San Pasqual Valley Groundwater Basin Sustainable Groundwater Management Act Technical Peer Review Meeting

Basin Definition

Numerical Model Update

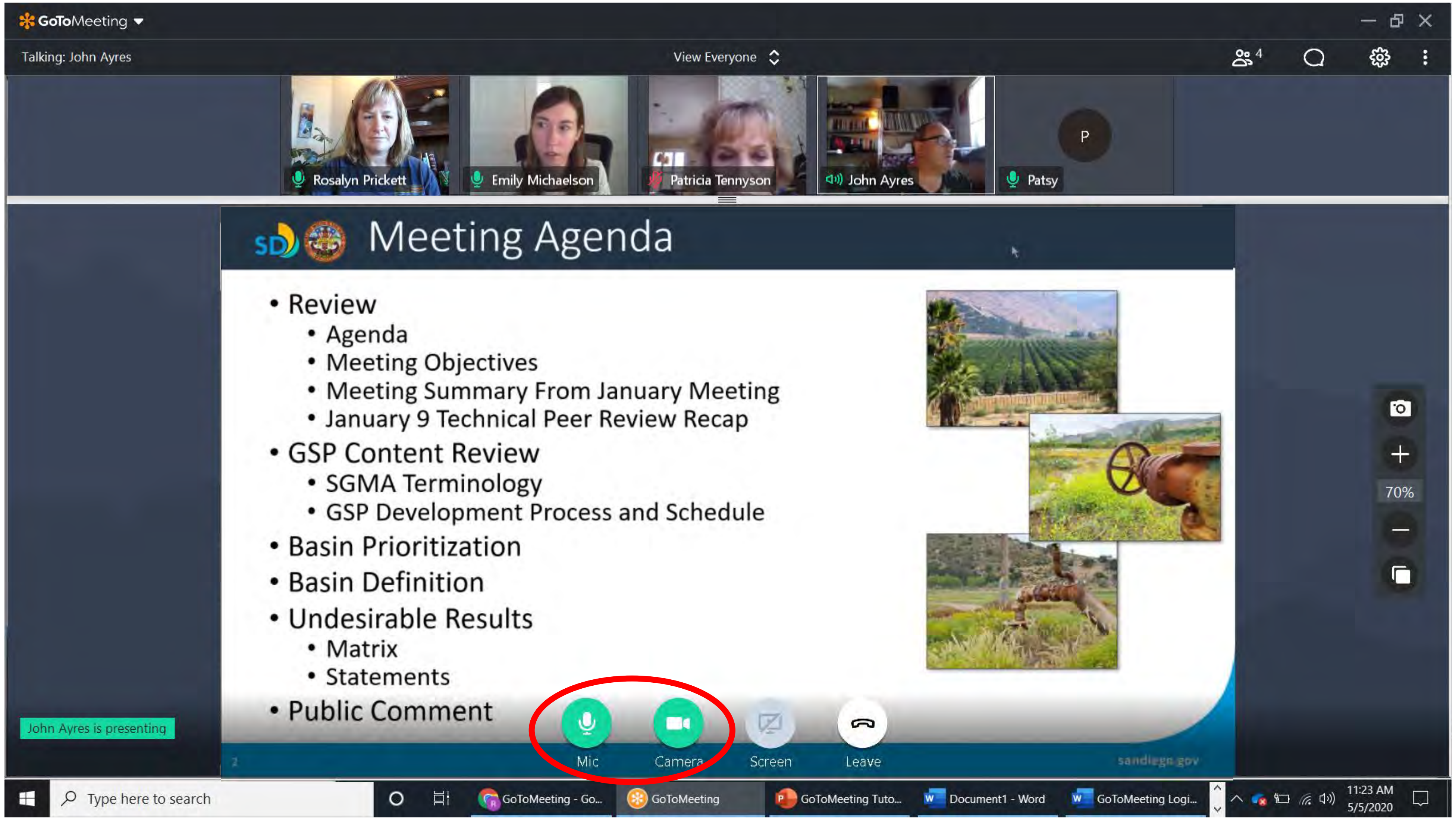
Monitoring Networks

May 14, 2020

Draft Work Product

GoToMeeting – Quick How To

- Your screen should look like this:



- Turn on/off your Mic (mute) and Camera (video) using the controls along the bottom
- During the meeting, you may need to wiggle your mouse to make the controls appear

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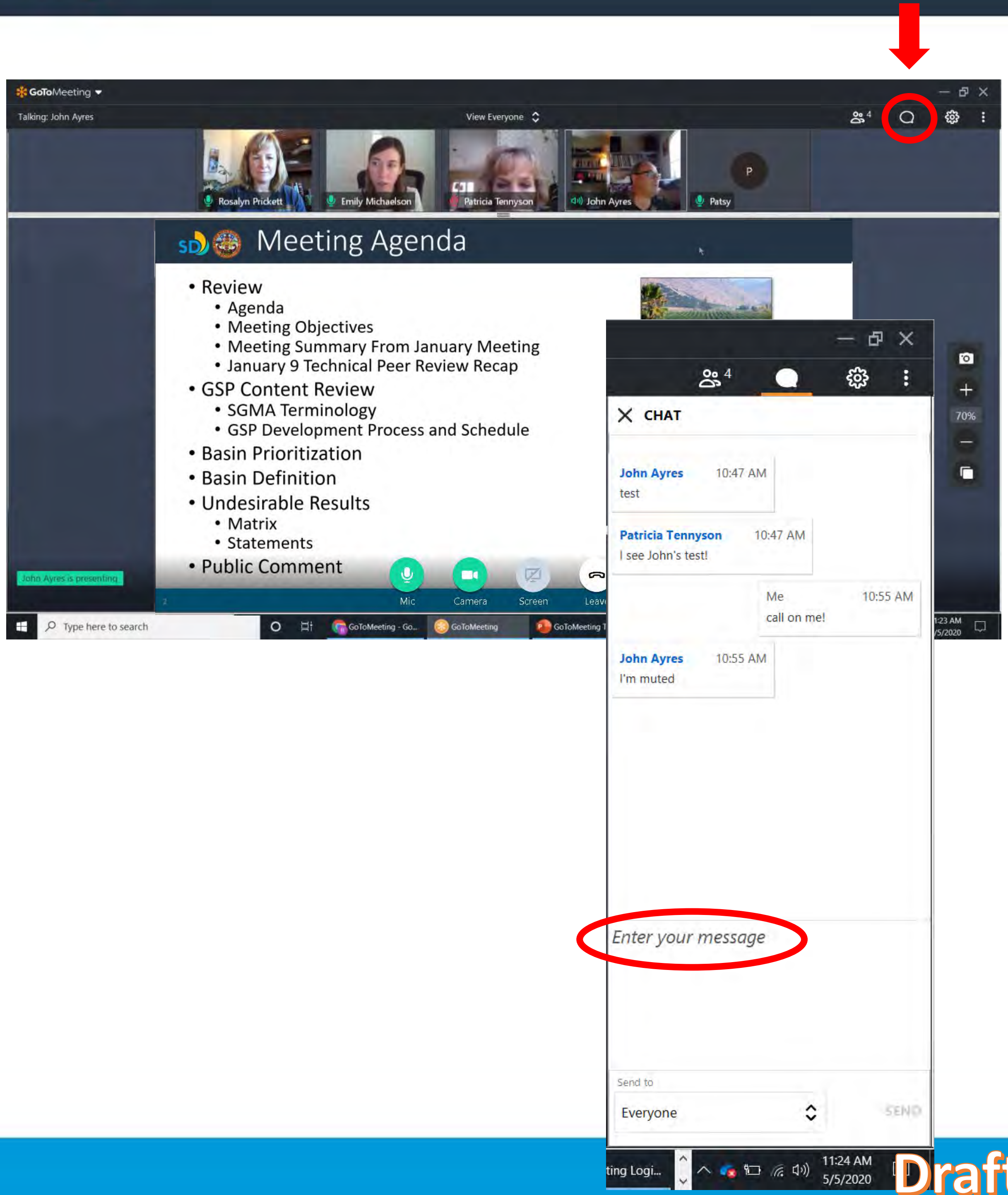
GoToMeeting – How to Ask a Question



- Let us know you have a question by clicking the **Chat** icon in the top right
- Click on *Enter your message*, type your message in the Chat and hit SEND
- Our organizer will mute everyone at the beginning of the meeting
- Once we receive your Chat and can pause to answer your question:
  - Our meeting organizer will unmute you to relay your question or comment
  - Please also check your phone/computer to make sure you're not muted there too
- For folks on the phone only, we will pause, unmute all callers, and ask for your questions or comments

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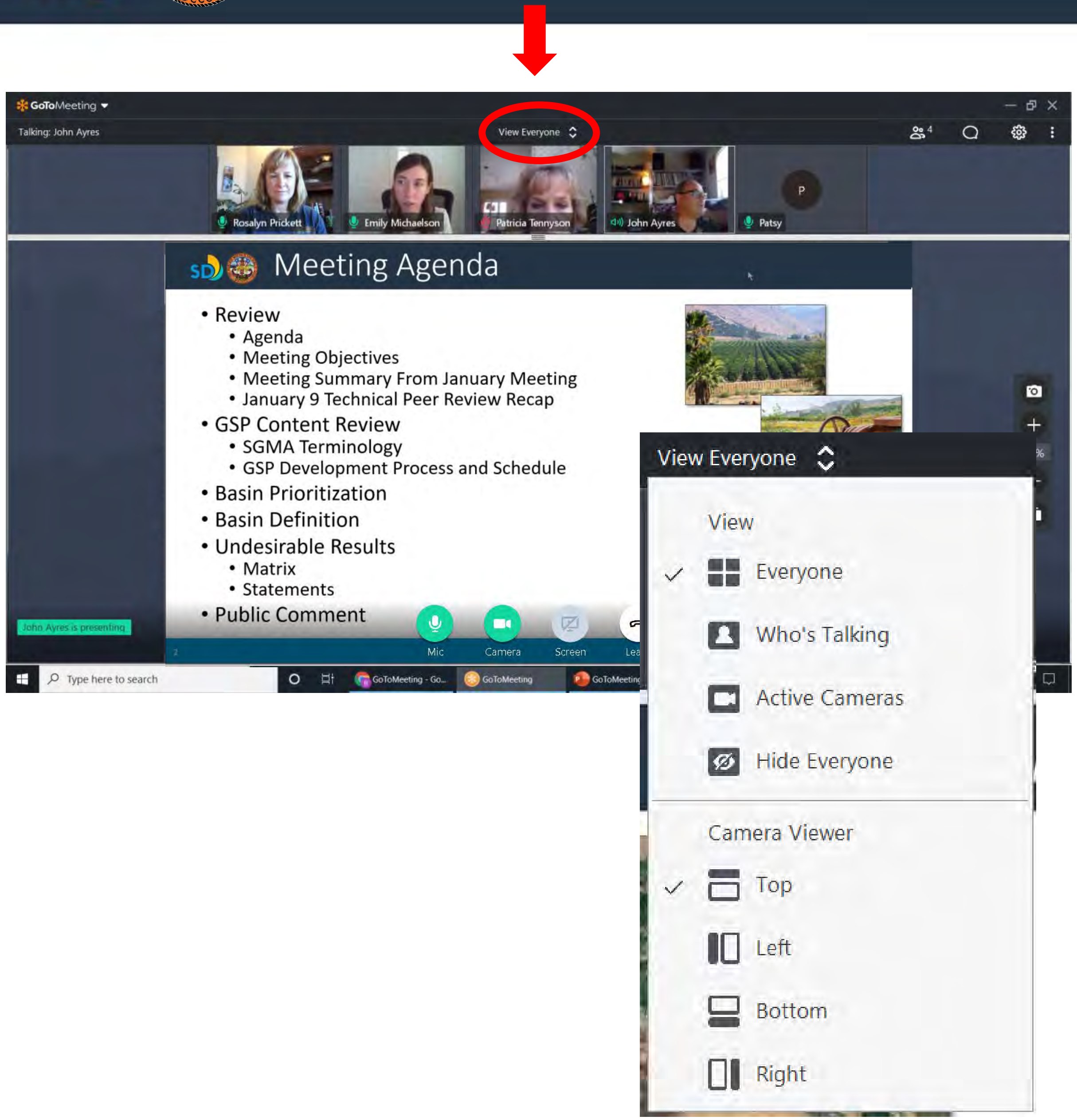
GoToMeeting – How to See Everyone



- To change your display options, select the **View Everyone** icon in the top right
- Select View-Everyone to display all attendees in the meetings
- Select Camera Viewer-Top to display participant images along the top of your screen
- The grey divider can be raised or lowered, which will change the screen size

Draft Work Product

Welcome to Our New Team Member!

- Rafael Sol Glenn
- April 27, 2020
- 8 lbs. 11oz.

