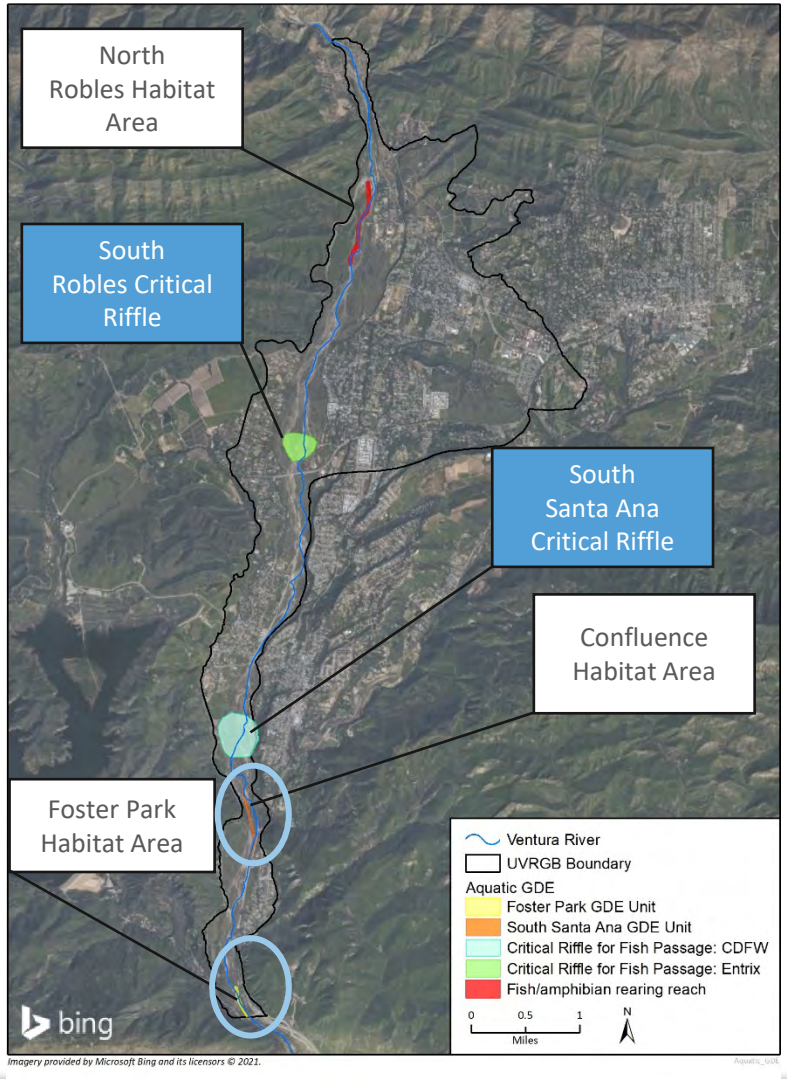
# Effects on Aquatic GDEs: North Robles Habitat Area

