

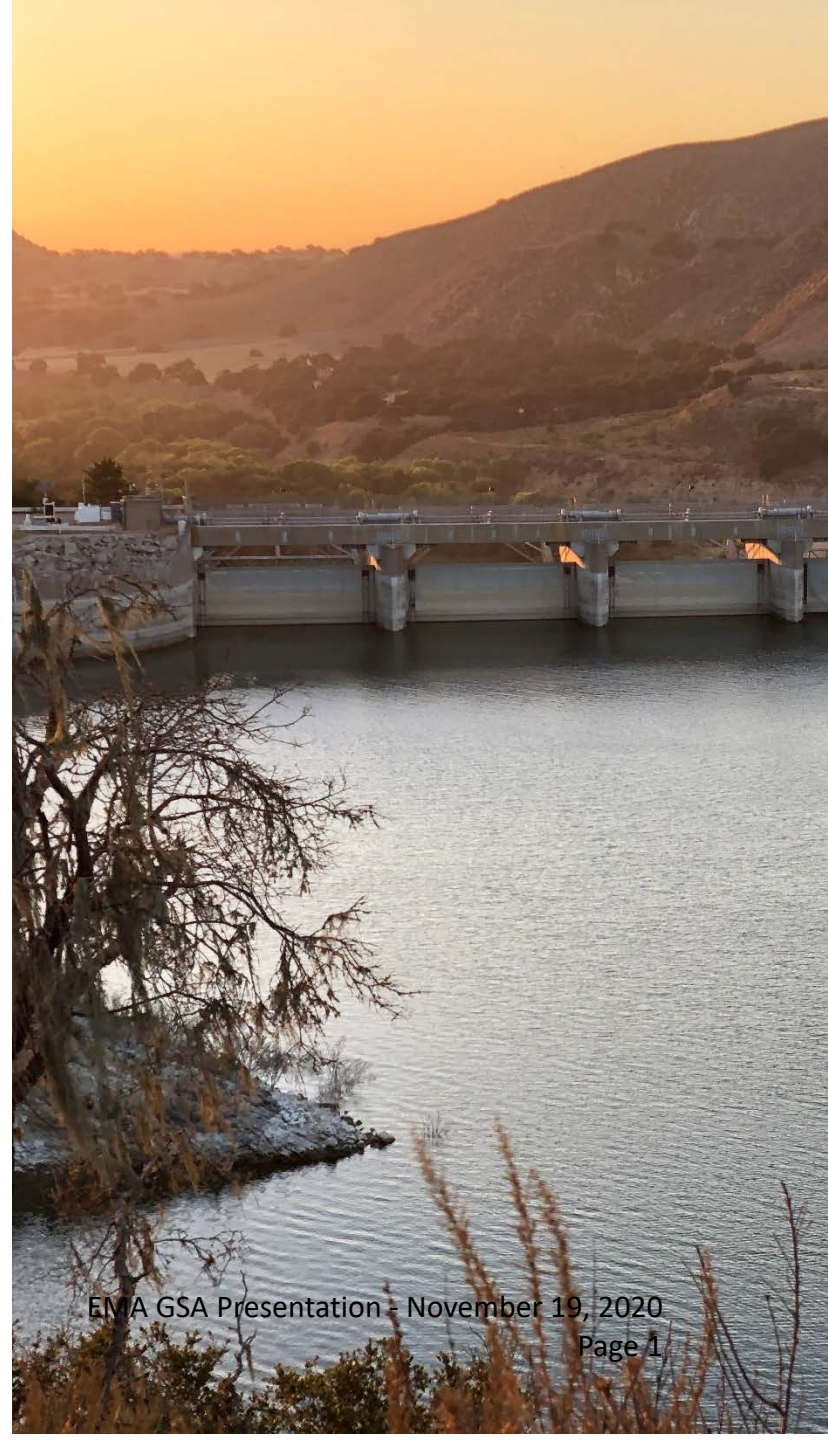


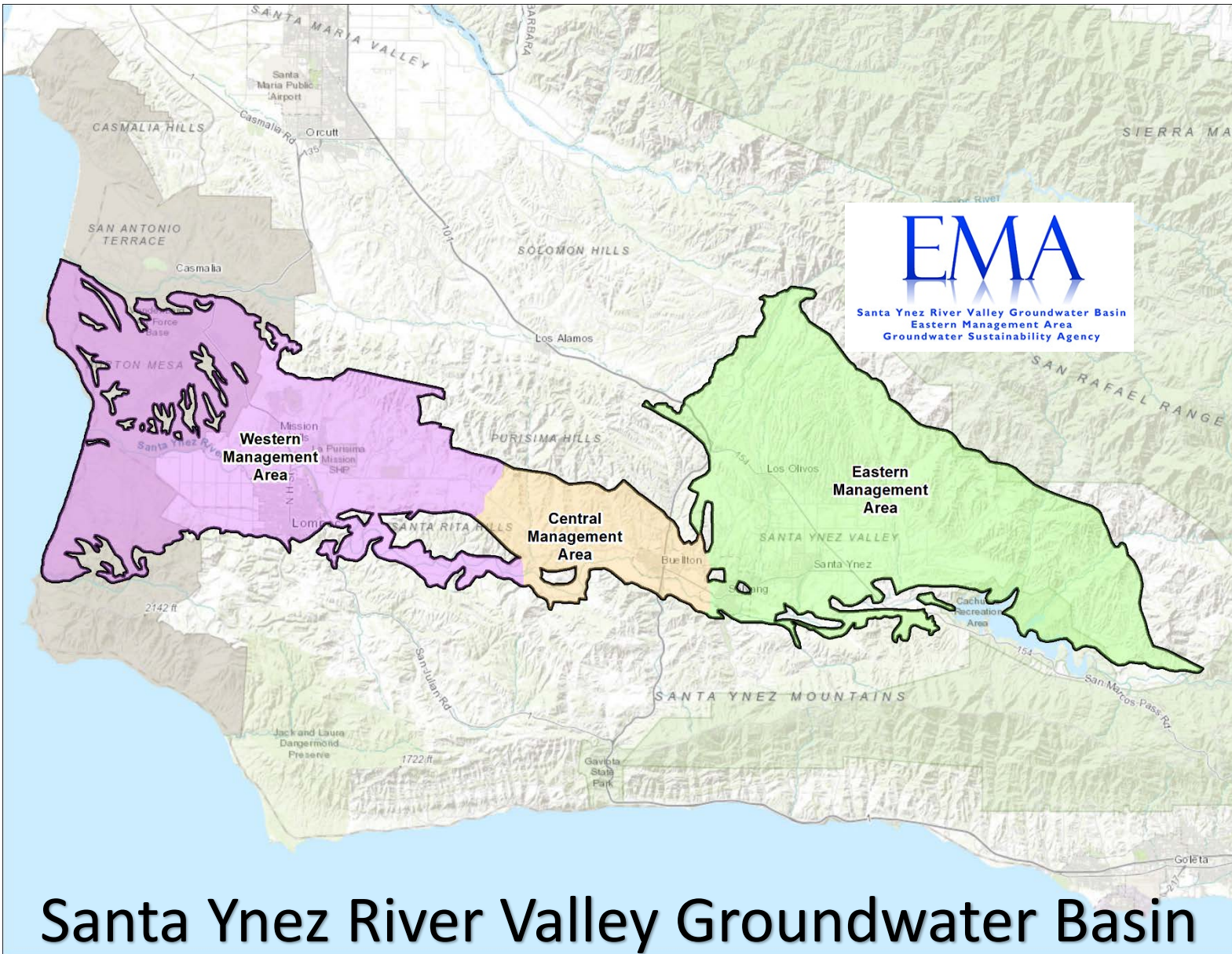
Santa Ynez River Valley Groundwater Basin  
Eastern Management Area  
Groundwater Sustainability Agency

# Groundwater Sustainability Plan

## Basin Setting and Sustainable Management Criteria (Part 1)

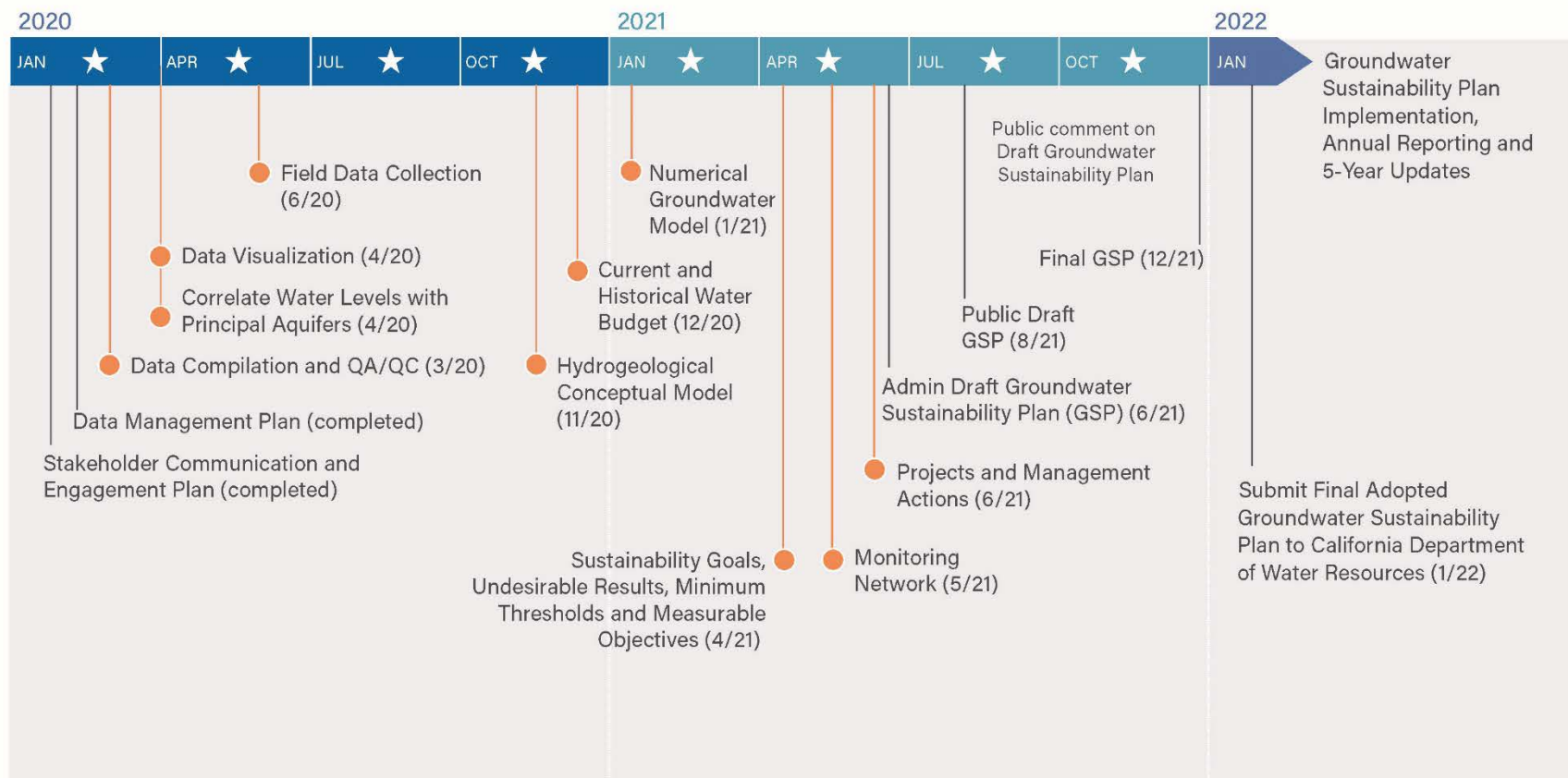
November 19, 2020





# Santa Ynez River Valley Groundwater Basin

# GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT MILESTONES



★ Groundwater Sustainability Agency Committee Public Meeting

● Technical Memorandum

# Sustainability Plan Pyramid



# **Basin Setting**

## **Hydrogeologic Conceptual Model**

## **Groundwater Conditions**

## **Sustainable Management Criteria**

# Current Work

- Hydrogeologic Conceptual Model and Groundwater Conditions Section of GSP
- Field Data Collection
  - SkyTEM
- Water Budgets
- Groundwater Flow Model
- Sustainable Management Criteria

# Basin Setting

DRAFT | Santa Ynez River Valley Groundwater Basin – Eastern Management Area Groundwater Sustainability Plan