Agenda and Meeting Objectives

- Review
  - Meeting Objectives
  - Meeting Summary
- Refined Analysis
  - Basin Definition
- Technical Input – Approach
  - Groundwater Model
    - Land Use
    - Fate and Transport
  - Monitoring Networks
- Preliminary Analysis Results
  - Undesirable Results
  - Basin Settings Figures
- Field Program Update
  - Monitoring Well Installation
  - Isotope Sampling
- Public Comment

Meeting Objectives and Minutes

- Meeting Objectives
  - Gain input on modeling and monitoring networks approach
  - Share preliminary results for Hydrogeologic Conceptual Model, and Groundwater Conditions
  - Discuss the basin definition
- Meeting Summary
  - Handout 1

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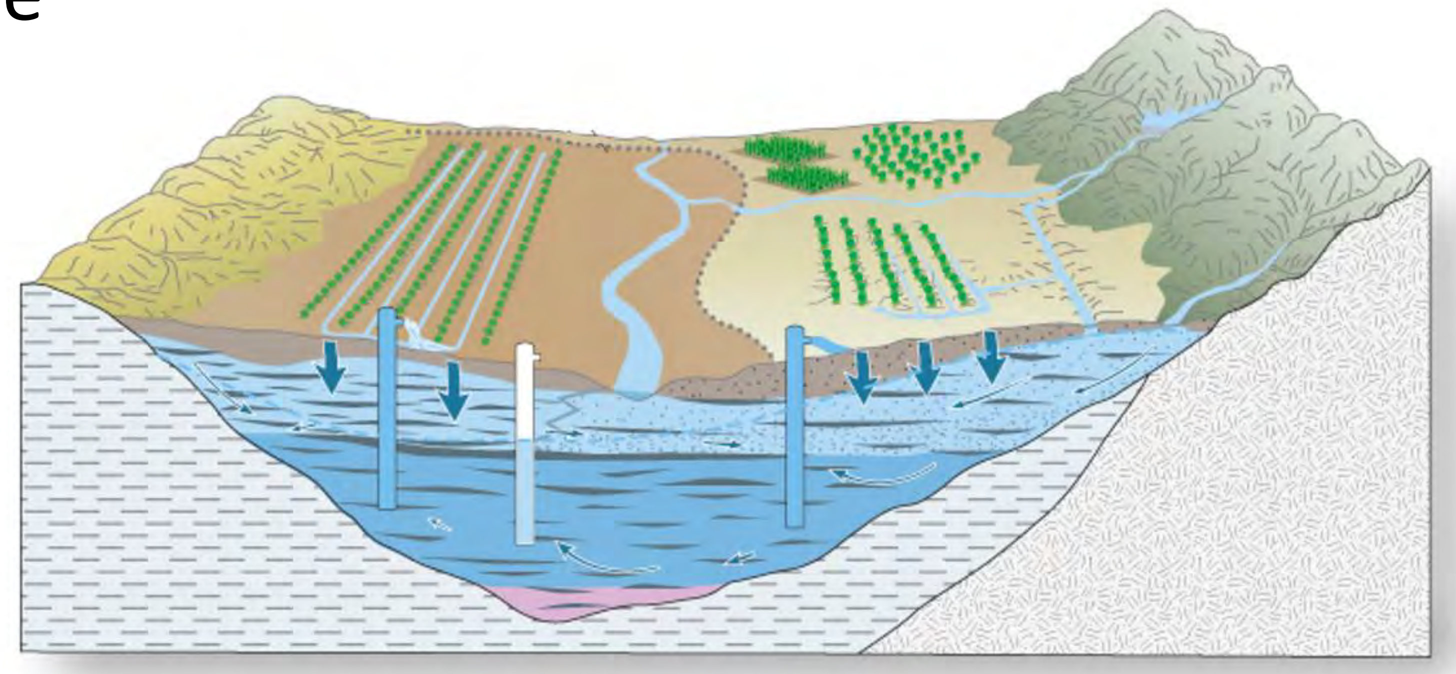
Technical Peer Review Meeting

REFINED ANALYSIS

Definition of Basin Statement:

- The SPV Basin is defined by Bulletin 118 and includes the Alluvium and Residuum. The interaction of groundwater between fractured bedrock beneath the Alluvium and the Residuum is not well understood and represents a potential Data Gap in the understanding of the SPV Basin. If groundwater conditions require the implementation of management actions, additional data collection, studies, aquifer testing, and/or surveying may be recommended to improve understanding of this interaction.



San Pasqual Valley GSP
Technical Peer Review Meeting

REFINED ANALYSIS
AC COMMENTS

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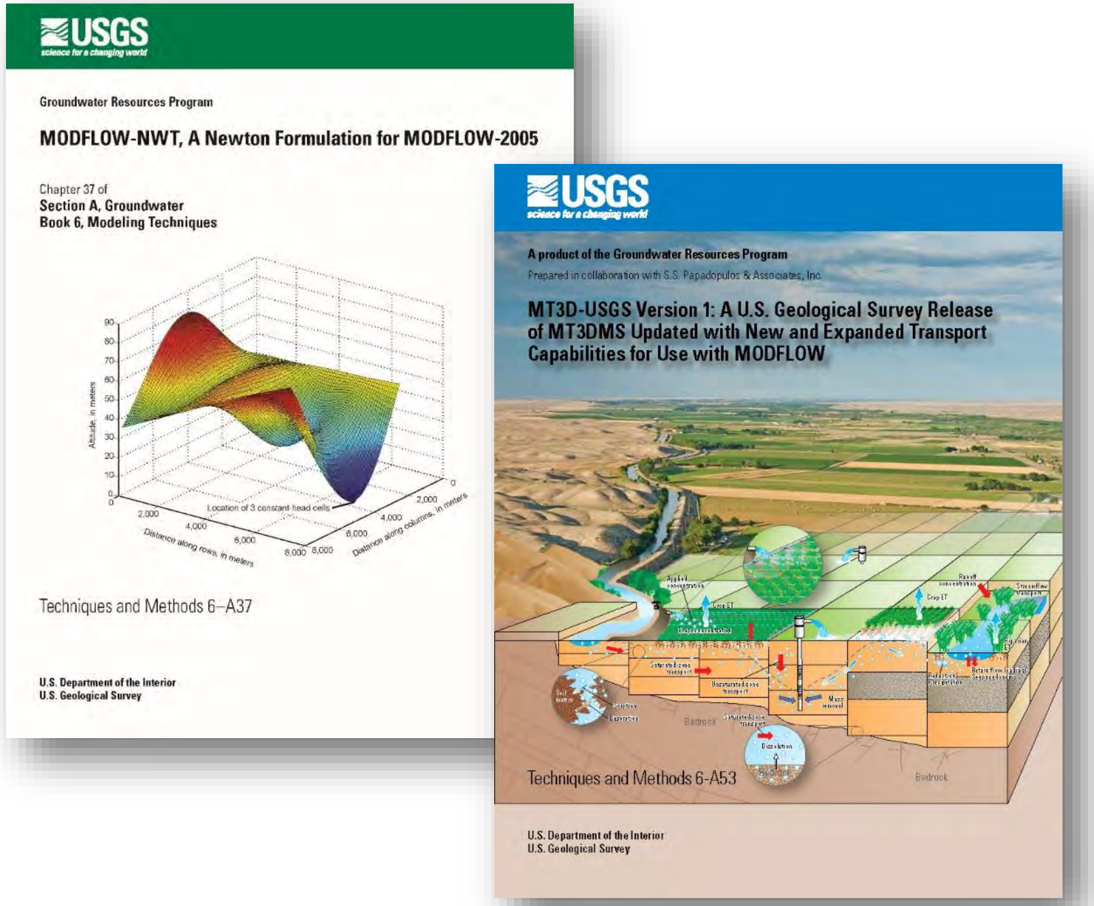
Technical Peer Review Meeting

TECHNICAL INPUT – APPROACH GROUNDWATER MODEL

Previously Recommended Modeling Codes

- Modeling team has reconsidered modeling approach since the January 2020 TPR meeting
- Solute transport is not required by GSP regulations
  - Not aware of other GSAs implementing solute transport modeling in their GSPs
- Solute transport modeling, as compared with flow modeling
  - More data intensive
  - Requires more complex & less available input data
  - Greater predictive uncertainty
- GSA plans to rely on historical water quality data and SNMP simulations to guide GSP decisions related to water quality
- Frees up funding for an unforeseen, but necessary, climate evaluation and for greater participation in TPR meetings



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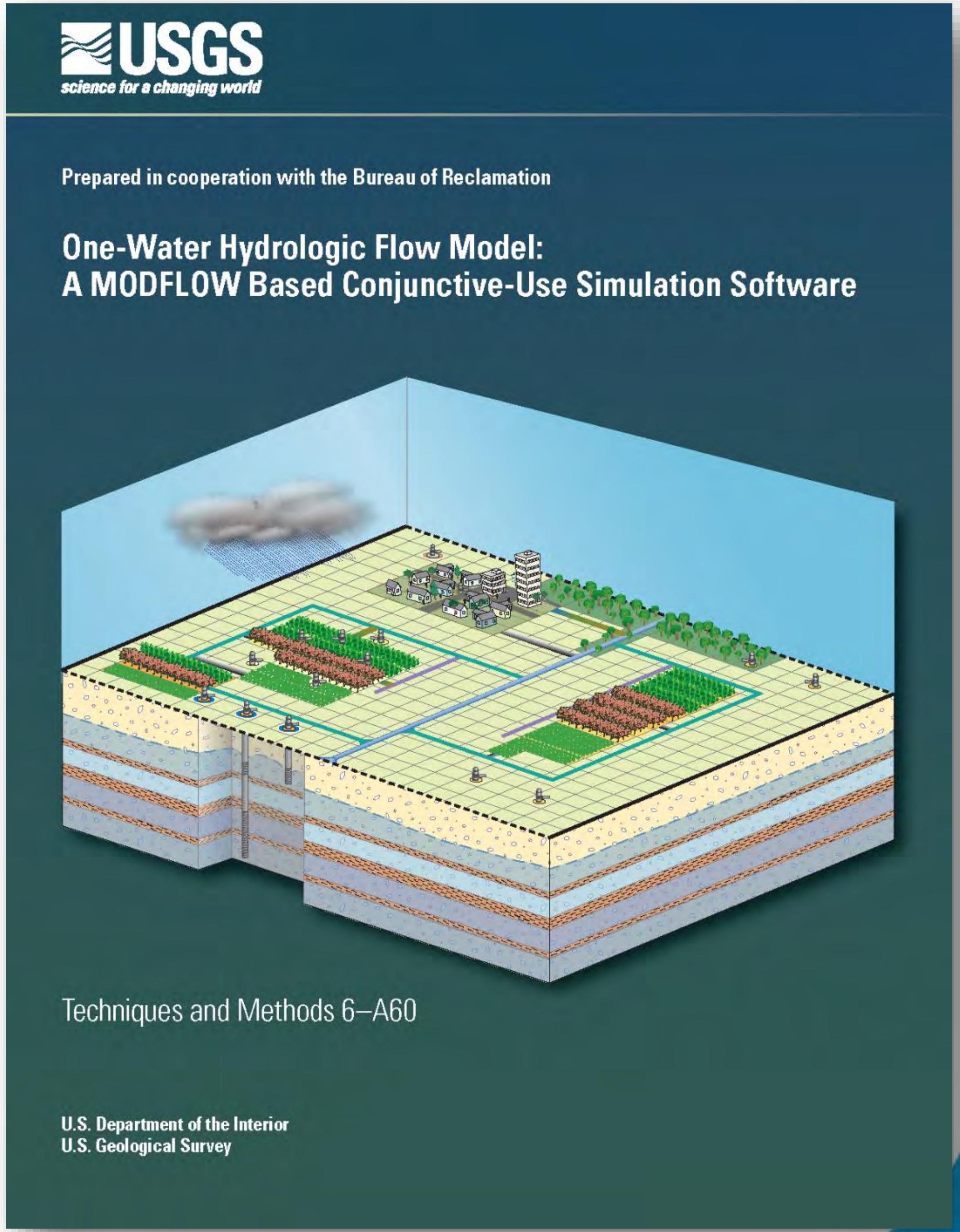
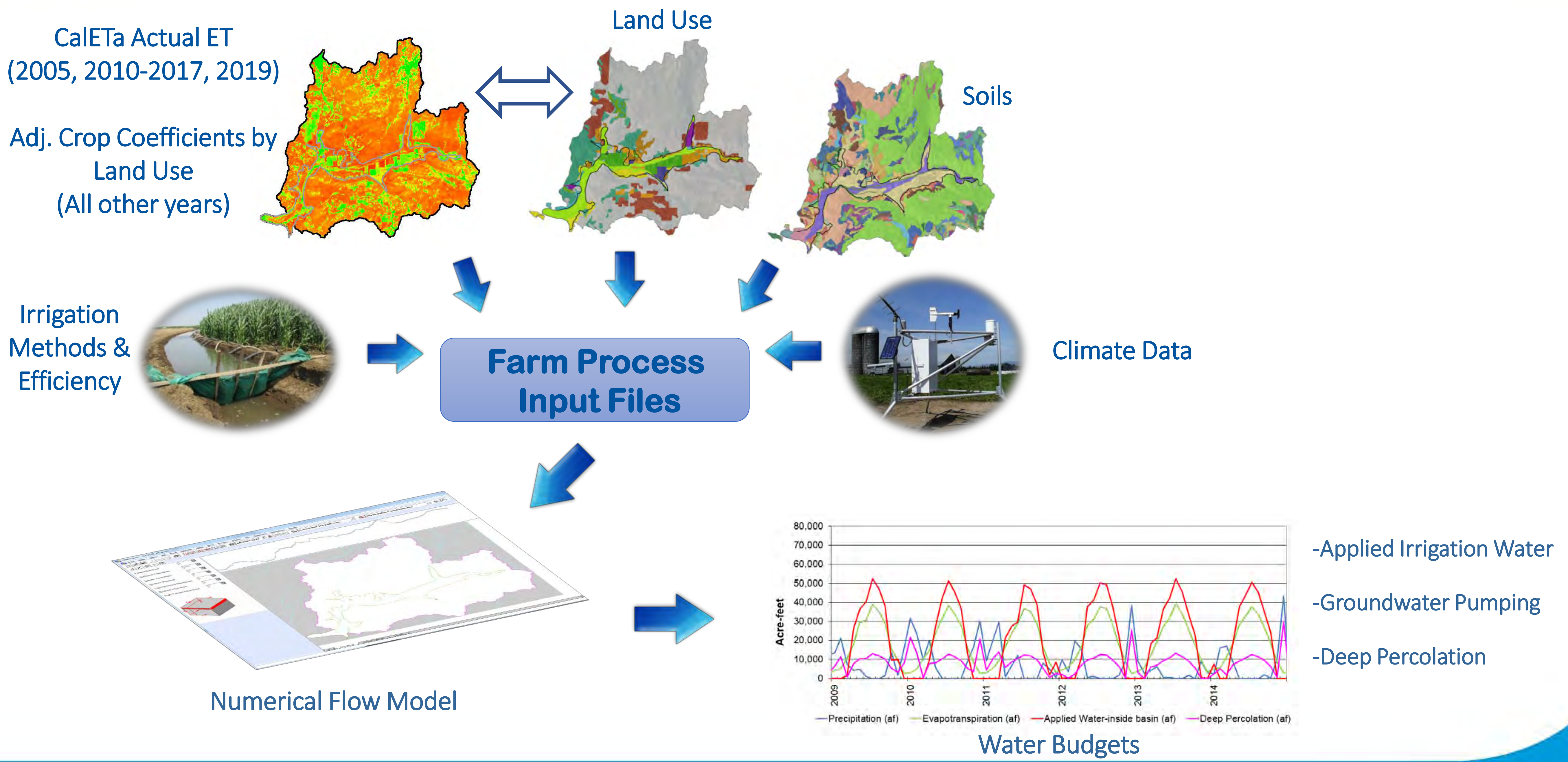
One-Water Hydrologic Flow Model