- North Robles Habitat Area
  - Limited effect
  - Minimal impact from pumping



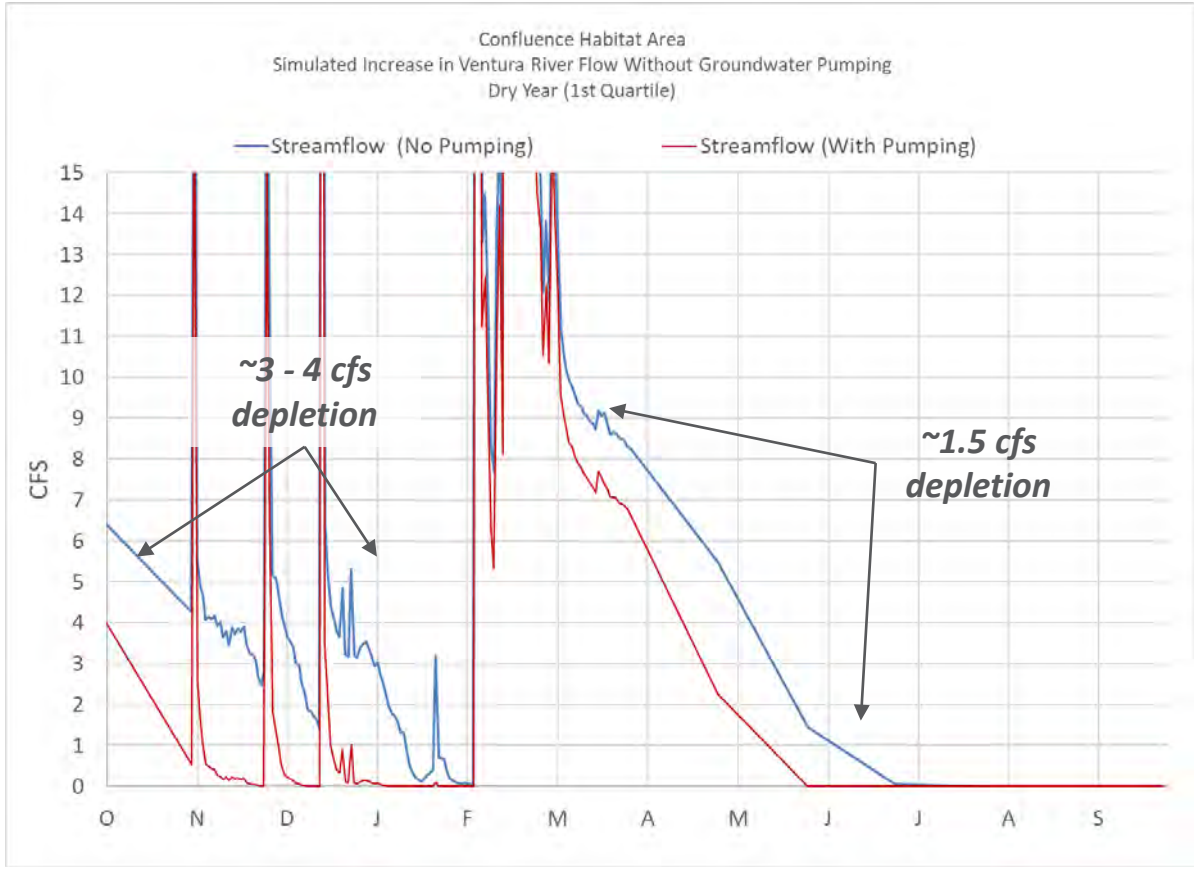
# Effects on Aquatic GDEs: Confluence and Foster Park