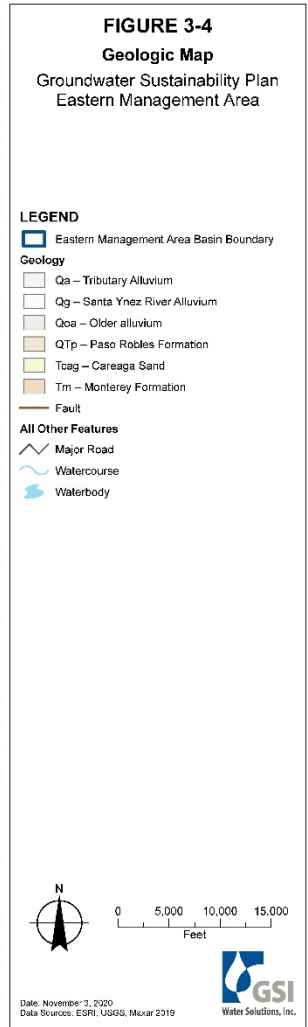
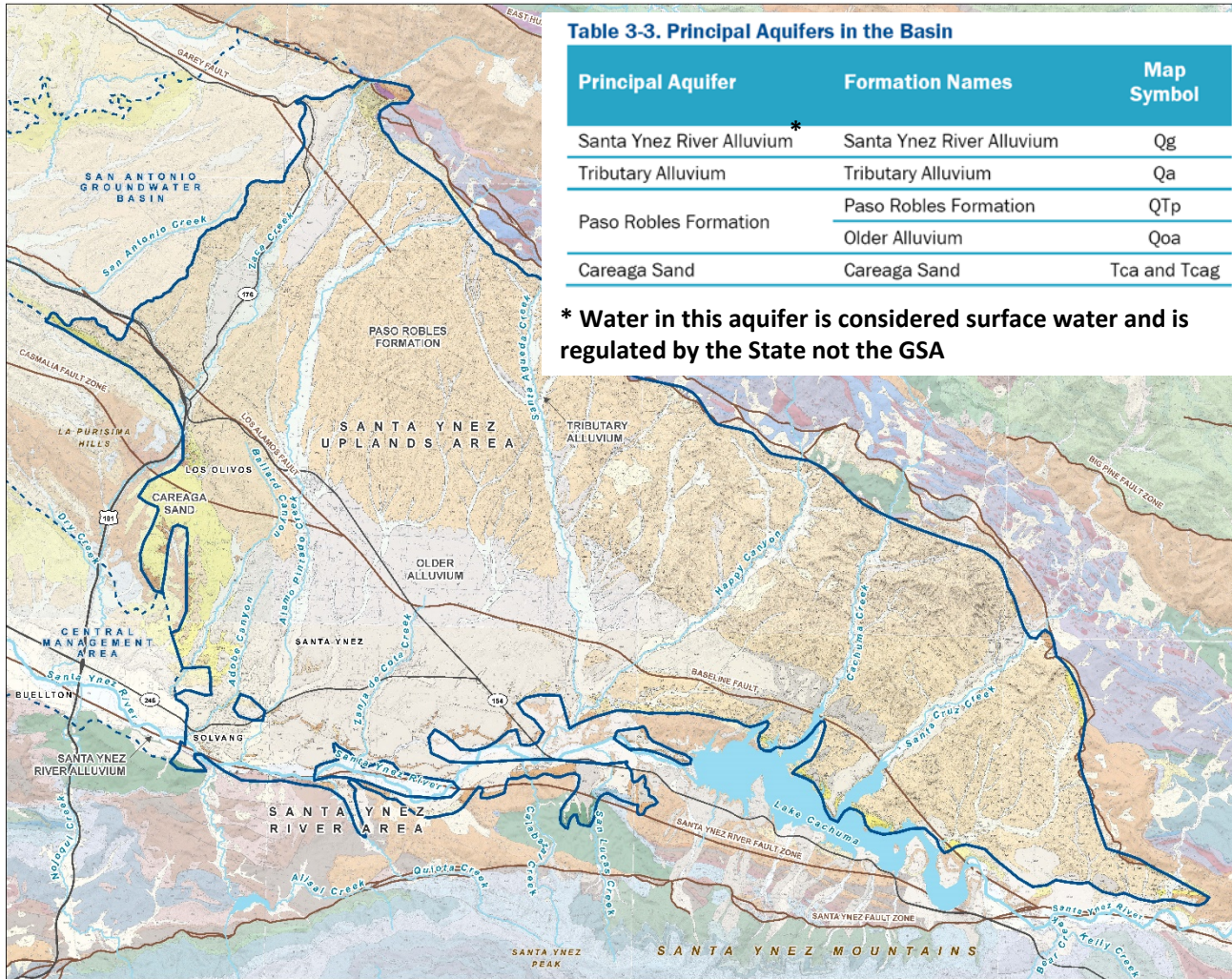
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Hydrogeologic  
Conceptual Model

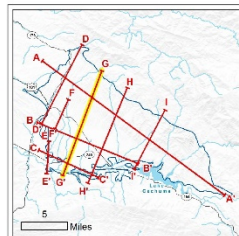
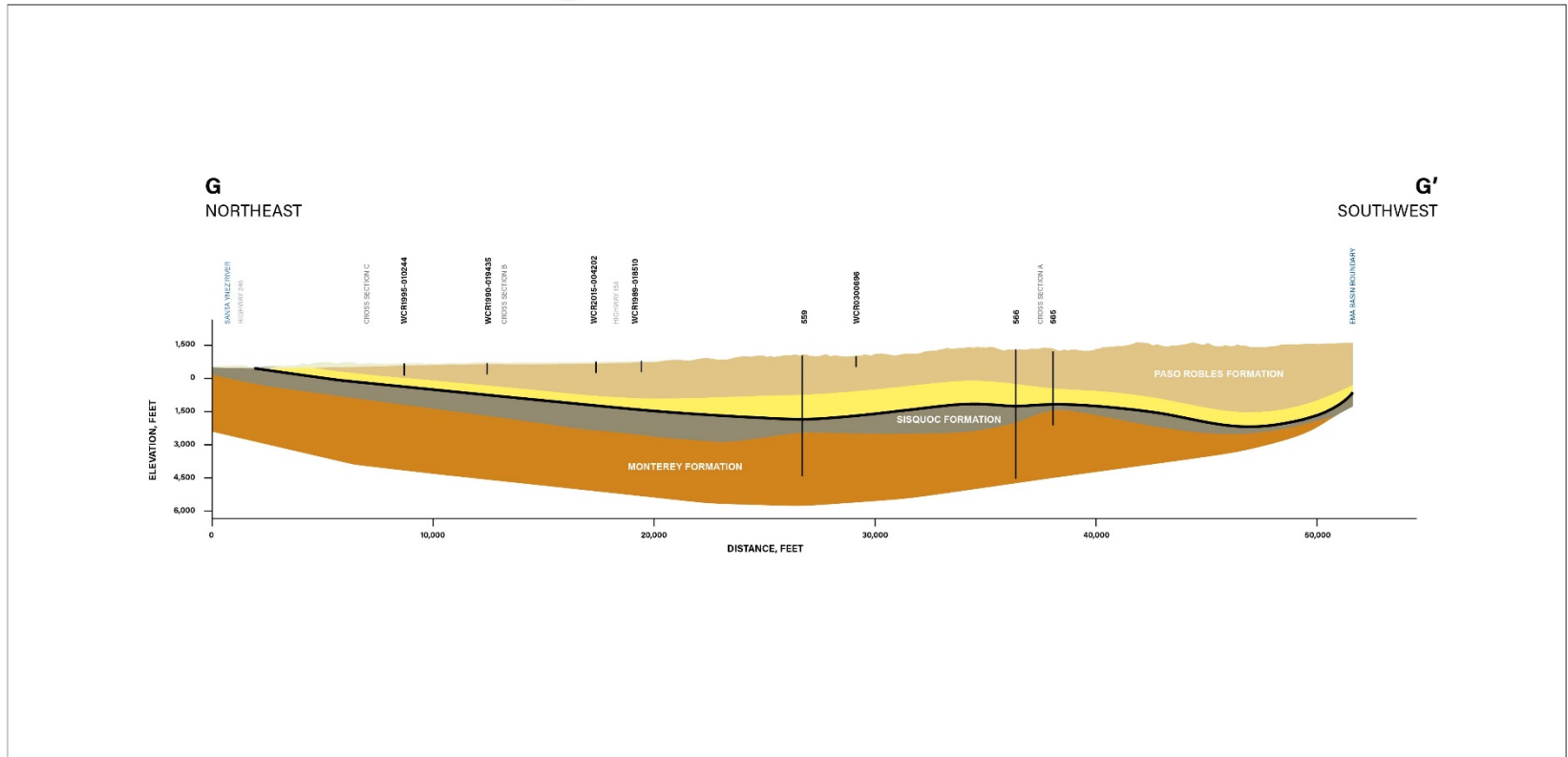
Groundwater  
Conditions

# Basin Setting: Geology





# Basin Setting: Cross Sections



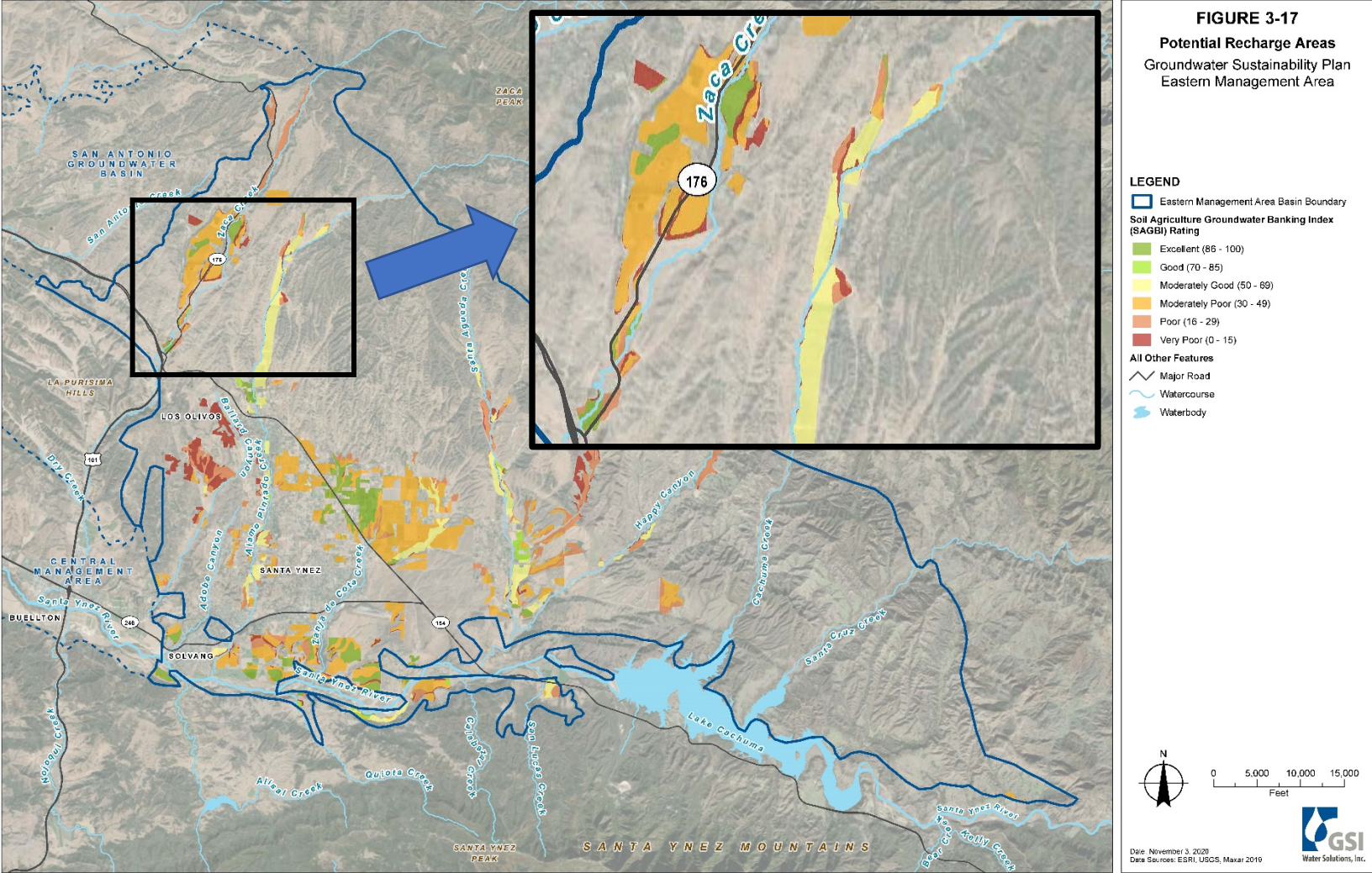
- LEGEND**
- Qa – Tributary Alluvium
  - Qoa – Older Alluvium
  - QTP – Paso Robles Formation
  - Tca – Careaga Sand
  - Basin Bottom
  - Tsq – Sisquoc Formation
  - Tm – Monterey Formation