- Compliant with *§352.4(f)*
- MODFLOW codes are industry standards in wide use
- Well documented with good technical support
- Can simulate aquifers that dry and rewet through time and more integrated flow processes
- Automatically estimates ag pumping based on irrigation-demand-driven land uses
- Includes convenient postprocessing capabilities to efficiently develop detailed water budgets
- Well suited to address local flow-related sustainability indicators



How Will Land Use Be Incorporated into the Modeling Process?



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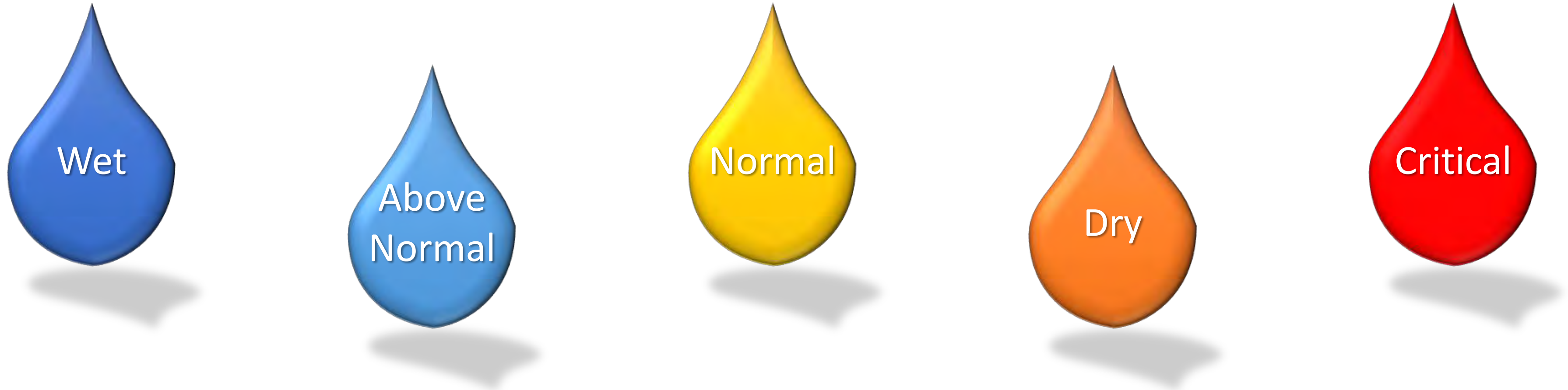
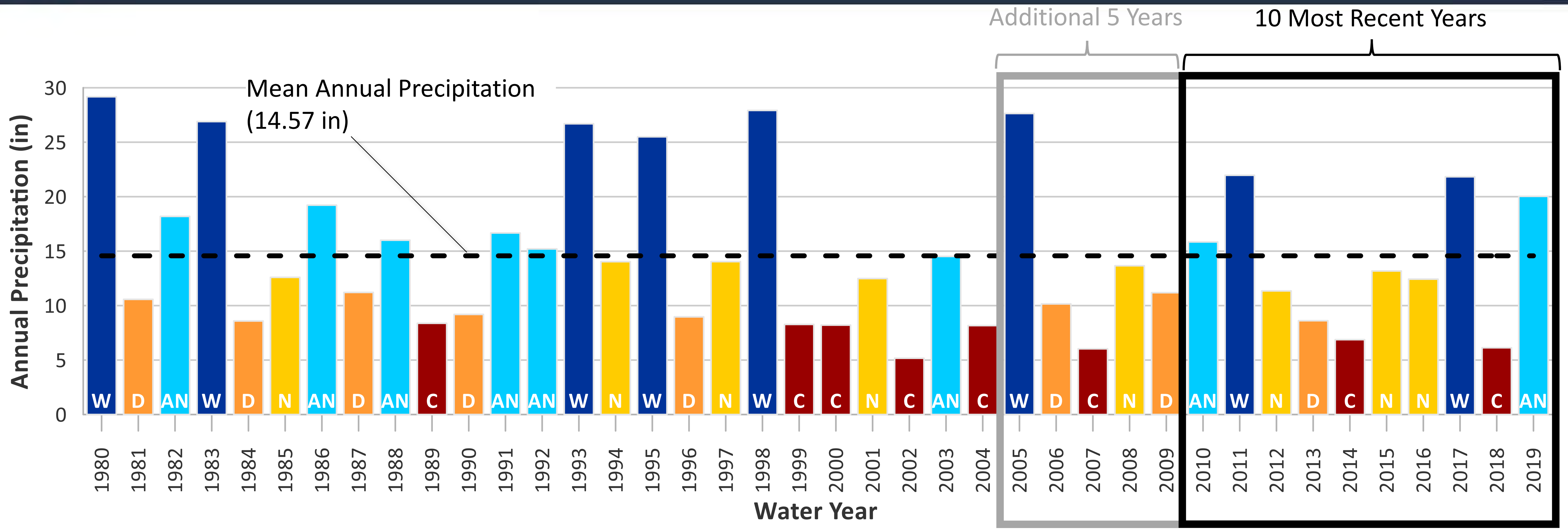
- Factors affecting the selection of a calibration period
  - GSP Regs require calibrating models to at least the last 10 years (2010–2020)
  - Reliability of available historical data
  - Climatic variability during last couple decades
- Water year indices had not been previously established for SPV, so a method based on precipitation data was implemented



Water Year Index for the Model Domain



Water Year Index

- W Wet
- AN Above Normal
- N Normal
- D Dry
- C Critical

Period	C	D	N	AN	W
2010–2020	2	1	3	2	2
Selected Calibration Period → 2005–2020	3	3	4	2	3
1980–2020	8	8	8	8	8

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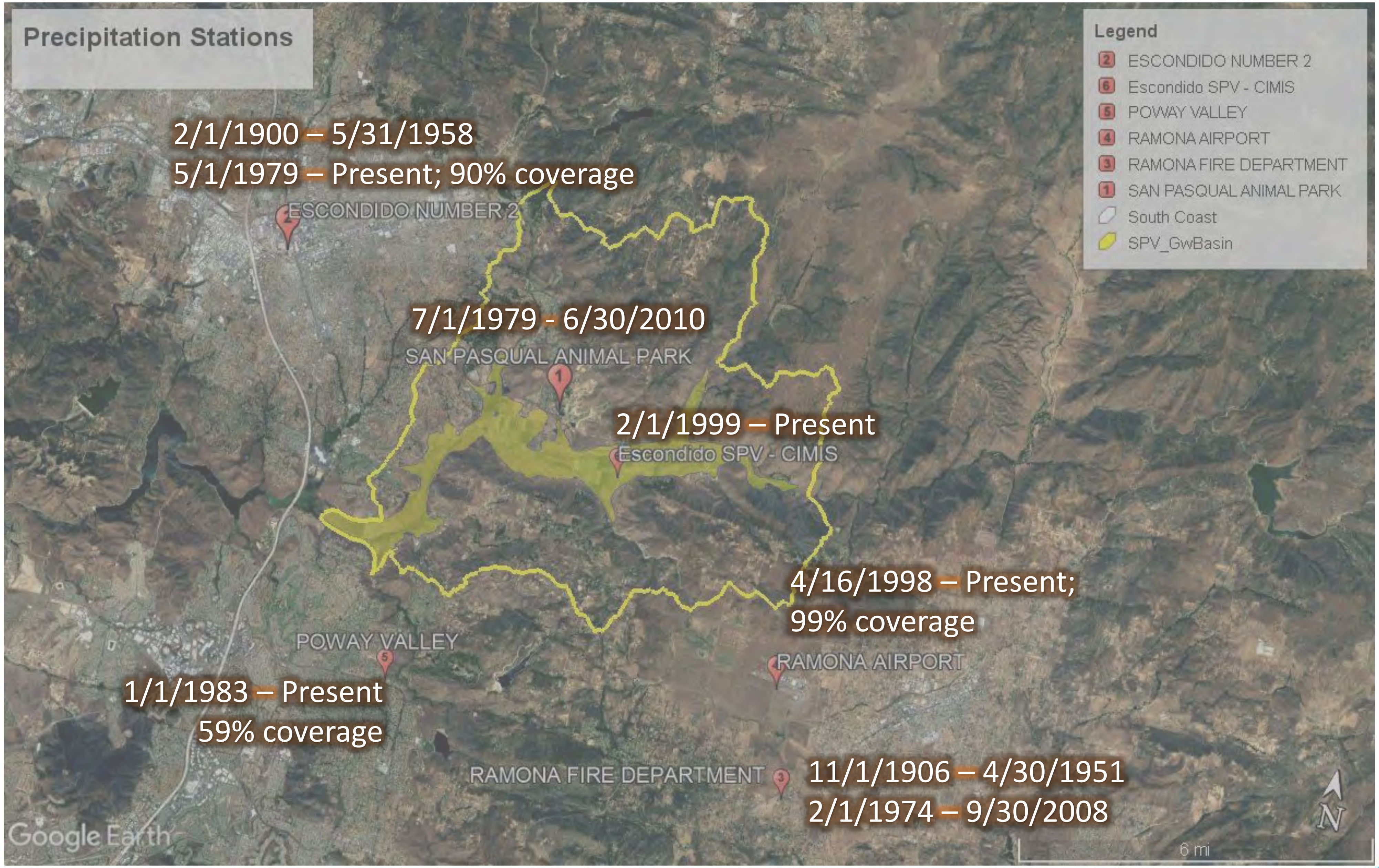
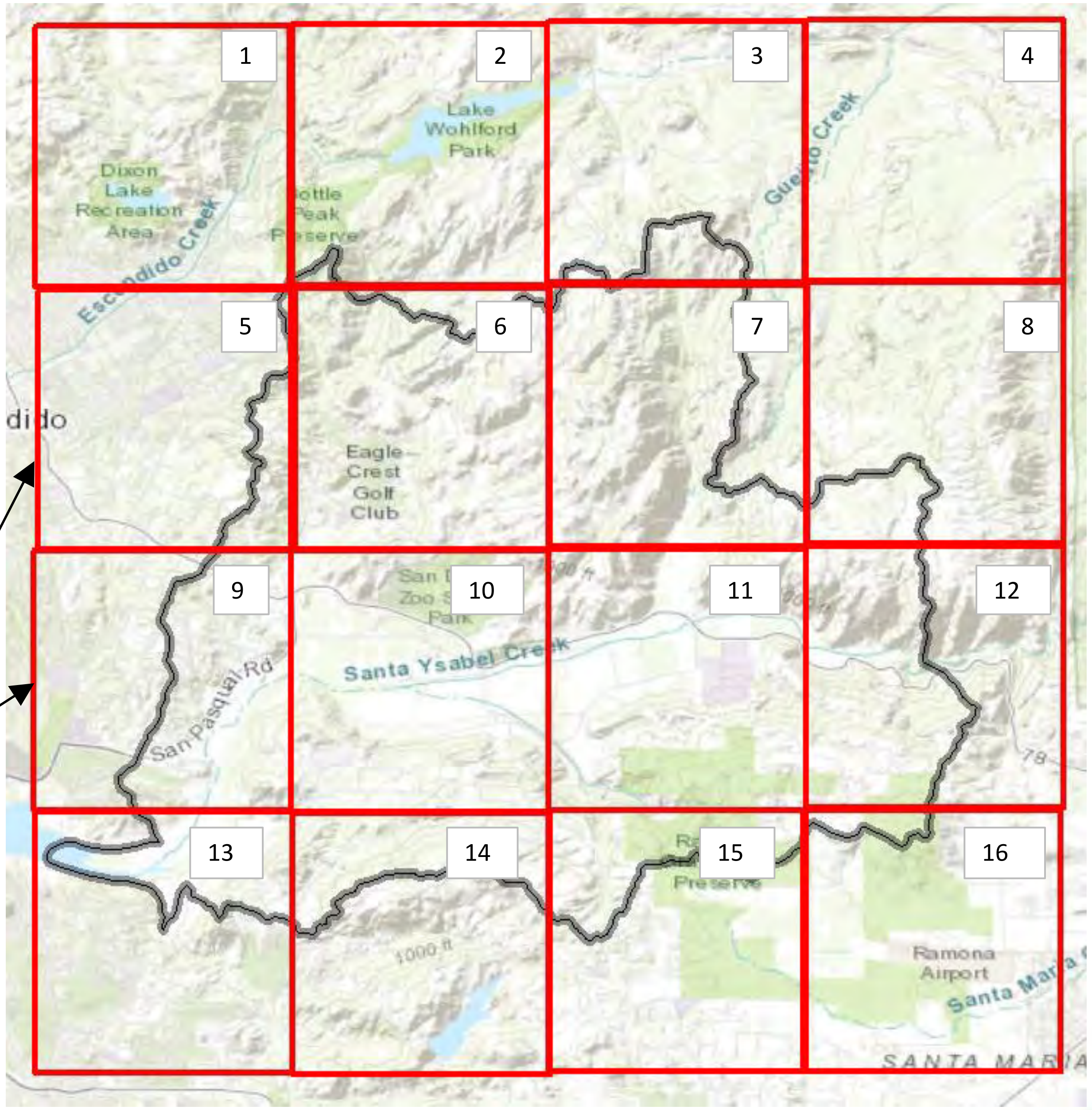
Overview of Local Precipitation Stations