- Confluence Habitat Area
- Foster Park Habitat Area



# Effects on Aquatic GDEs: Confluence Habitat Area

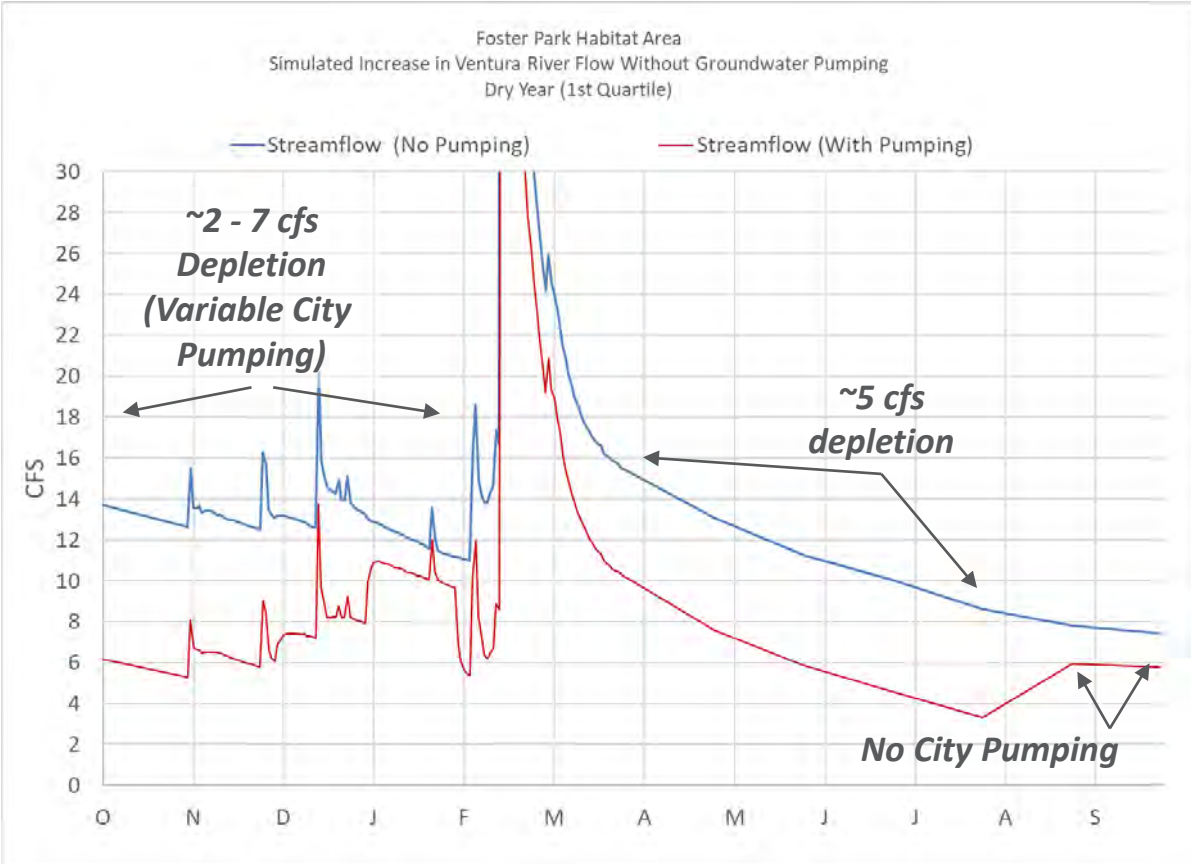
- Confluence Habitat Area
  - Effects from pumping are potentially significant during dry periods.
  - Effects to Aquatic GDEs are a data gap.
  - Future monitoring recommended to address data gap and determine if significant and unreasonable effects are occurring to the Aquatic GDEs.




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

# Effects of ISW Depletion on Aquatic GDEs

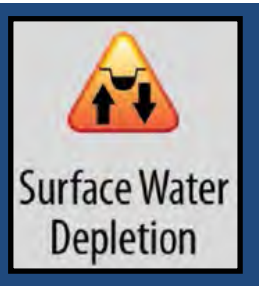
- Foster Park Habitat Area
  - Pumping can cause significant and unreasonable effects during dry periods.
  - City of Ventura has studied effects on Aquatic GDEs and believed to be best available information for this area.
  - City's minimum pumping thresholds are appropriate for MT
  - City monitoring, UVRGA to review results and incorporate into 5-year GSP revision



# Monitoring and Management Considerations

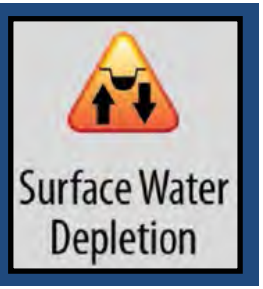
- Monitor:
  - Surface flow, depletion rates, and groundwater levels
    - Locations: Foster Park and Confluence Aquatic Habitat Area GDEs
  - Aerial imagery of surface flow extents
    - Locations: Foster Park and Confluence Aquatic Habitat Area GDEs
  - Impacts on aquatic species during low flow conditions
    - Location: Confluence Aquatic Habitat Area GDE
- Track studies and monitoring by others in the UVRGB