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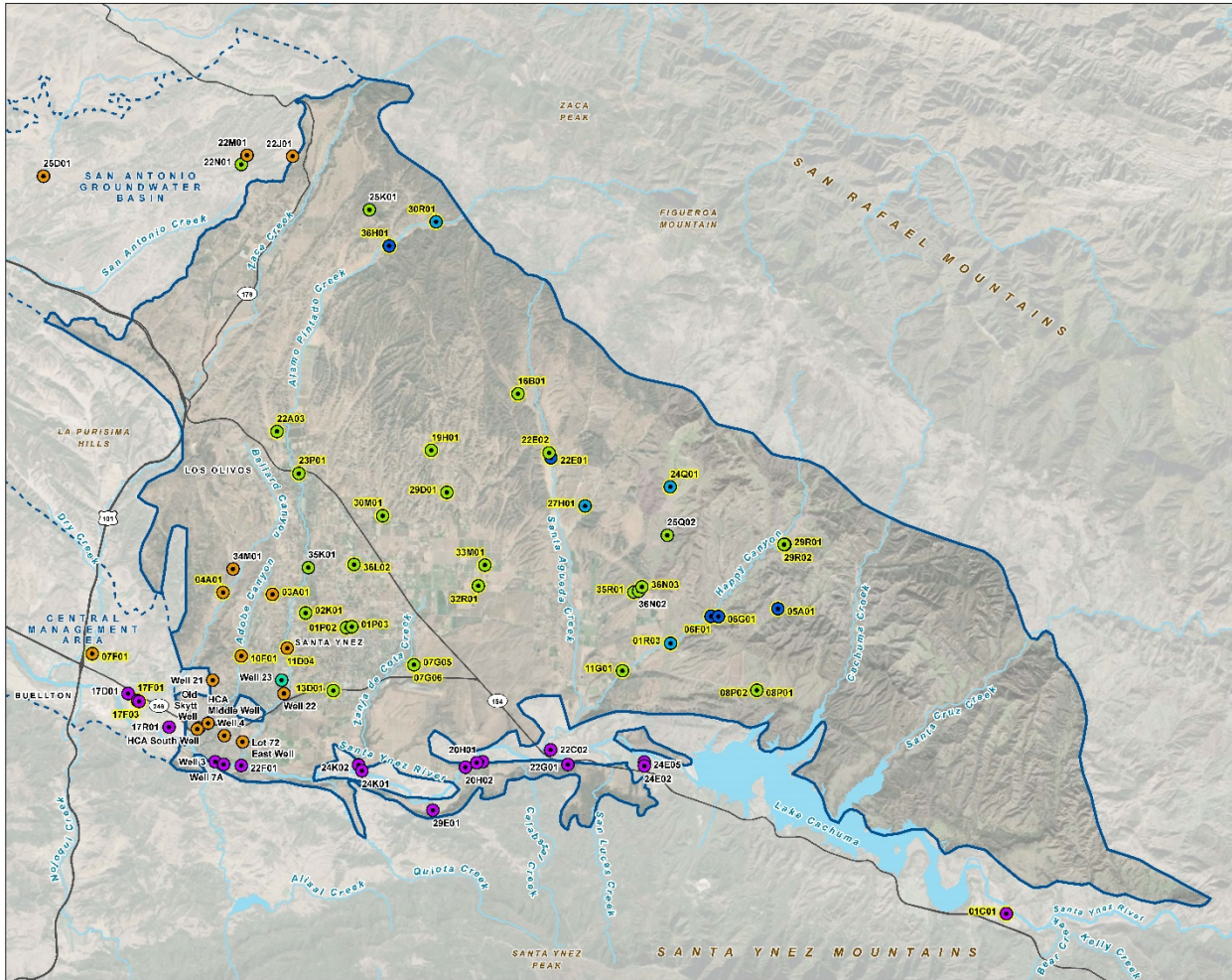
**FIGURE 3-12**  
**Cross Section G**  
 Groundwater Sustainability Plan  
 Eastern Management Area



# Basin Setting: Recharge Areas



# Basin Setting: Representative Wells



**FIGURE 3-19**  
**Representative Wells**  
Groundwater Sustainability Plan  
Eastern Management Area

**LEGEND**

- Well
- County Monitoring Program Well
- Eastern Management Area Basin Boundary

**Aquifer Zone**

- Tributary Alluvium
- Tributary Alluvium/Paso Robles Formation
- Santa Ynez River Alluvium
- Paso Robles Formation
- Paso Robles Formation/Careaga Sand
- Careaga Sand

**All Other Features**

- Major Road
- Watercourse
- Waterbody

Scale: 0, 5,000, 10,000, 15,000 Feet

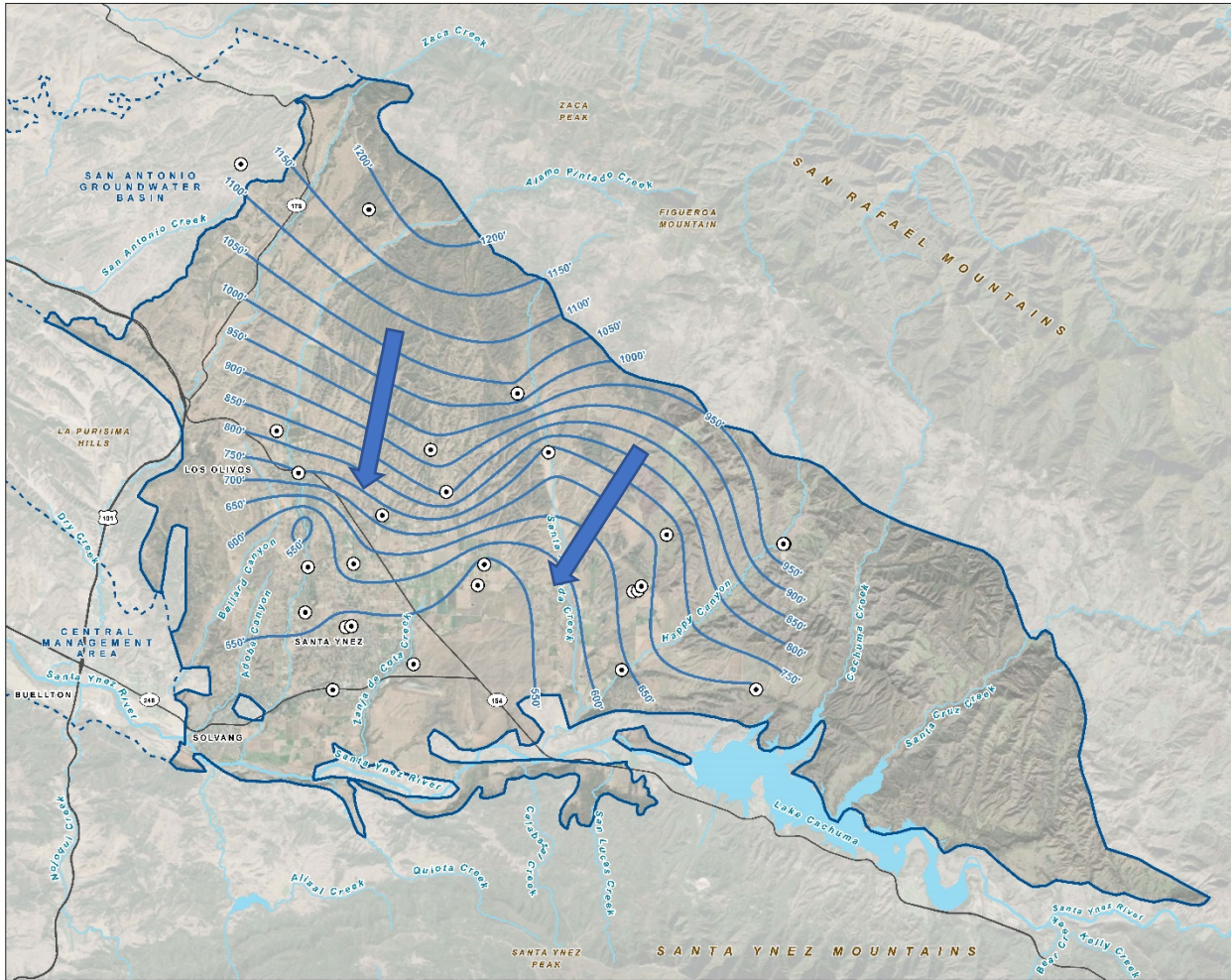
North Arrow

Date: November 8, 2020  
Data Source: ESRI, USGS, Maxar 2019

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# Basin Setting: Groundwater Conditions



**FIGURE 3-20**  
**Paso Robles Formation**  
**Groundwater Elevation**  
**Contour Map, Spring 2018**  
 Groundwater Sustainability Plan  
 Eastern Management Area

**LEGEND**

- Paso Robles Formation Well
- Paso Robles Formation Groundwater Elevation, Spring 2018
- Eastern Management Area Basin Boundary

**All Other Features**

- Major Road
- ~ Watercourse
- Waterbody

Scale: 0, 5,000, 10,000, 15,000 Feet

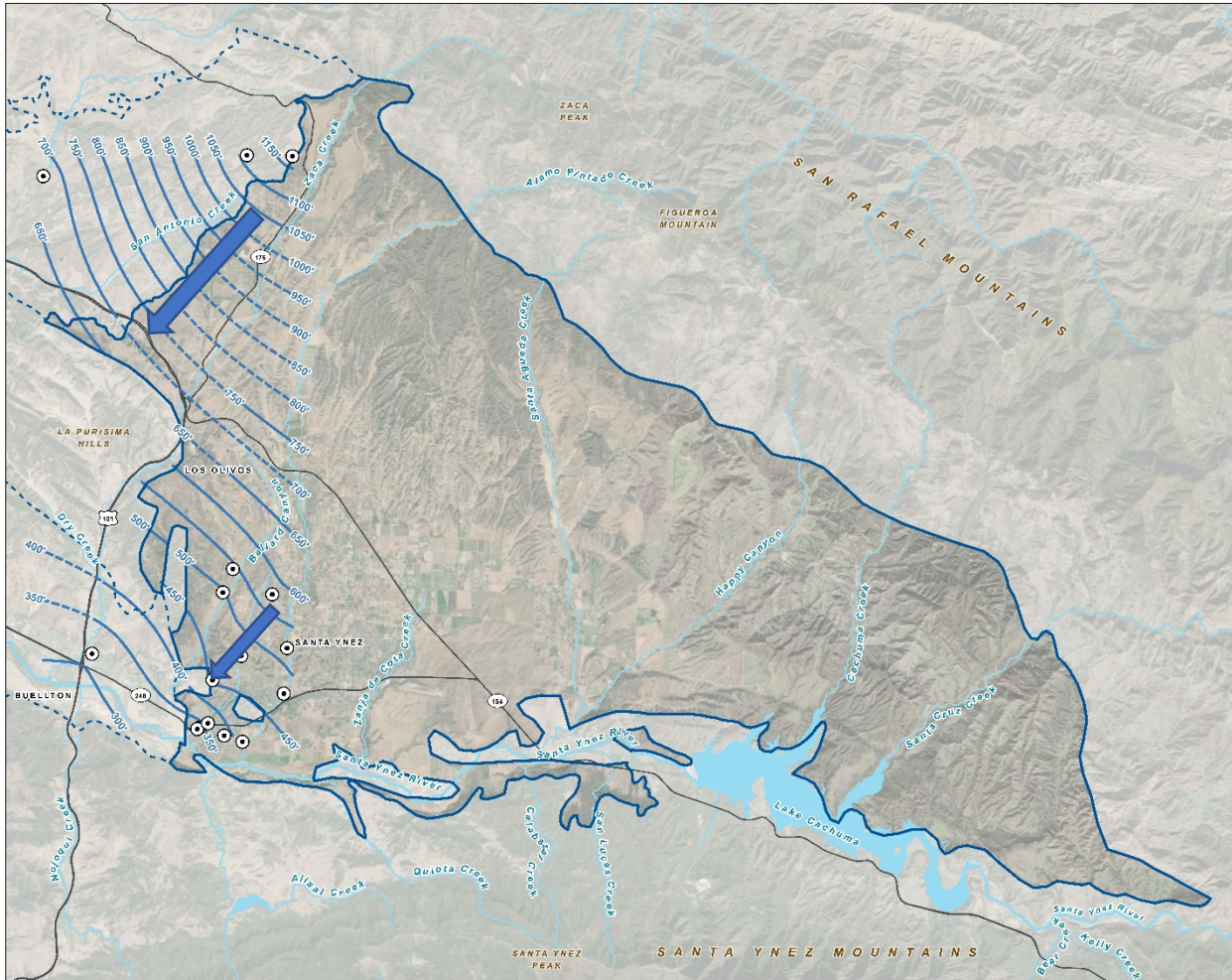
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# Basin Setting: Groundwater Conditions



**FIGURE 3-21**  
**Careaga Sand**  
**Groundwater Elevation**  
**Contour Map, Spring 2018**  
 Groundwater Sustainability Plan  
 Eastern Management Area

**LEGEND**

- Careaga Sand Well
- Careaga Sand Groundwater Elevation, Spring 2018
- Eastern Management Area Basin Boundary