PRISM* Dataset

- Climate–elevation regression model
- Spatial resolution = 4 km
- Monthly (1895 to present)
  Daily (1981 to present)



Depiction of PRISM Grid Cells (red)

*Parameter-elevation Relationships on Independent Slopes Model (http://www.prism.oregonstate.edu/)

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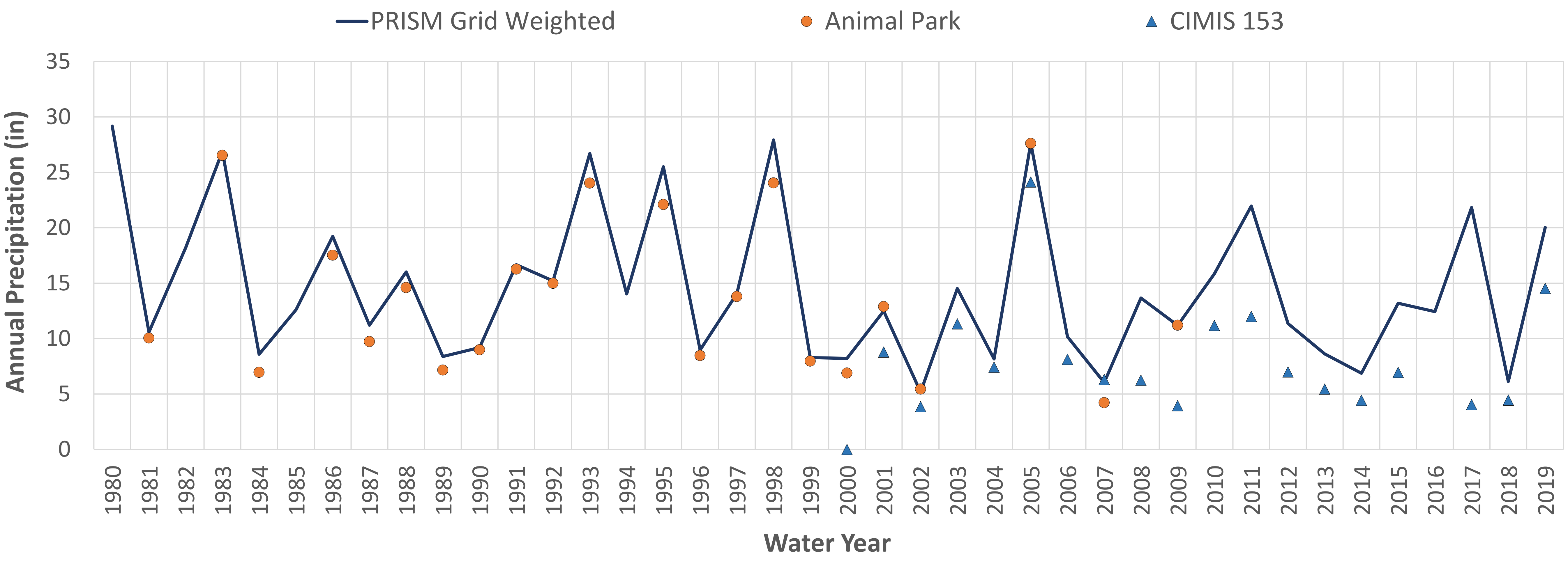
PRISM versus Local Stations: Precipitation Interannual Variability



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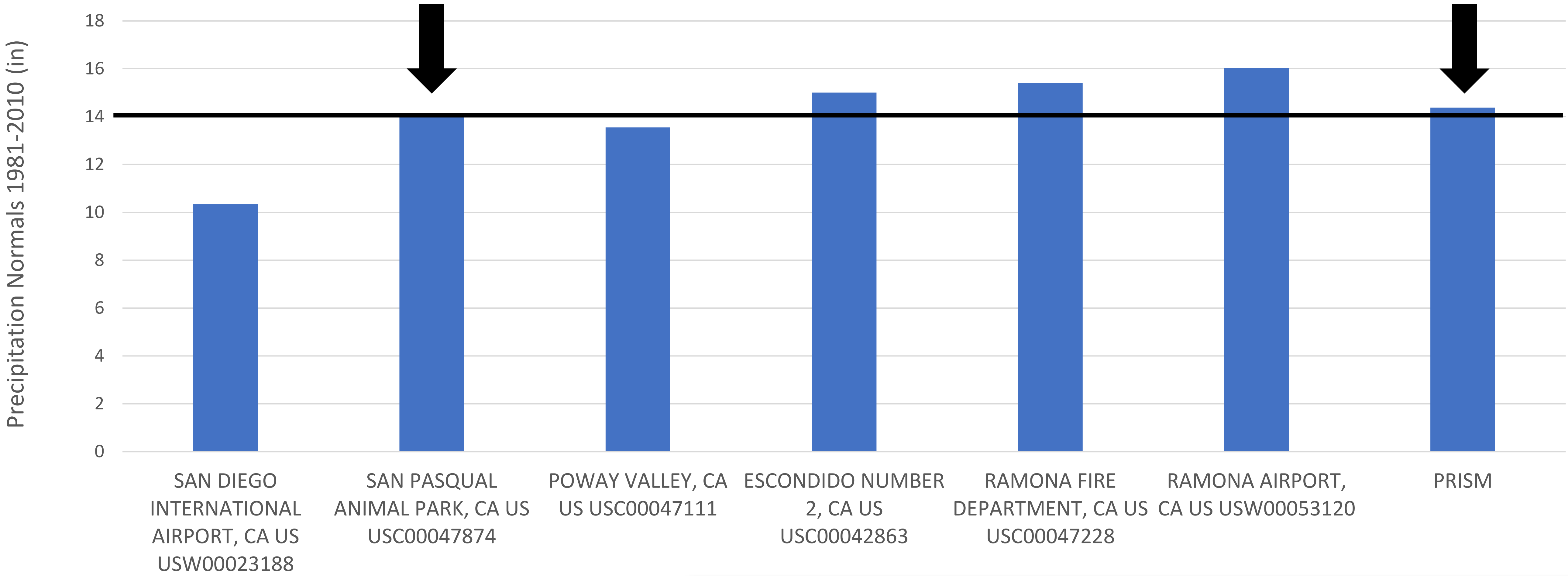
Station and PRISM Precipitation Normals: 1981–2010 Average



PRISM average is similar to the average at San Pasqual Animal Park. PRISM data are in wide use, well documented, and are readily available for the model domain. Processes for incorporating climate change into PRISM datasets are already established. So PRISM is recommended as the source of precipitation data for the model.

Source: Anthony Arguez, Imke Durre, Scott Applequist, Mike Squires, Russell Vose, Xungang Yin, and Rocky Bilotta (2010). NOAA's U.S. Climate Normals (1981-2010). https://www.ncei.noaa.gov/metadata/geoportal/rest/metadata/item/gov.noaa.ncdc:C00821/html#

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TECHNICAL INPUT – APPROACH
MONITORING NETWORKS

Technical Input – Approach
Monitoring Networks

- Need to cover the six Sustainability Indicators:

- Approach:
  - Monitor Levels and Quality (TDS, Nitrate)
  - Use Levels as a proxy for storage, subsidence, and surface water depletion
  - Seawater Intrusion is not applicable
- Rationale:
  - Robust levels and quality monitoring networks in place
  - Levels are what is measured for storage
  - No indication of existing subsidence
  - Surface water depletion is not directly measurable, is calculated based off level information
  - Implementation cost and local control considerations

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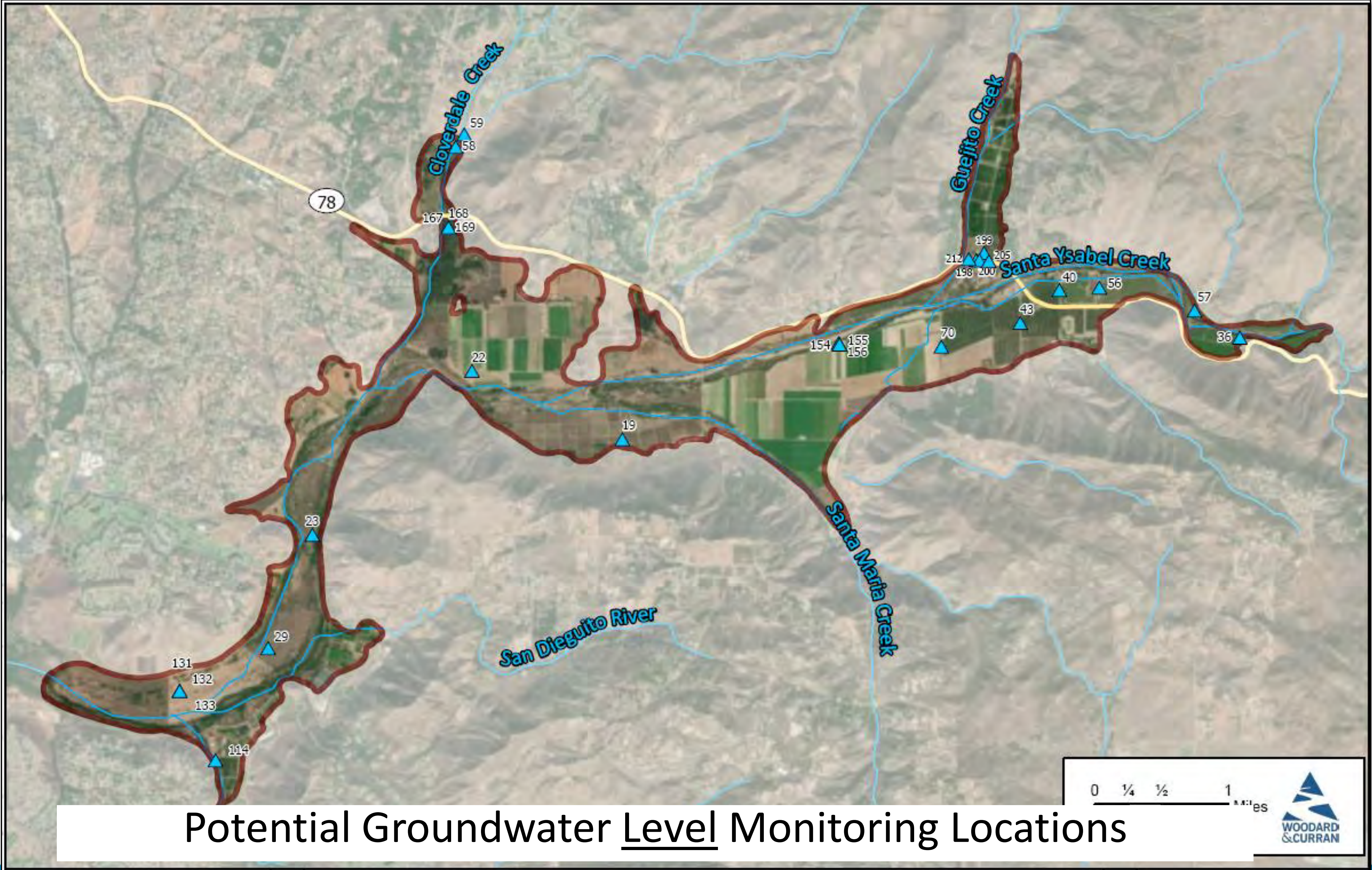
Technical Input – Approach
Monitoring Networks