# ISW DEPLETION SMC AREAS SCREENED OUT



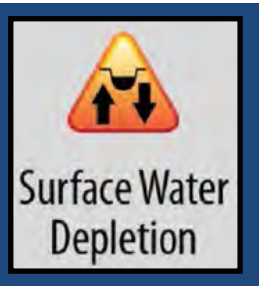

- Passage Areas and Robles Habitat Area:
  - No significant and unreasonable effects
  - No further consideration for SMC development

# CONFLUENCE HABITAT AREA PROPOSED ISW SMC




- Unclear whether depletion causes significant and unreasonable effects
  - Data Gap: impact on fish during low flow conditions
- Study to determine effects on fish at low flow conditions
- Add MT/MO for Confluence Habitat Area during 1st or 2nd GSP update if significant and unreasonable effects determined to be likely

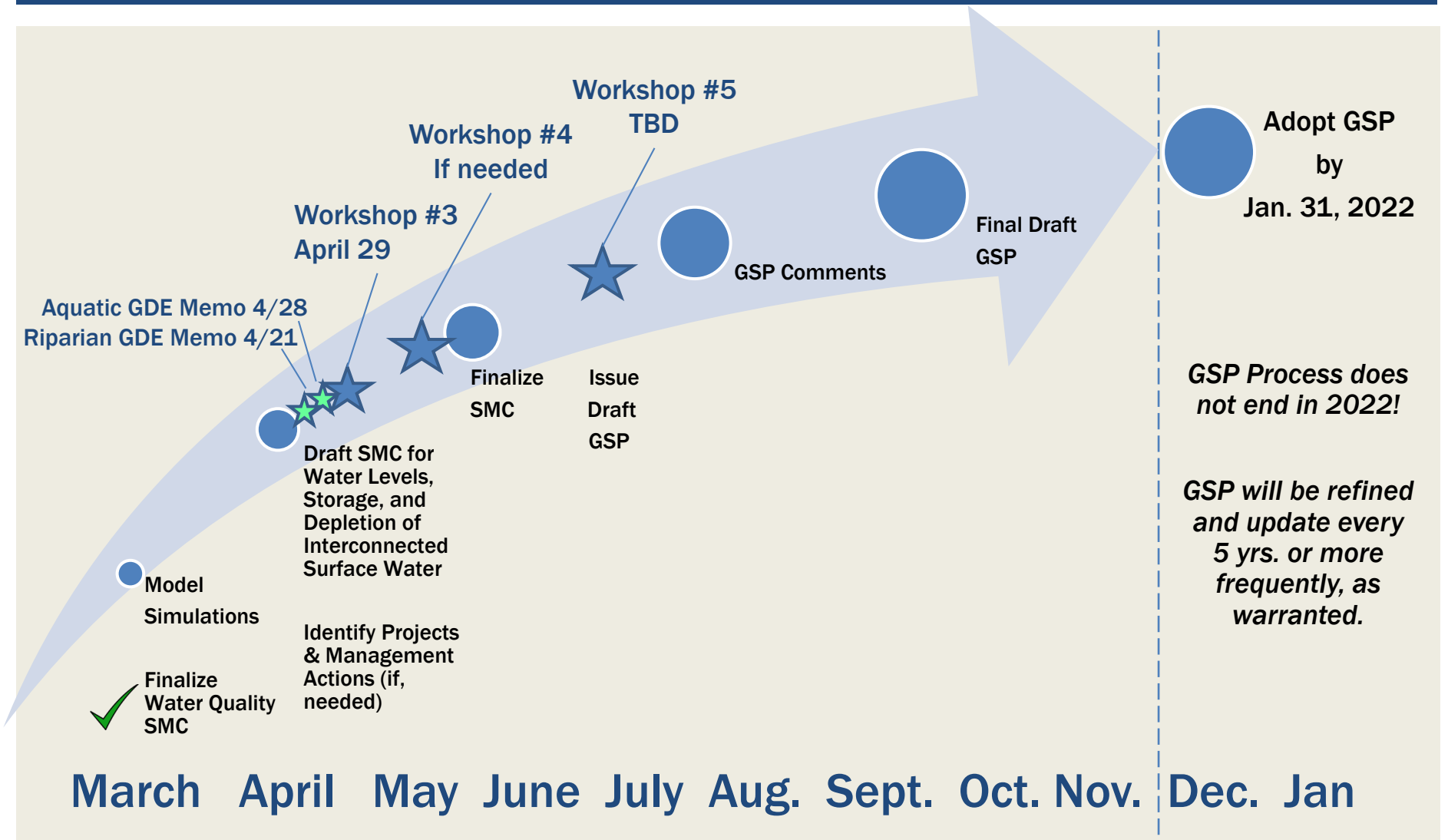
# FOSTER PARK HABITAT AREA PROPOSED ISW SMC