**All Other Features**

- Major Road
- ~ Watercourse
- Waterbody

Scale: 0 5,000 10,000 15,000 Feet

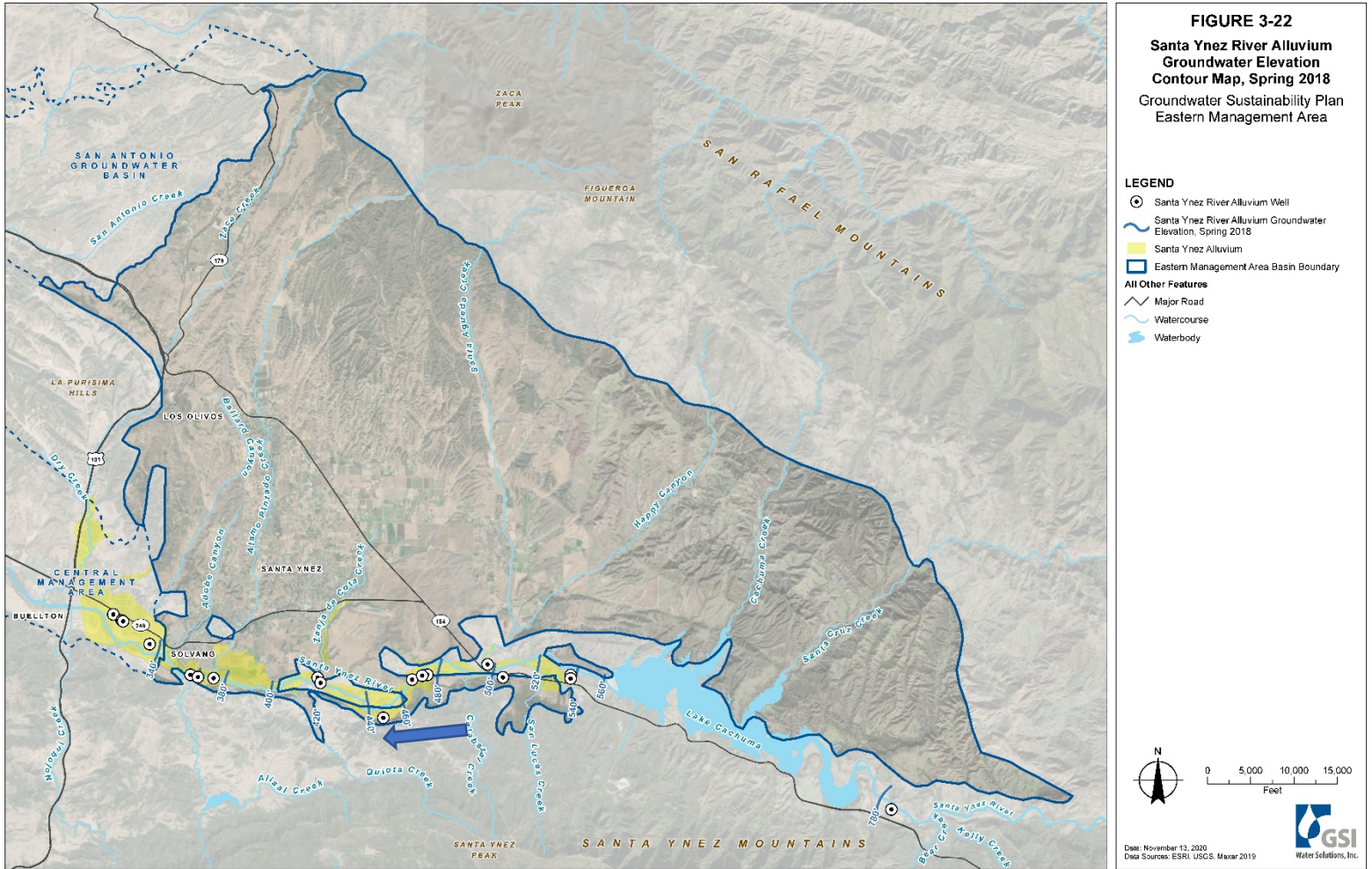
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**GSI**  
 Water Solutions, Inc.

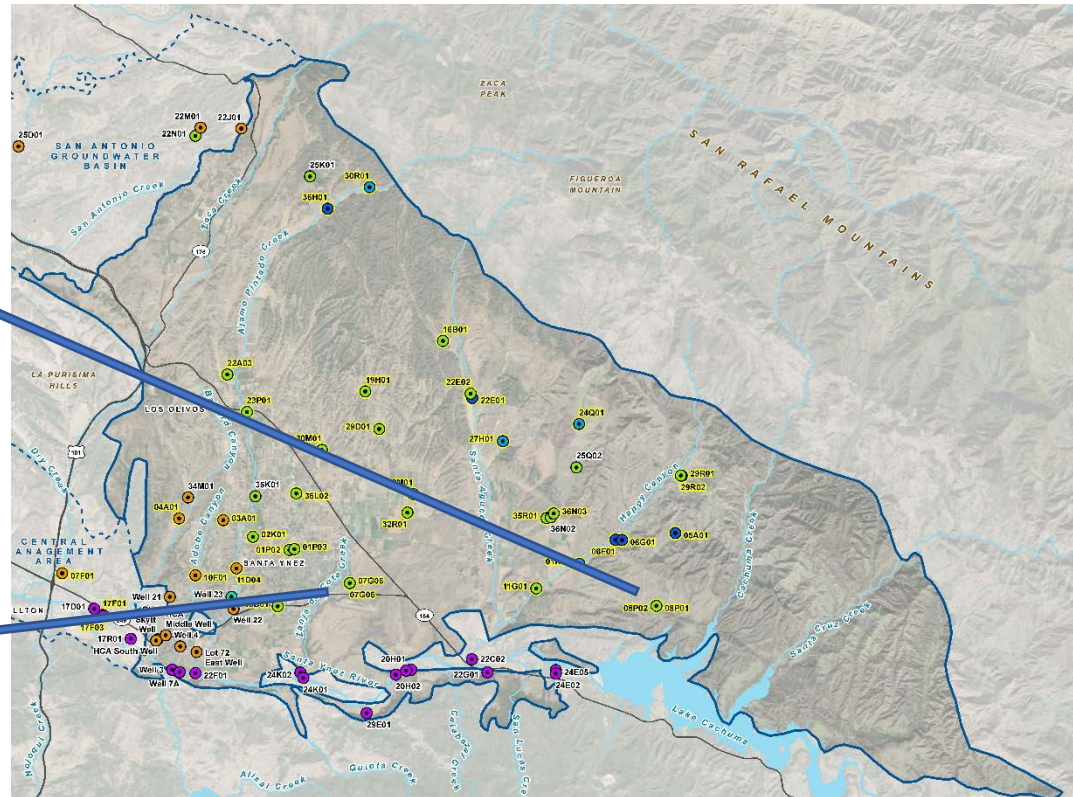
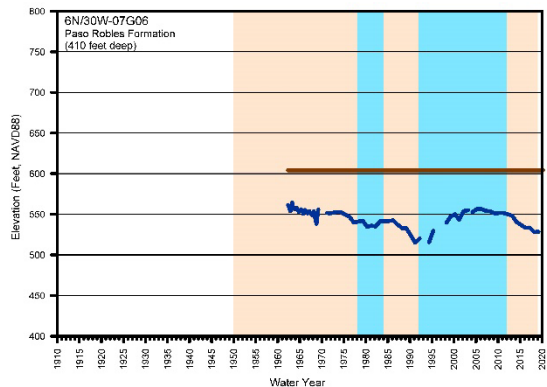
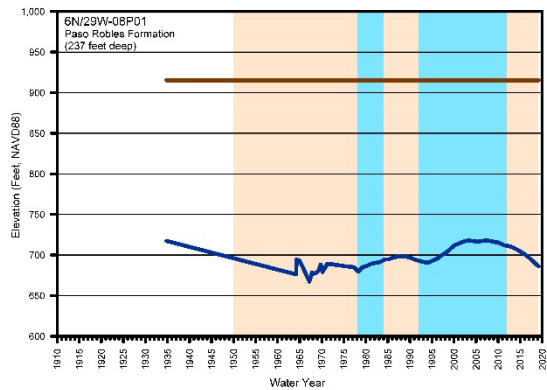
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# Basin Setting: Groundwater Conditions



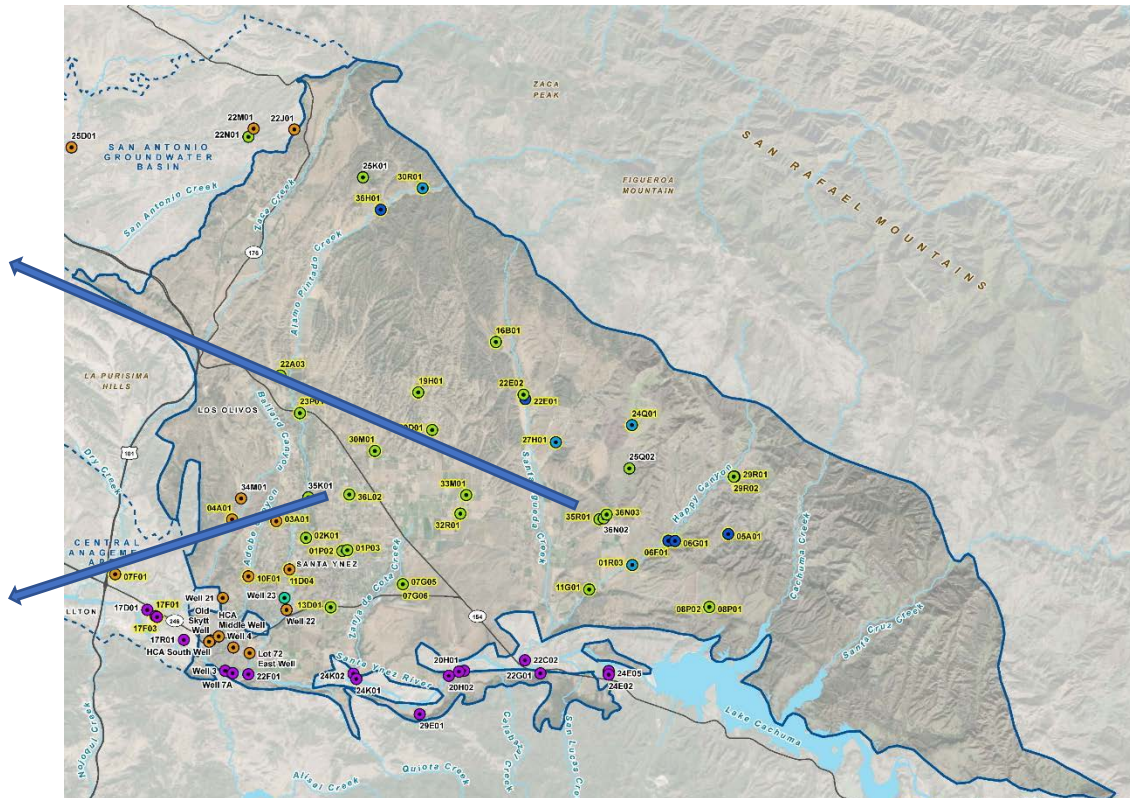
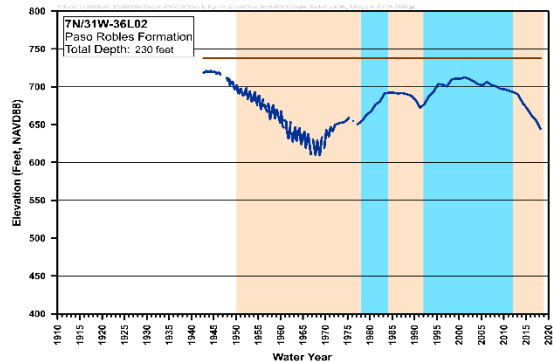
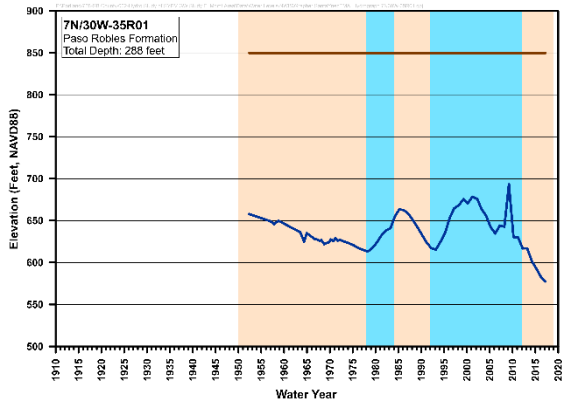
# Basin Setting: Groundwater Conditions