Potential Groundwater Level Monitoring Locations

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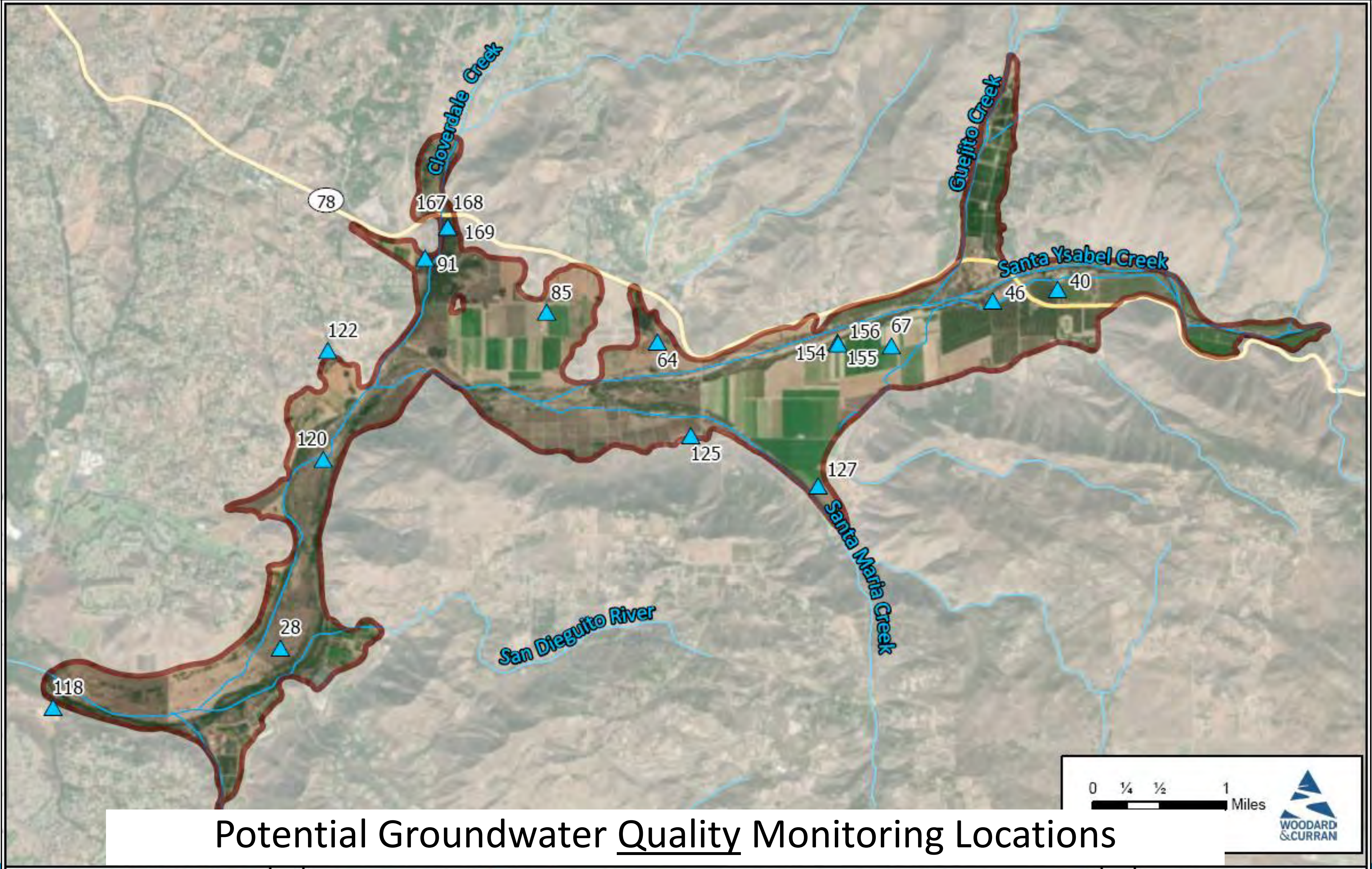
Technical Input – Approach
Monitoring Networks



Potential Groundwater Quality Monitoring Locations

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TECHNICAL INPUT – APPROACH
AC COMMENTS

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PRELIMINARY ANALYSIS RESULTS
UNDESIRABLE RESULTS

Preliminary Analysis Results

- Full Figures in Handout 3
- Undesirable Results Review
- Figures
  - Geologic Map
  - Contour Maps
  - Surface water flows and quality
  - Cross Section

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- "Undesirable Result" wording is used in two ways in SGMA:
  - 1st - Statements that describe what happens if conditions are bad for local users e.g. what happens if there is an "undesirable result".
  - 2nd - Sustainable Management criteria define how measurements will indicate if the basin reaches an "undesirable result".

Preliminary Analysis Results
Undesirable Results

- Statements and how they are detected are a key component of the GSP, and require careful wording
- Approach:
  - Consider stakeholder input
  - Phrased broadly to meet regulations “significant and unreasonable effects…caused by groundwater conditions” (354.26)
  - Drives monitoring network, thresholds, projects, and management actions portions of GSP

Preliminary Analysis Results

Undesirable Results

Sustainability Indicator [1]	I. STORAGE	II. GROUNDWATER ELEVATION	III. WATER QUALITY	IV. SURFACE WATER CONNECTIVITY
Undesirable Results Consideration [2]	Unreasonable reduction of groundwater storage, which results in: a. Adverse impacts to the viability of agriculture, and the agricultural economy. b. Unusable and stranded groundwater extraction infrastructure. c. Need to deepen or construct new wells. d. Adverse impacts to domestic wells users. e. Adverse impacts on connected ecosystems.	Chronic lowering of groundwater levels indicating unreasonable depletion of supply, which results in: a. Adverse impacts to the viability of agriculture, and the agricultural economy. b. Unusable and stranded groundwater extraction infrastructure. c. Need to deepen or construct new wells. d. Adverse impacts to domestic wells users. e. Adverse impacts on connected ecosystems.	Significant and unreasonable degraded water quality that adversely impacts drinking, irrigation, industrial, and environmental uses, resulting from: a. Adverse impacts to the viability of agriculture, and the agricultural economy. b. Adverse impacts to ecosystems and habitat. c. Adverse impacts to the viability of drinking water.	Significant and unreasonable depletions of interconnected surface water that results in: a. Adverse impacts on downstream neighbors. b. Adverse impacts on the natural stream environment.
Minimum Threshold Consideration [3]	• TBD	• Local well infrastructure depths • Groundwater dependent ecosystems	• Maintain and sustain water quality • Trend or exceedance of historic baseline of water quality indicators at representative sites (TDS, Nitrate)	• Understand historic rates of stream depletion for comparison
Measurable Objective Consideration [4]	*Example* • Maintain groundwater storage (*within the limits of basin sustainable yield*) that provide for sustainable use of the groundwater basin.	*Example* • Maintain groundwater elevations (*within xx at locations y, z*) that provide for sustainable use of the groundwater basin.	*Example* • Maintain groundwater quality in the San Pasqual Valley Basin for the benefit of groundwater users.	*Example* • Manage groundwater to protect against adverse impacts to surface water flows in creeks flowing through the San Pasqual Valley Basin.
Interim Milestones Consideration [5]	• TBD	• TBD	• TBD	• TBD
Projects & Management Actions Consideration	• Lean and efficient management of groundwater • Use recycled water for recharge or direct use • Agricultural Best Management Practices (BMPs)	• Manage streambeds to increase percolation • Maximize stormwater capture • Work with RWQCB on runoff • Limit new users if needed • Allow alternate dust control methods	• Use recycled water for recharge or direct use • Protect habitat restoration areas • Limit contamination of groundwater due to stormwater infiltration	• TBD
Planning Principles [6]	• Consistent, reliable supplies of water desired • Seek grant funds for conservation improvements • Maintain ability to market crops		• Collaboration and cooperation • Consider effects of west end pumping on east end groundwater levels • Avoid economic impacts where possible • Limit invasive species	

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- Groundwater Levels example:

  "The Undesirable Result for the chronic lowering of groundwater levels is a result that causes significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal or environmental uses over the planning and implementation horizon of this GSP."

- Statements for the six sustainability indicators are included in Handout #2

- How the Undesirable Result is detected:
  - Based on monitoring
  - When XX% of representative monitoring wells (XX of XX) for levels fall below their minimum groundwater elevation thresholds for 2 consecutive years during the defined monitoring period.
  - The % of wells will be set as part of development of the Sustainable Management Criteria