- SGMA significant and unreasonable effects when depletion causes streamflow to decline below 2 cfs at USGS gage (Hopkins, 2013)
- Minimum Threshold (MT) and Measurable Objectives (MO) based on not depleting below 2 cfs
- City to voluntarily implement Foster Park protocols and monitor
- Additional monitoring and modeling to better quantify depletion by upstream pumping
- Update MT/MO during 1st or 2nd GSP update based on monitoring results

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

# SCHEDULE


Workshop #5
TBD
Workshop #4
If needed
Workshop #3
April 29
Aquatic GDE Memo 4/28
Riparian GDE Memo 4/21
Finalize
SMC
Issue
Draft
GSP
GSP Comments
Final Draft
GSP
Adopt GSP
by
Jan. 31, 2022
GSP Process does not end in 2022!
GSP will be refined and update every 5 yrs. or more frequently, as warranted.
Draft SMC for Water Levels, Storage, and Depletion of Interconnected Surface Water
Model
Simulations
Identify Projects & Management Actions (if, needed)
Finalize Water Quality SMC
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Jan

# QUESTIONS

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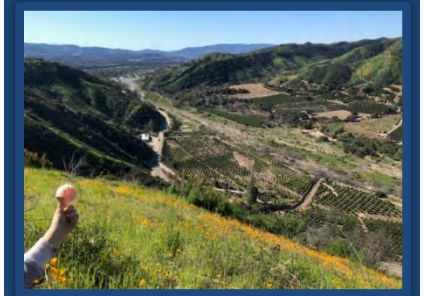
# STAKEHOLDER Q&A & FEEDBACK



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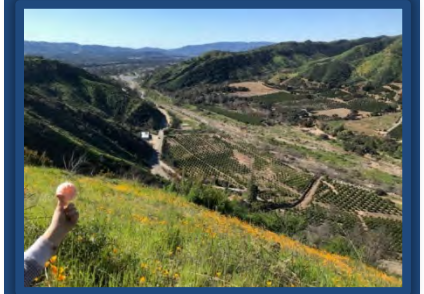
# ATTENDEE POLL NOS. 4 - 7



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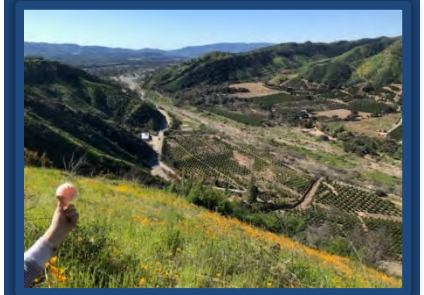
# UVRGA DIRECTOR COMMENTS



# PLEASE STAY ENGAGED!!!

- 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

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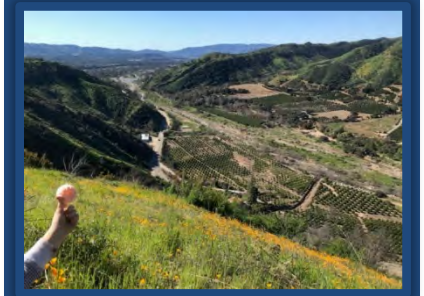
# WRAP UP
# THANK YOU FOR PARTICIPATING!



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# EXTRA SLIDES