## Paso Robles Formation

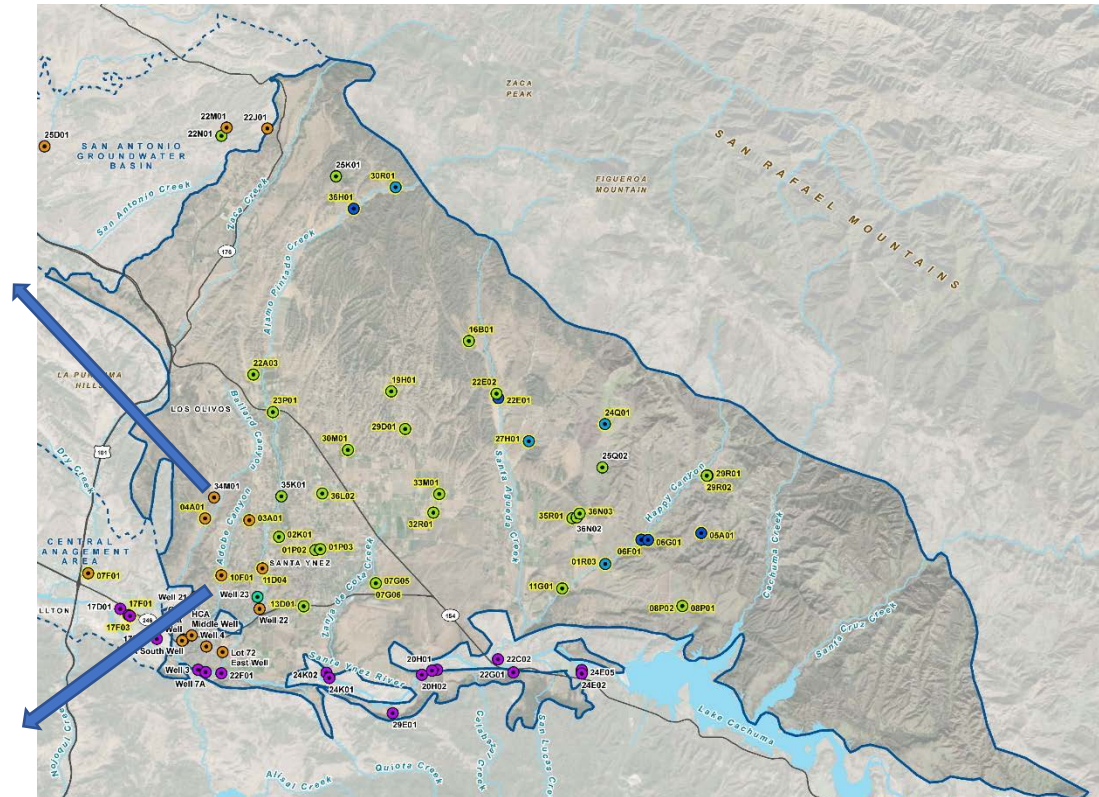
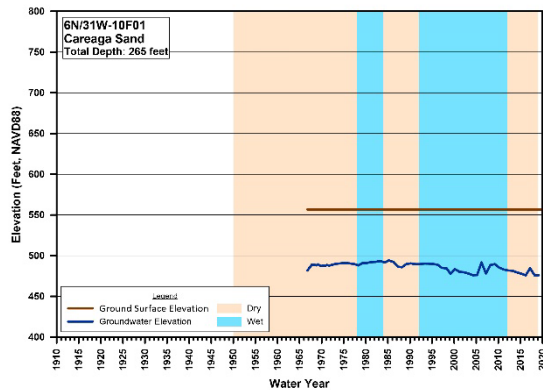
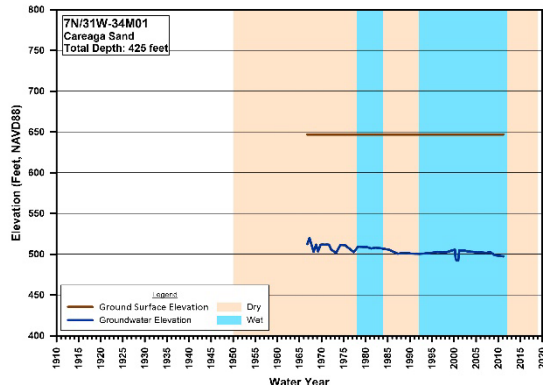


# Basin Setting: Groundwater Conditions



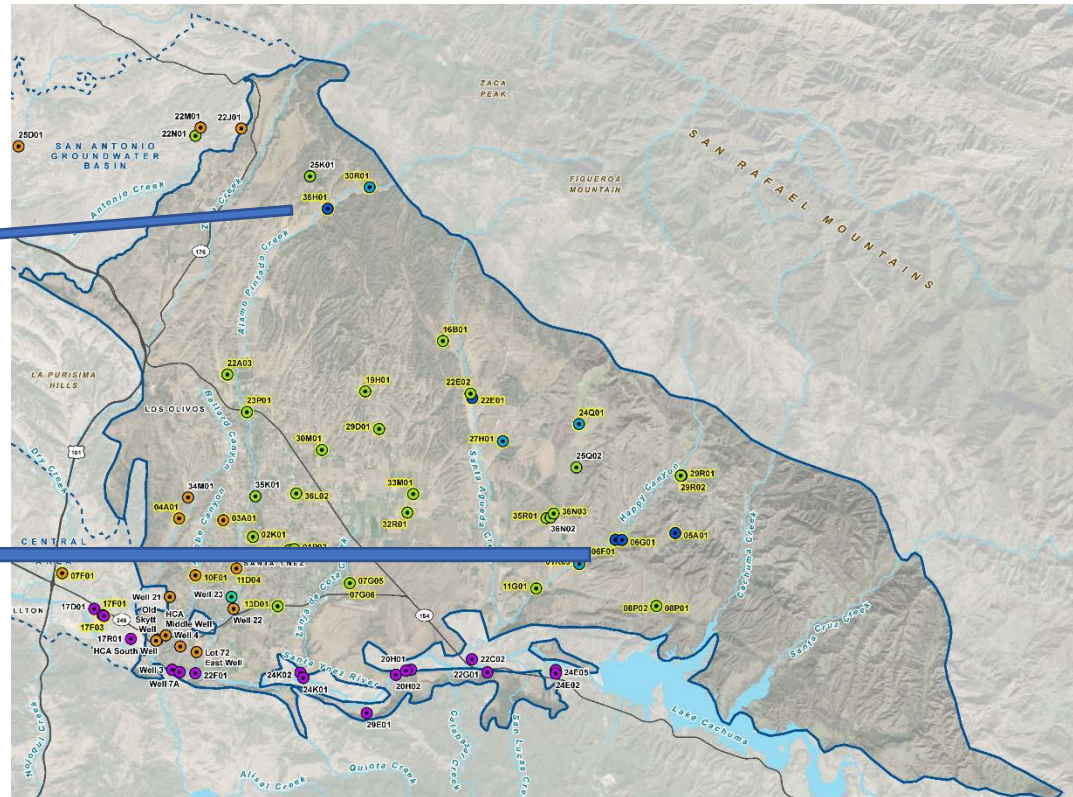
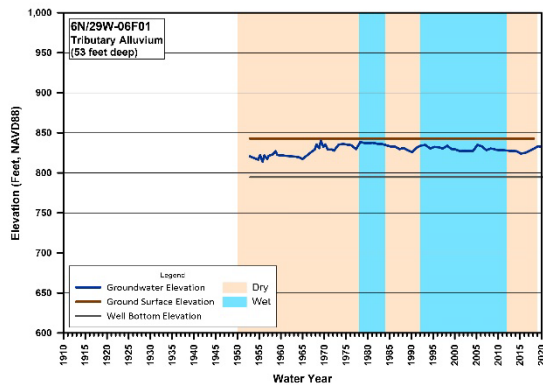
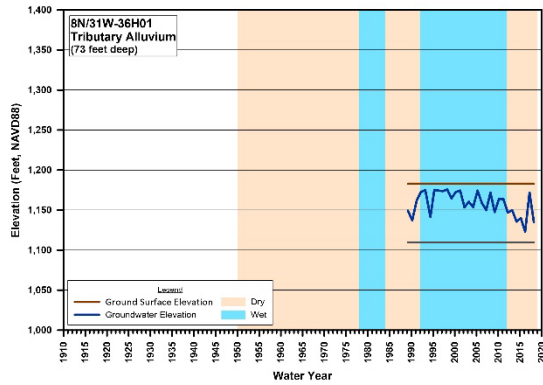
## Paso Robles Formation

# Basin Setting: Groundwater Conditions



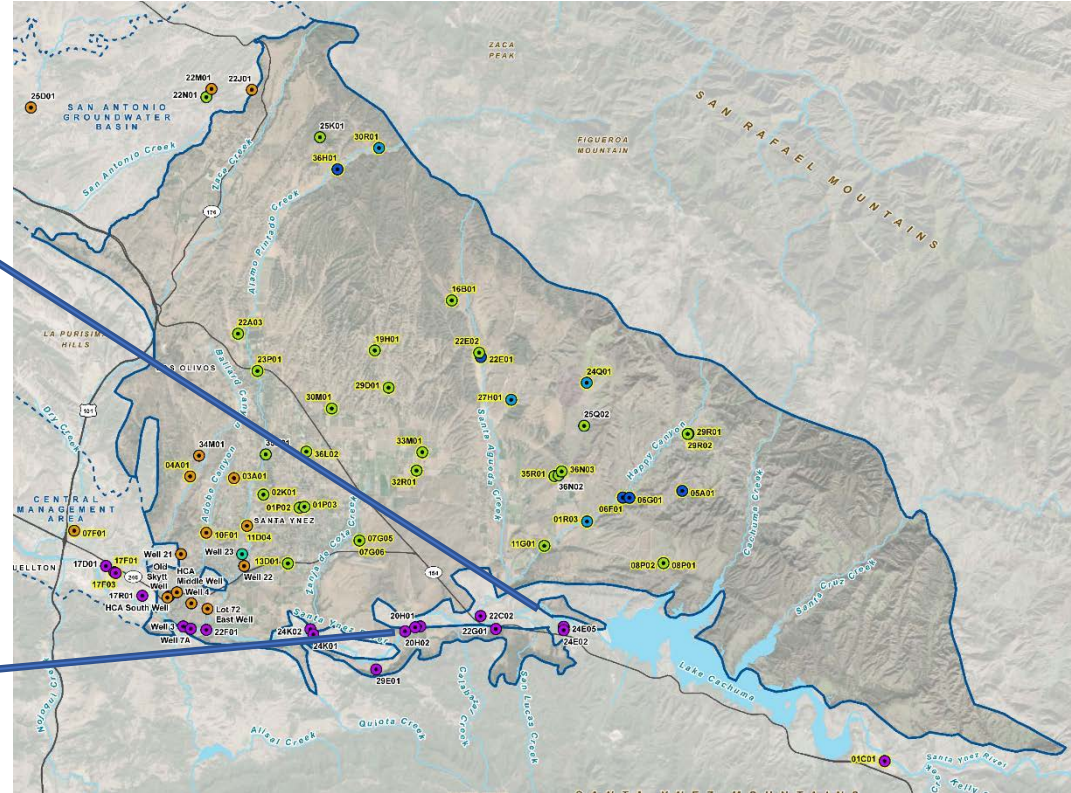
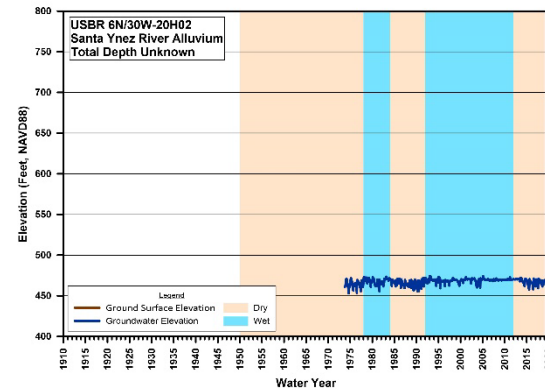
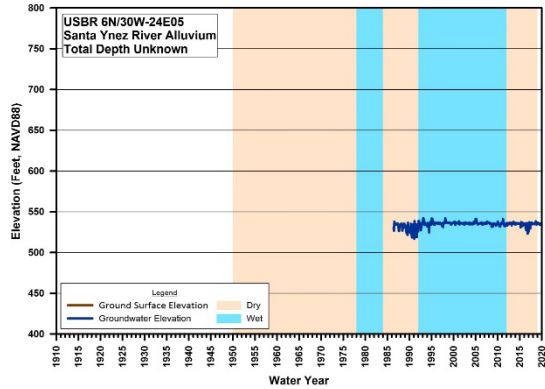
## Careaga Sand