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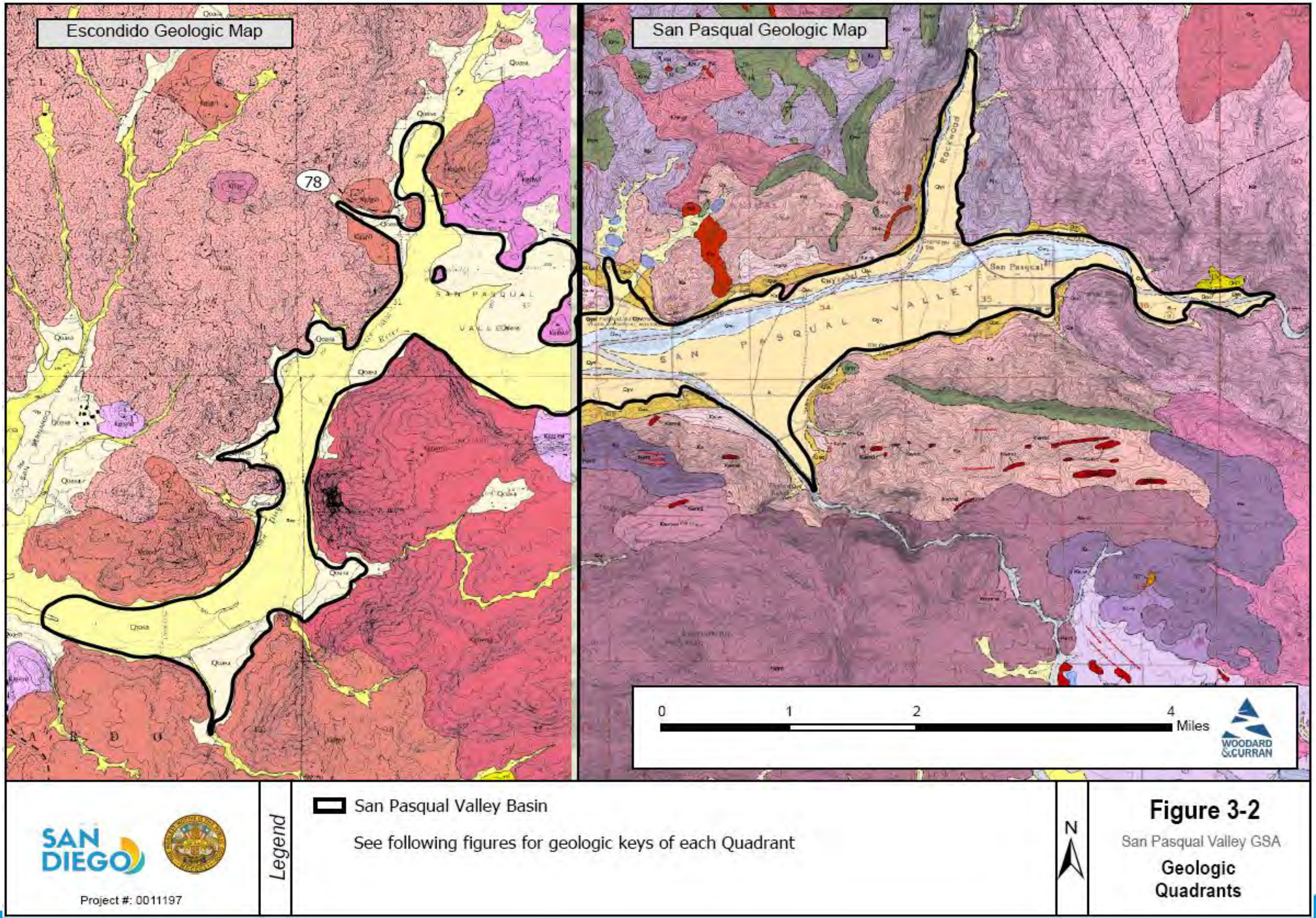
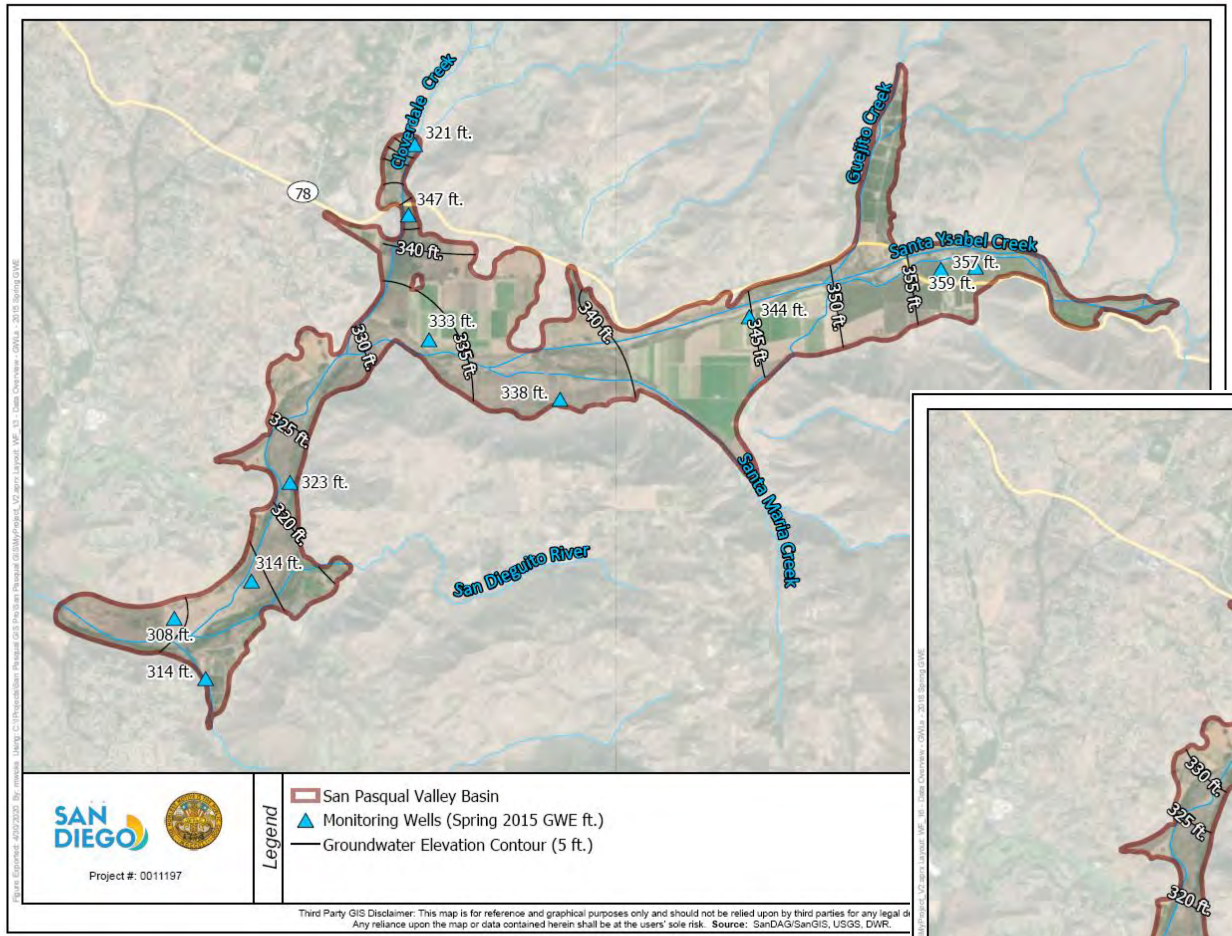
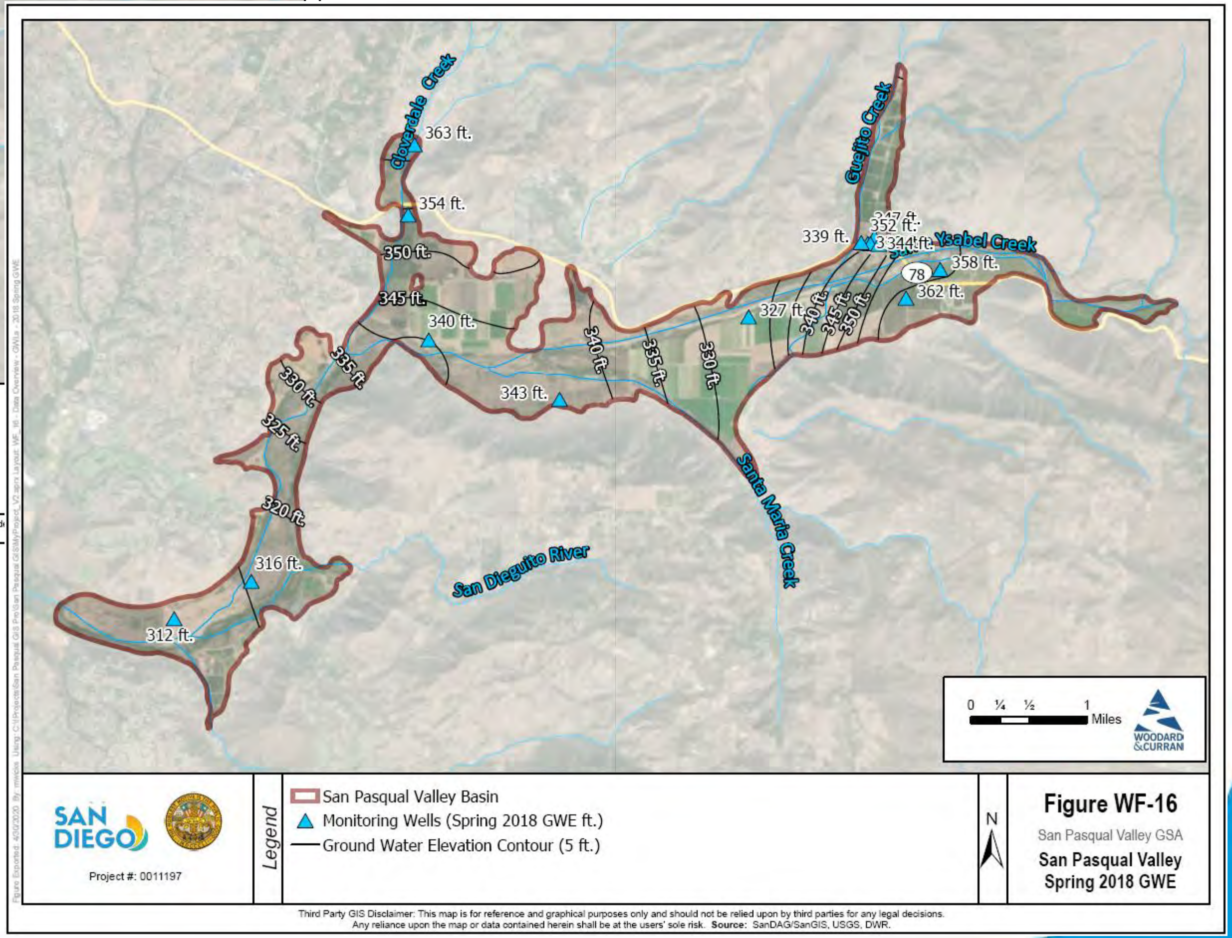
PRELIMINARY ANALYSIS RESULTS
BASIN & HCM FIGURES

- See Basin Settings and HCM figures in Handout 2



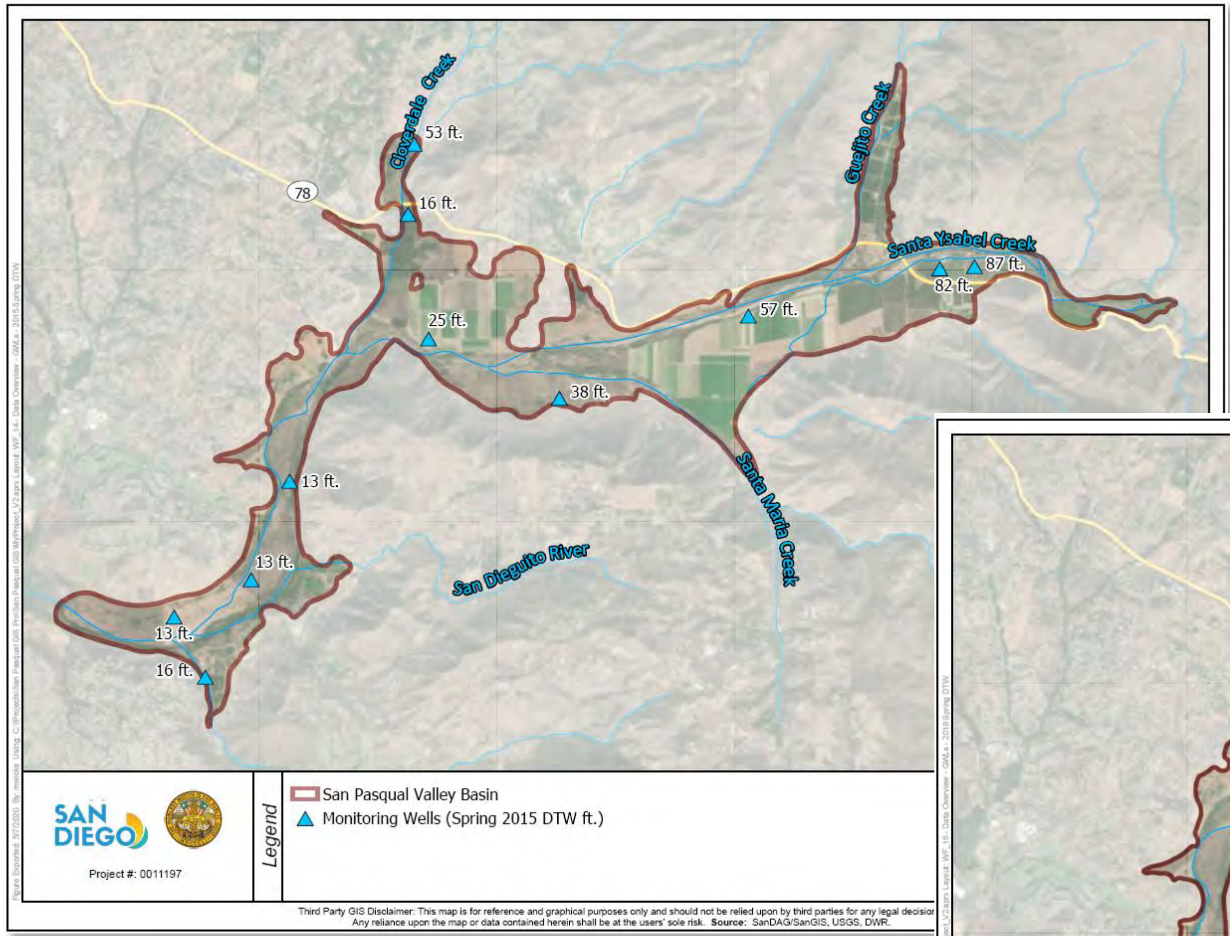
- Groundwater elevation contour maps:
  - Spring 2015
  - Spring 2018

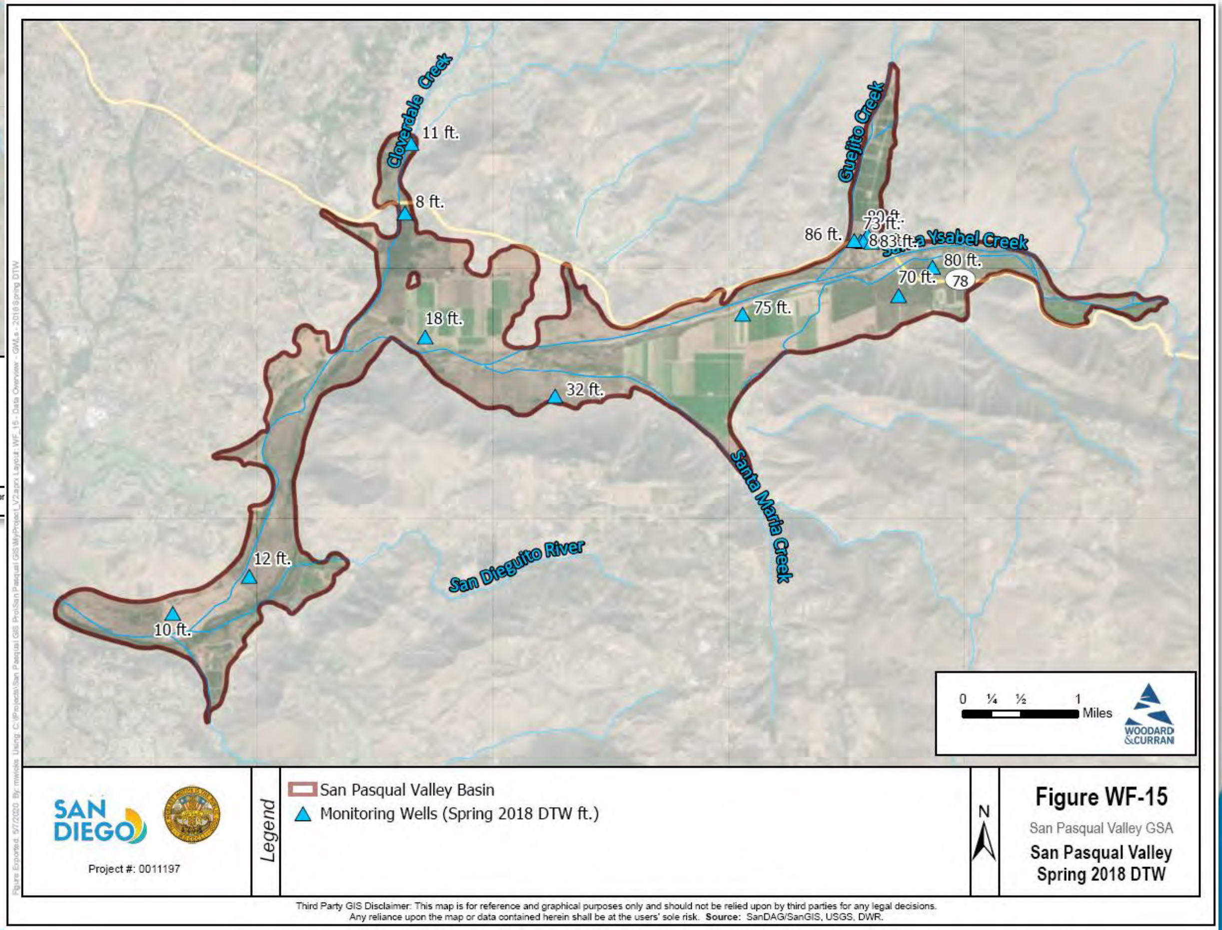




Preliminary Analysis Results
Basin Settings Figures

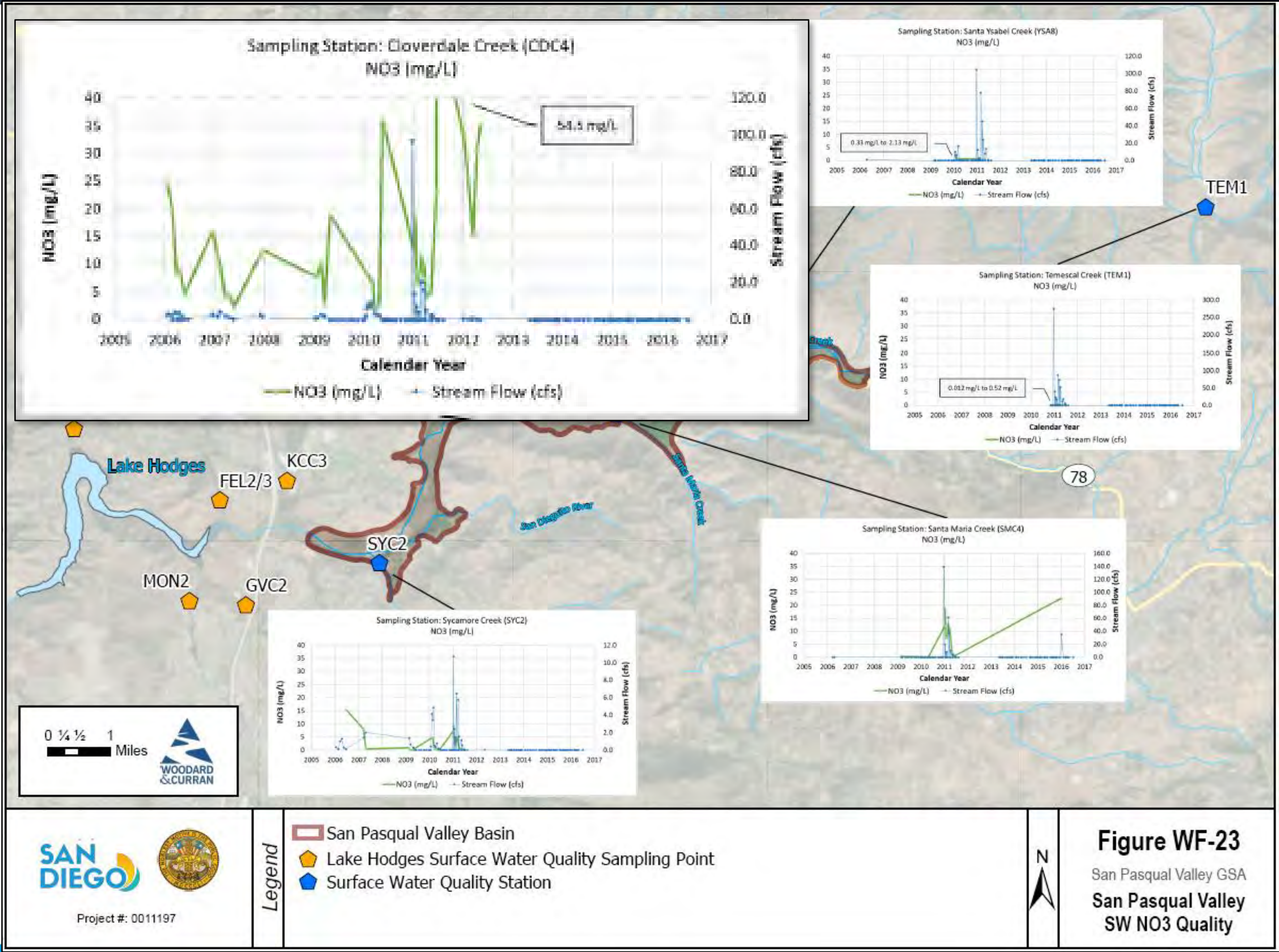
- Depth to Water Values:
  - Spring 2015
  - Spring 2018





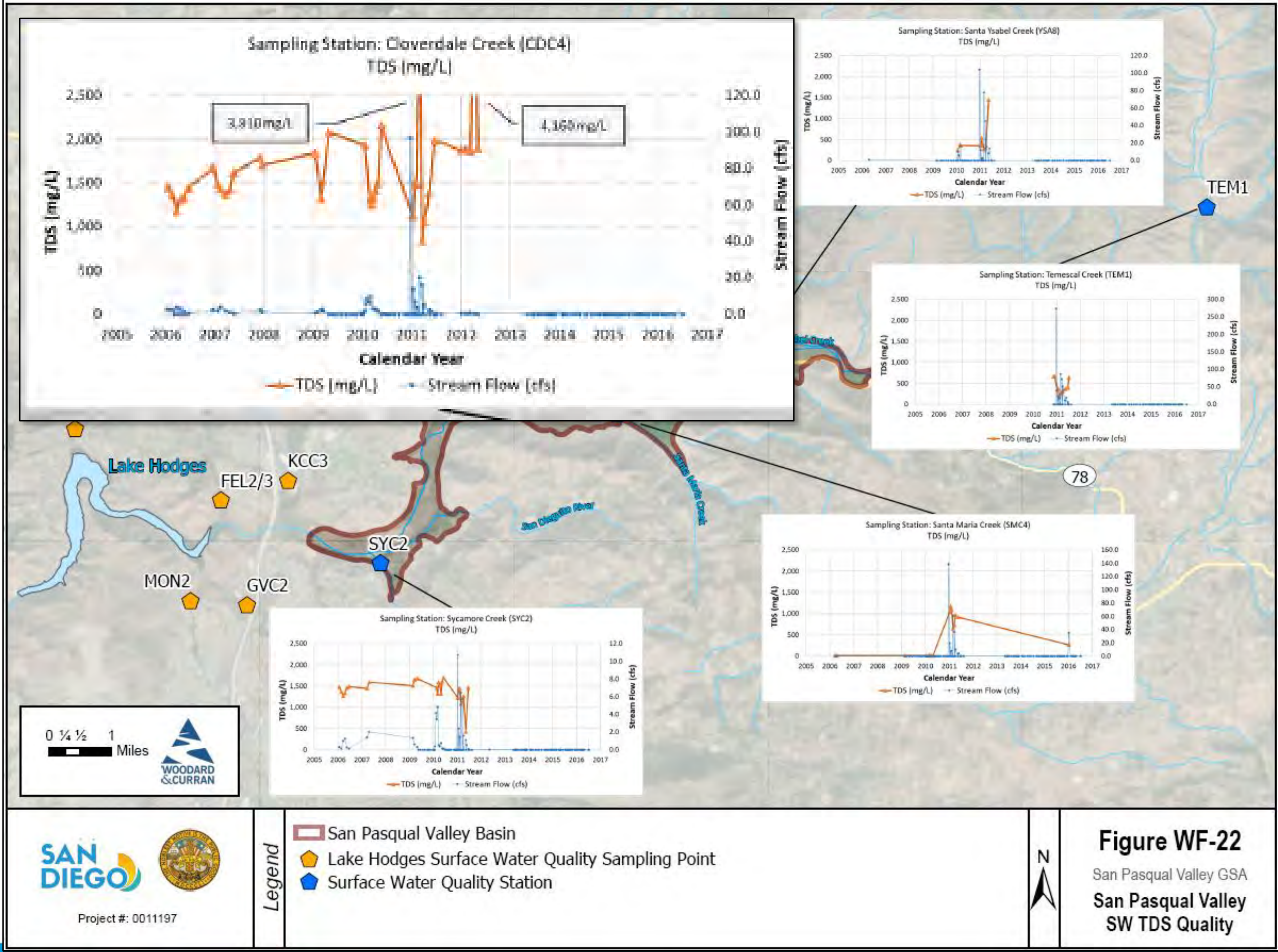
Draft Work Product

- City stream gages and monitoring sites:
  - Nitrate as NO3
  - Stream Flows



Draft Work Product

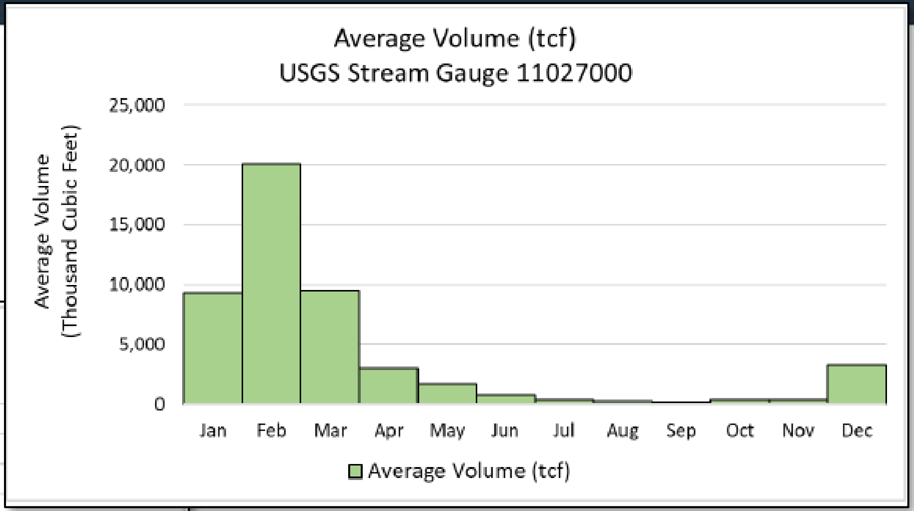
- City stream gages and monitoring sites:
  - Total Dissolved Solids (TDS)
  - Stream Flows