# Basin Setting: Groundwater Conditions



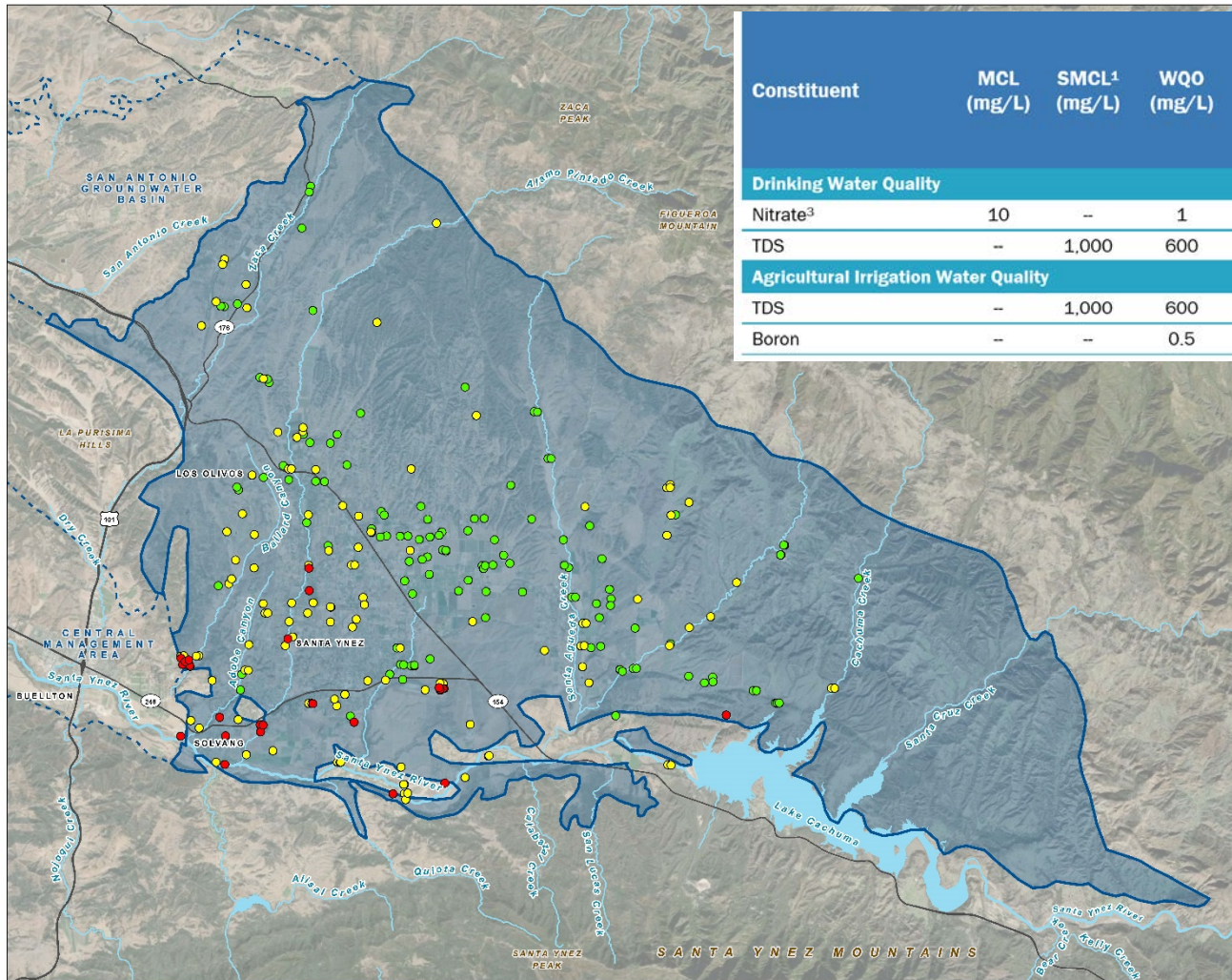
## Tributary Alluvium

# Basin Setting: Groundwater Conditions



## Santa Ynez River Alluvium

# Basin Setting: Water Quality



**FIGURE 3-30**  
**Total Dissolved Solids**  
**2015-2018 Average**  
 Groundwater Sustainability Plan  
 Eastern Management Area

**LEGEND**  
 Well Concentration  
 Total Dissolved Solids, mg/L  
 ● <600  
 ● 600-1,000  
 ● >1,000

**All Other Features**  
 Eastern Management Area Basin Boundary  
 Major Road  
 Watercourse  
 Waterbody

**NOTES**  
 1. The Water Quality Objective for Total Dissolved Solids is 600 mg/L.  
 2. The upper Secondary Maximum Contamination Level for Total Dissolved Solids is 1,000 mg/L.

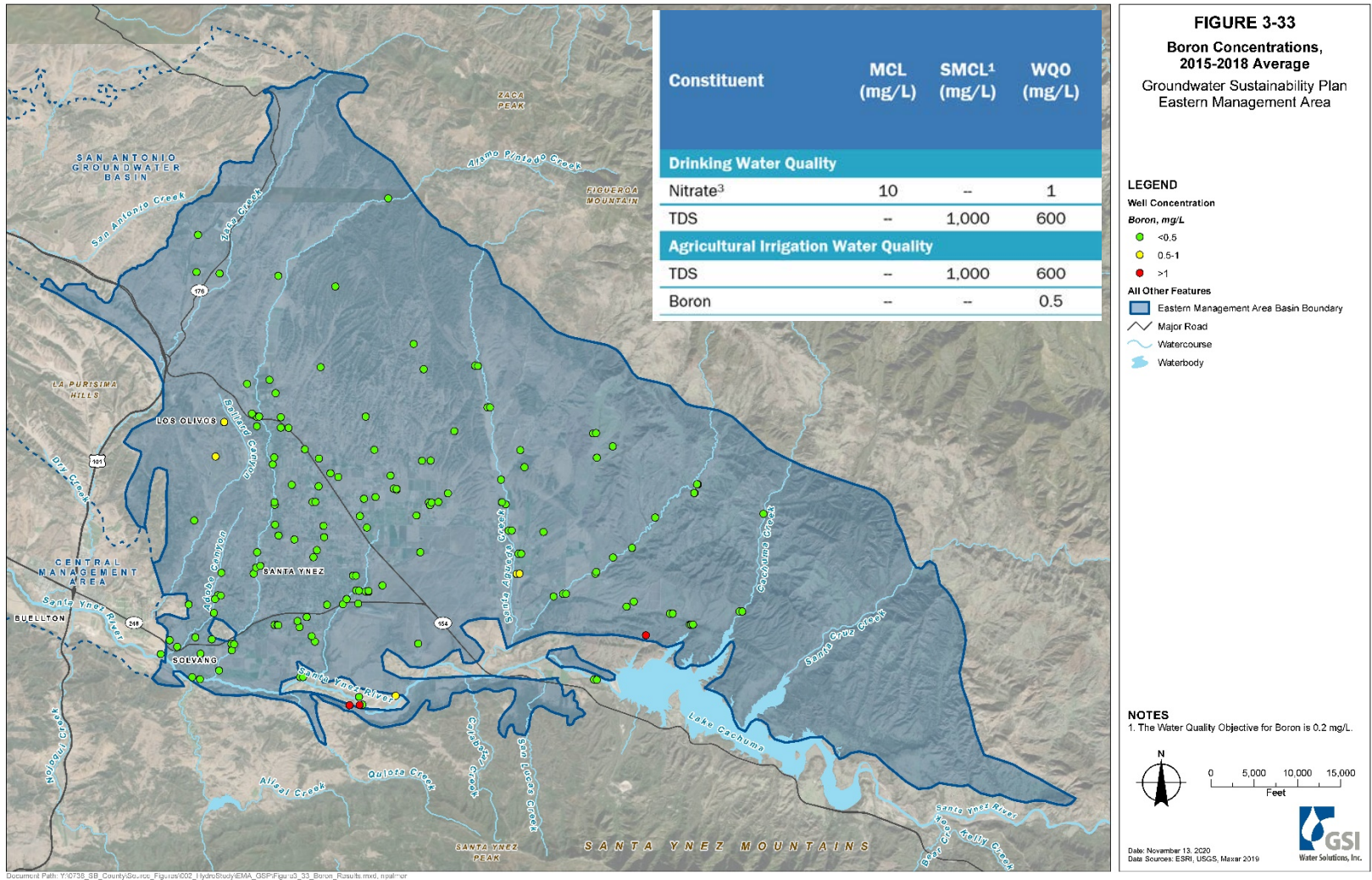
Date: November 3, 2020  
 Data Sources: ESRI, USGS, Mazar 2019

GSI Water Solutions, Inc.

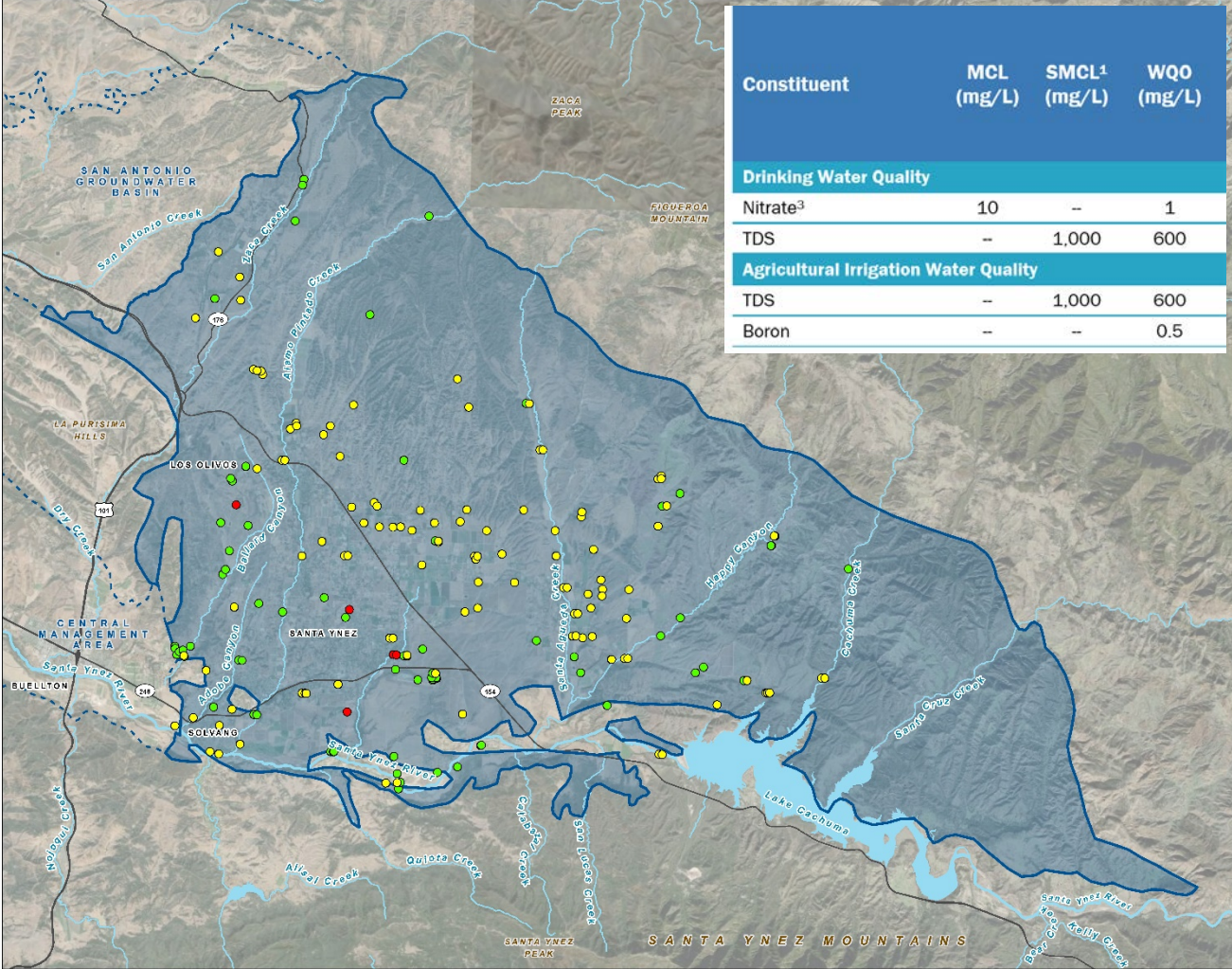
## Total Dissolved Solids

EMA GSA Presentation - November 19, 2020

# Basin Setting: Water Quality



# Basin Setting: Water Quality



**FIGURE 3-35**  
**Nitrate 2015-2018 Average**  
 Groundwater Sustainability Plan  
 Eastern Management Area

**LEGEND**

Well Concentration  
 Nitrate, mg/L

- < 1
- 1 - 10
- > 10

**All Other Features**

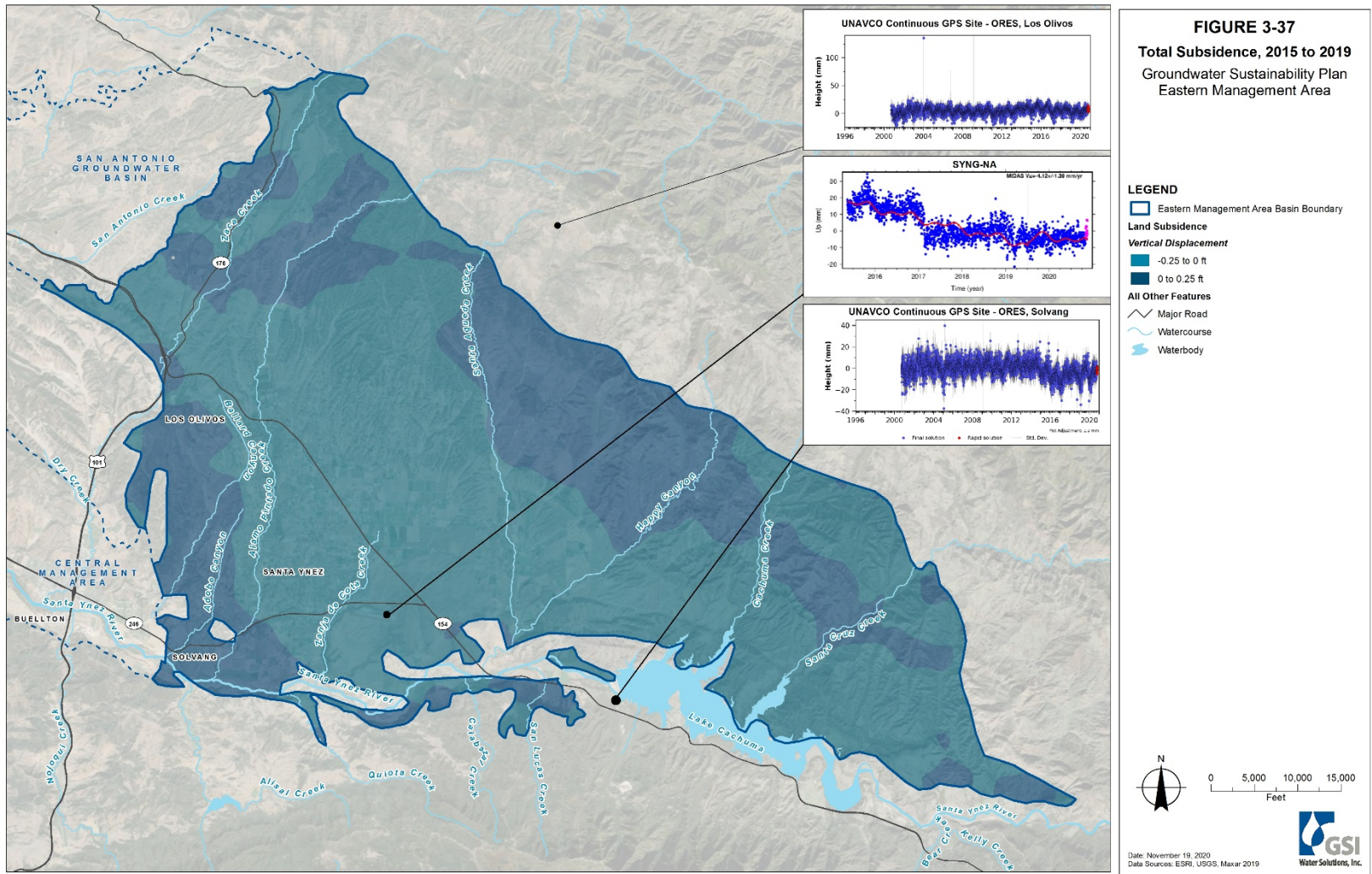
- Eastern Management Area Basin Boundary
- Major Road
- Watercourse
- Waterbody

**NOTES**

1. The Water Quality Objective for Nitrogen is 5 mg/L.
2. The Maximum Contamination Level for Nitrogen is 10 mg/L.

Date: November 13, 2020  
 Data Sources: ESRI, USGS, Mavar 2019

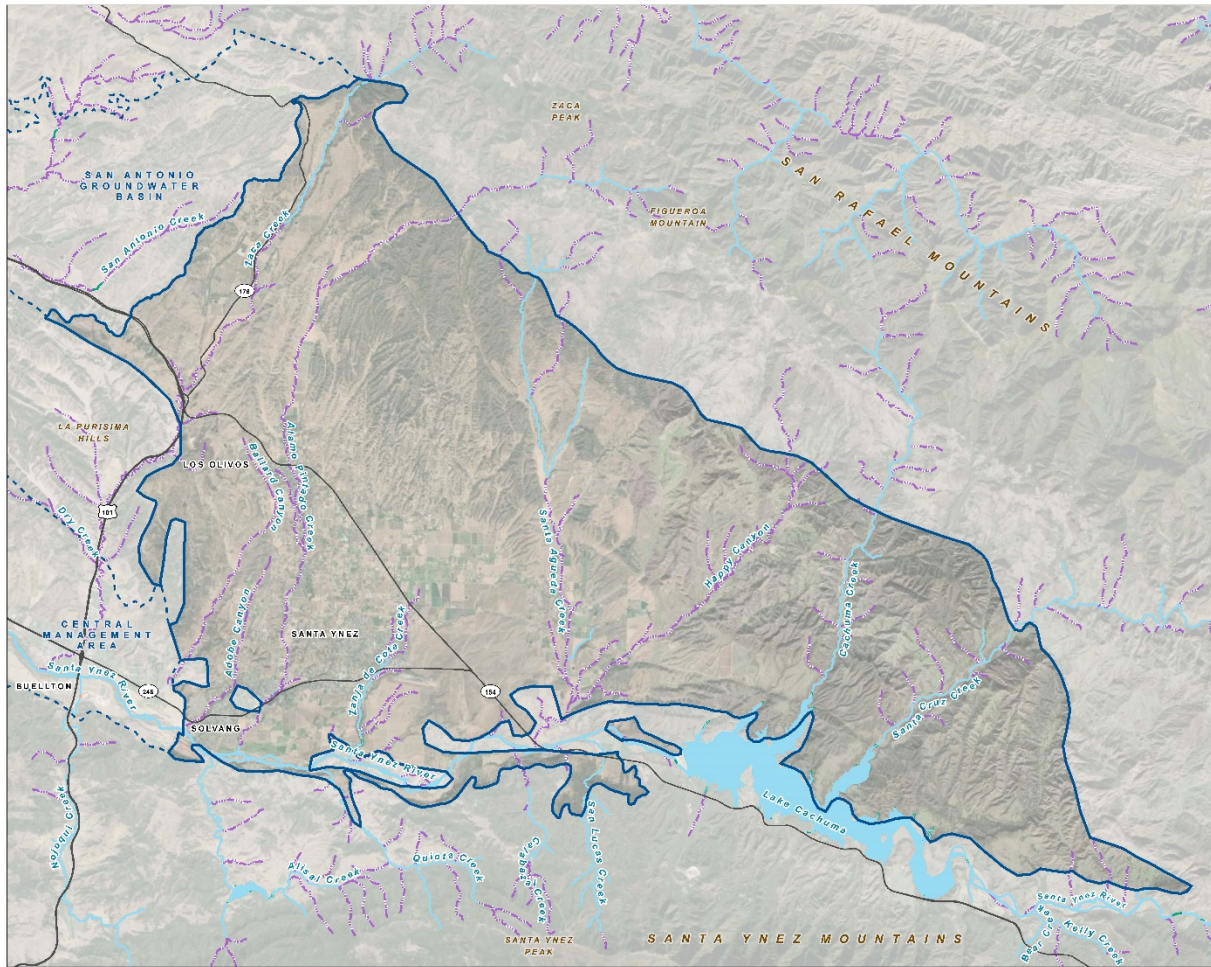
# Basin Setting: Subsidence



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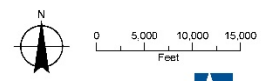
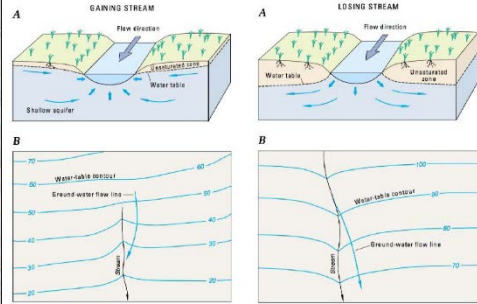


# Basin Setting: Interconnected Surface Water



**FIGURE 3-38**  
**Stream Classifications**  
Groundwater Sustainability Plan  
Eastern Management Area

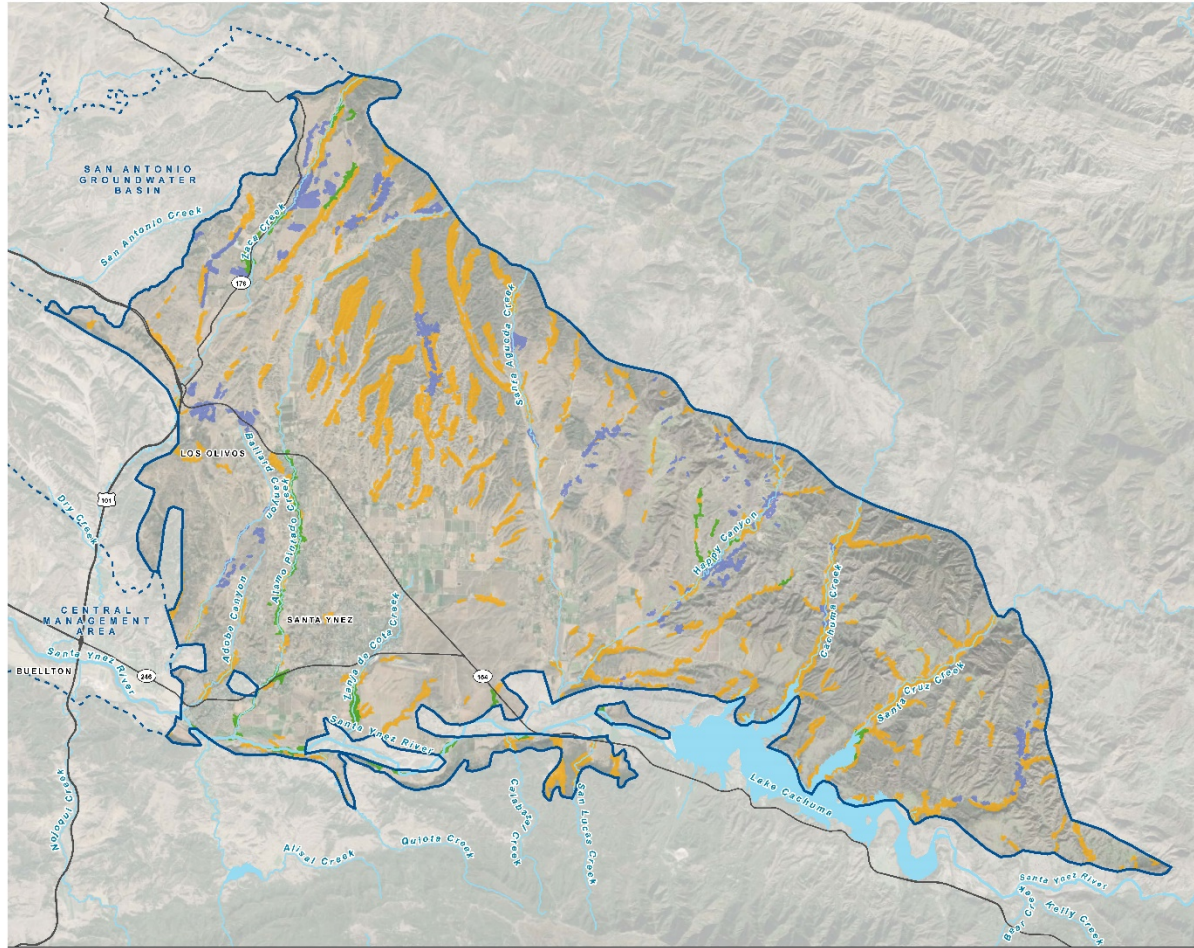
- LEGEND**
- USGS NHD Stream Classification
- Perennial
  - Intermittent
  - Artificial Path
  - Connector
- Eastern Management Area Basin Boundary
- All Other Features**
- Major Road
  - Waterbody



Date: November 3, 2020  
Data Sources: ESRI, USGS, Maxx 2019

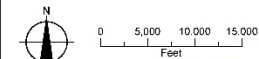


# Basin Setting: Potential Groundwater Dependent Ecosystems



**FIGURE 3-40**  
**Natural Communities Commonly**  
**Associated with Groundwater**  
 Groundwater Sustainability Plan  
 Eastern Management Area

- LEGEND**
- Eastern Management Area Basin Boundary
  - Natural Communities Commonly Associated with Groundwater (NCCAG)**
    - Coast Live Oak
    - Valley Oak
    - Riparian Mixed Hardwood
  - All Other Features**
    - Major Road
    - Watercourse
    - Waterbody









Date: November 3, 2020  
 Data Sources: ESRI, USGS NCCAG, Maxar 2510  
 GSI Water Solutions, Inc.

# Sustainable Management Criteria

# Sustainable Management Criteria

- Sustainability indicators and how they are measured
- Sustainable Management Criteria (SMC) development process
- Example sustainability goals
- Definition of “undesirable result ” and what is considered “significant and unreasonable”
- Example SMCs for groundwater levels

# Sustainability Indicators and How they are Measured

Sustainability Indicators	 Lowering GW Levels	 Reduction of Storage	 Seawater Intrusion	 Degraded Quality	 Land Subsidence	 Surface Water Depletion
Metric(s) Defined in GSP Regulations	<ul style="list-style-type: none"> <li>• Groundwater Elevation</li> </ul>	<ul style="list-style-type: none"> <li>• Total Volume</li> </ul>	<ul style="list-style-type: none"> <li>• Chloride concentration isocontour</li> </ul>	<ul style="list-style-type: none"> <li>• Migration of Plumes</li> <li>• Number of supply wells</li> <li>• Volume</li> <li>• Location of isocontour</li> </ul>	<ul style="list-style-type: none"> <li>• Rate and Extent of Land Subsidence</li> </ul>	<ul style="list-style-type: none"> <li>• Volume or rate of surface water depletion</li> </ul>

# Sustainable Management Criteria (SMC) Development Process for each Sustainability Indicator ( )



## 1. Basin Conditions

Need a good understanding of what is currently sustainable and what is not?

## 2. Sustainability Goal and Significant & Unreasonable

Qualitative statement

## 3. Undesirable Result

Quantitative set of conditions related to the minimum threshold that cause significant and unreasonable results

## 4. Minimum Thresholds

Numeric values for each sustainability indicator used to define undesirable results

## 5. Measurable Objectives

Quantifiable goals for the maintenance or improvement of specified groundwater conditions

# Example Sustainability Goals

GSA will define!



*Maintain groundwater levels that continue to support current groundwater uses*



*Reduce or prevent land subsidence that causes impacts to critical infrastructure*



*Maintain groundwater volumes in storage to sustain current groundwater uses during prolonged drought conditions*



*Avoid chronic depletion of surface water and prevent impacts to surface water*



*Avoid degradation of groundwater quality that would impact groundwater users*



*Prevent or abate seawater intrusion (not applicable)*

# Undesirable Results

Conditions causing undesirable results must be significant and unreasonable

- Chronic lowering of groundwater levels
- Chronic reduction of groundwater storage
- ~~Seawater intrusion~~
- Degraded water quality
- Land subsidence that substantially interferes with surface land uses
- Surface water depletions caused by groundwater use that have significant and unreasonable adverse impacts on beneficial uses of surface water

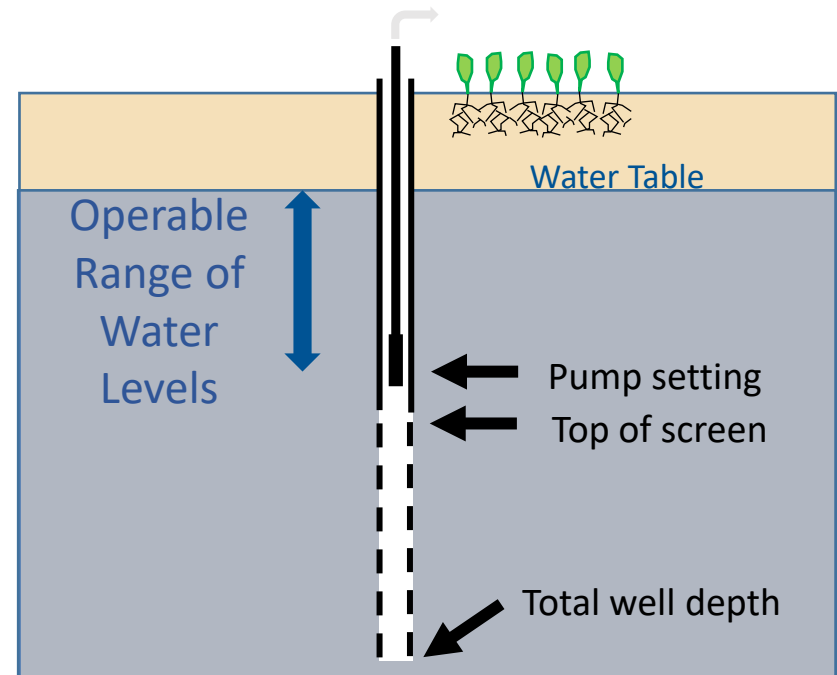
GSA will decide what is significant and unreasonable  
Sustainability is the absence of undesirable results



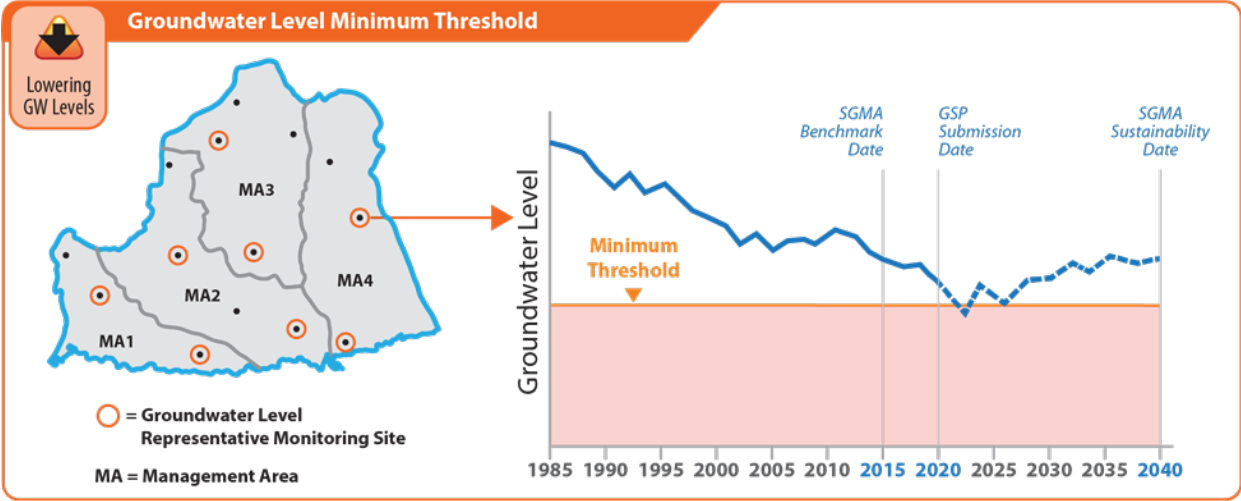
# How would we define undesirable results for groundwater levels at representative wells?

## Examples

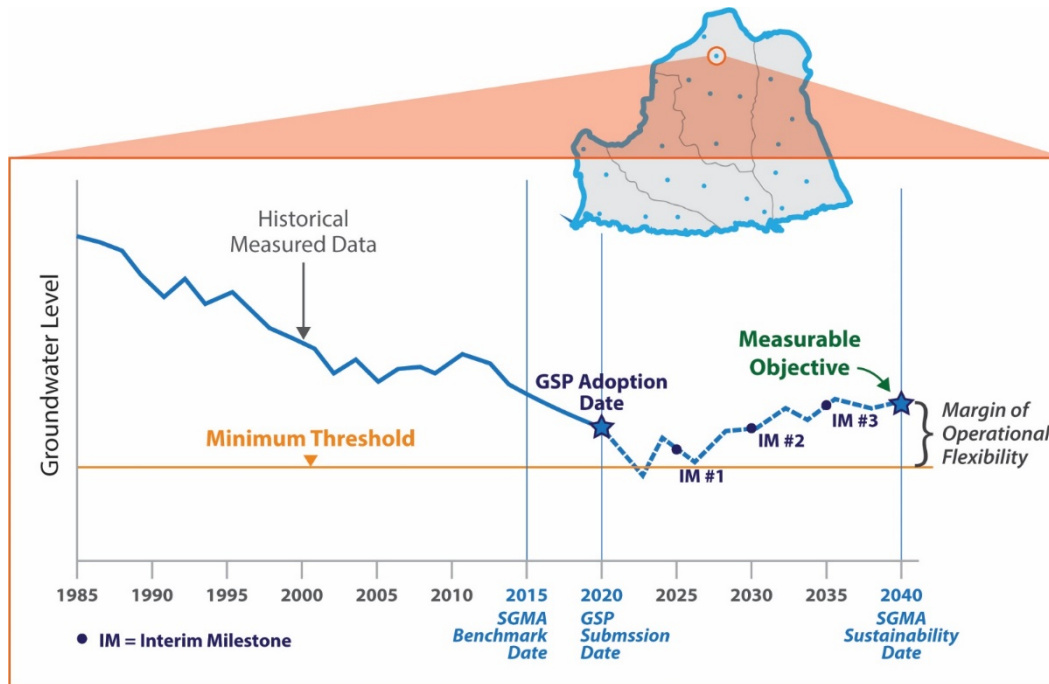
- Water levels drop below minimum thresholds at X % of representative wells
- Water levels drop below top of screen in X % of wells
- Water level declines impacting other groundwater users
- Impacts on upland groundwater flow outside management area
- Downward water level trend unrelated to drought conditions



# What is a groundwater level MINIMUM THRESHOLD?

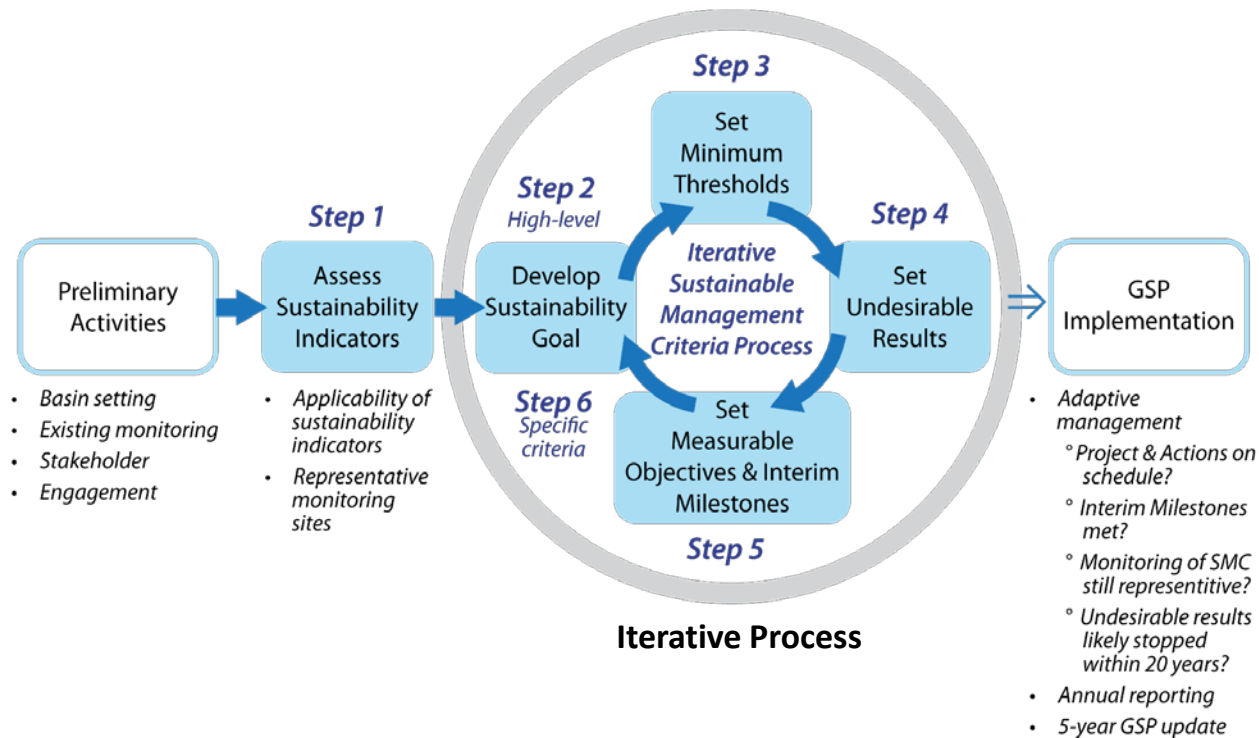


# What is MEASURABLE OBJECTIVE and INTERIM MILESTONE?



In Review:

# SMC Development Process



# What's Next?

- Review comments on groundwater conditions report for the EMA
- Review proposed SMCs for groundwater level declines
  - Review monitoring data and representative wells
  - Define goals – what is significant and unreasonable
  - Define undesirable results – do we have any?
  - Review alternative minimum thresholds and measurable objectives for different parts of the basin
  - Consider stakeholder feedback when revising SMCs
- Develop SMCs for other indicators
- Review SMCs to avoid unintended undesirable results for each indicator

**“It's tough to  
make  
predictions,  
especially  
about the  
future.”**

**-Yogi Berra**



**Questions?**