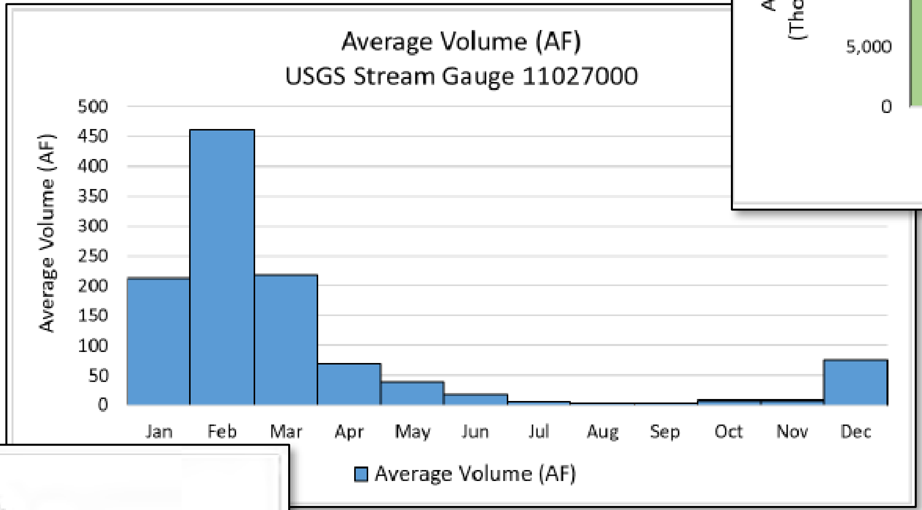


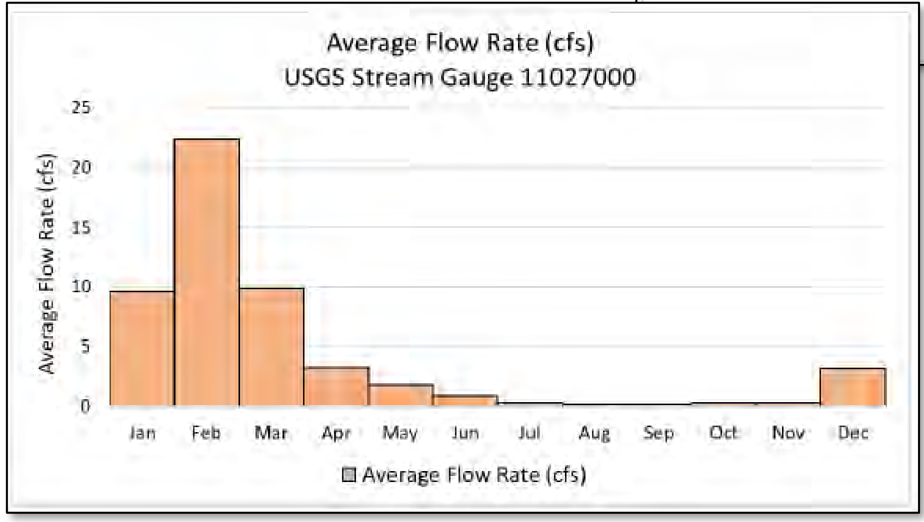
Draft Work Product

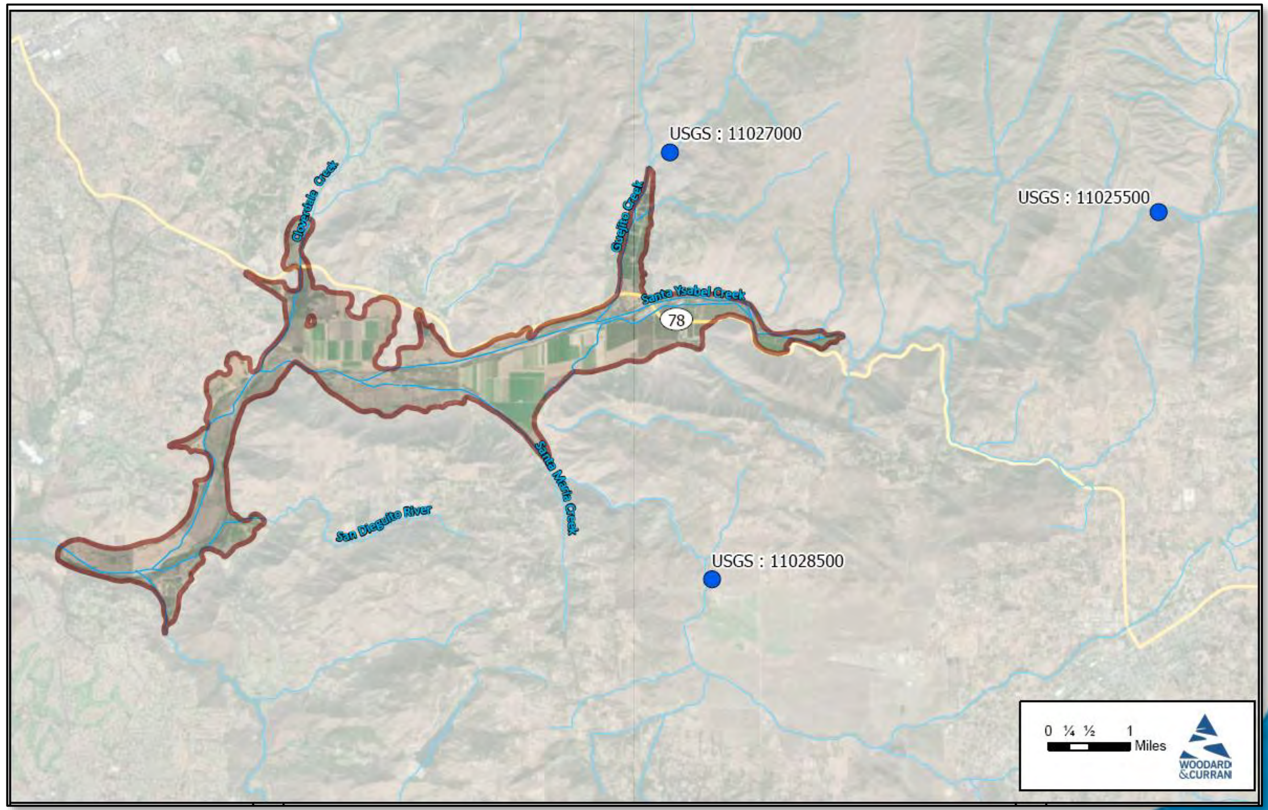
Preliminary Analysis Results
Basin Settings Figures

- USGS Stream Gages
- 1980 – 2015 Data



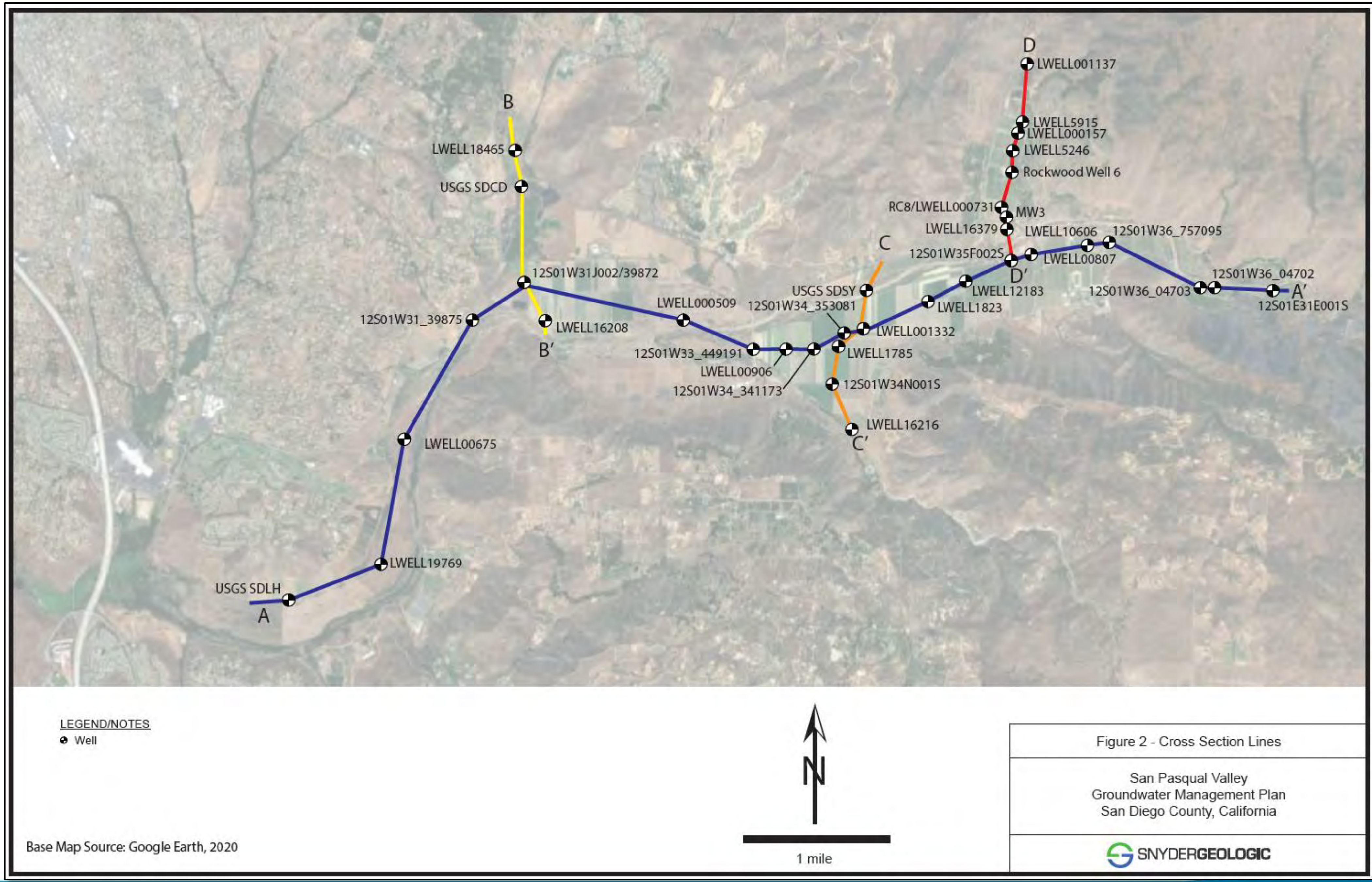






Draft Work Product

- Geologic Cross Sections
- Cross Section Lines
- With Well Completion Reports



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Preliminary Analysis Results

HCM

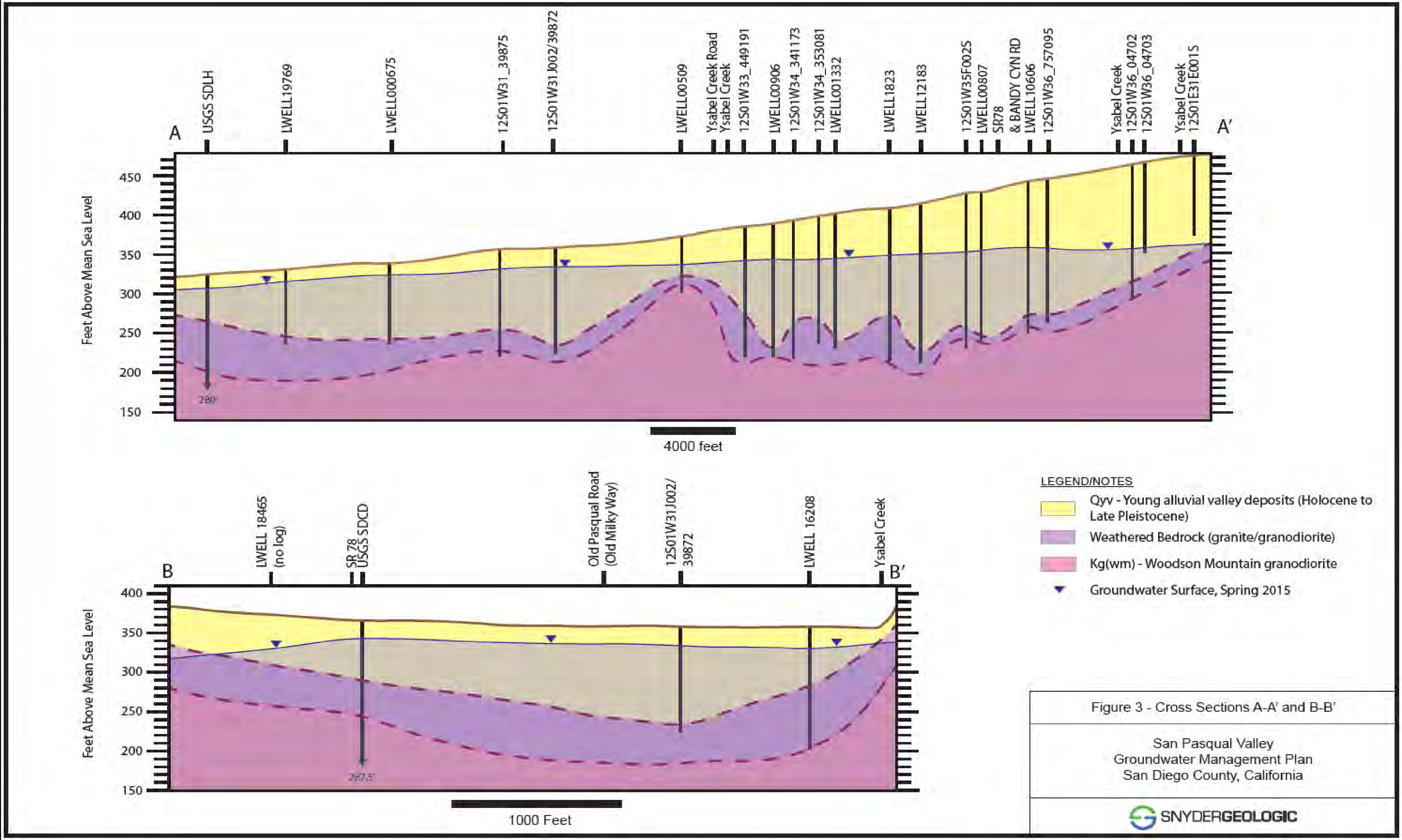
- Cross Sections
- A-A’
- B-B’

Alluvium

Alluvium (wet)

Residuum

Bedrock



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Preliminary Analysis Results

HCM

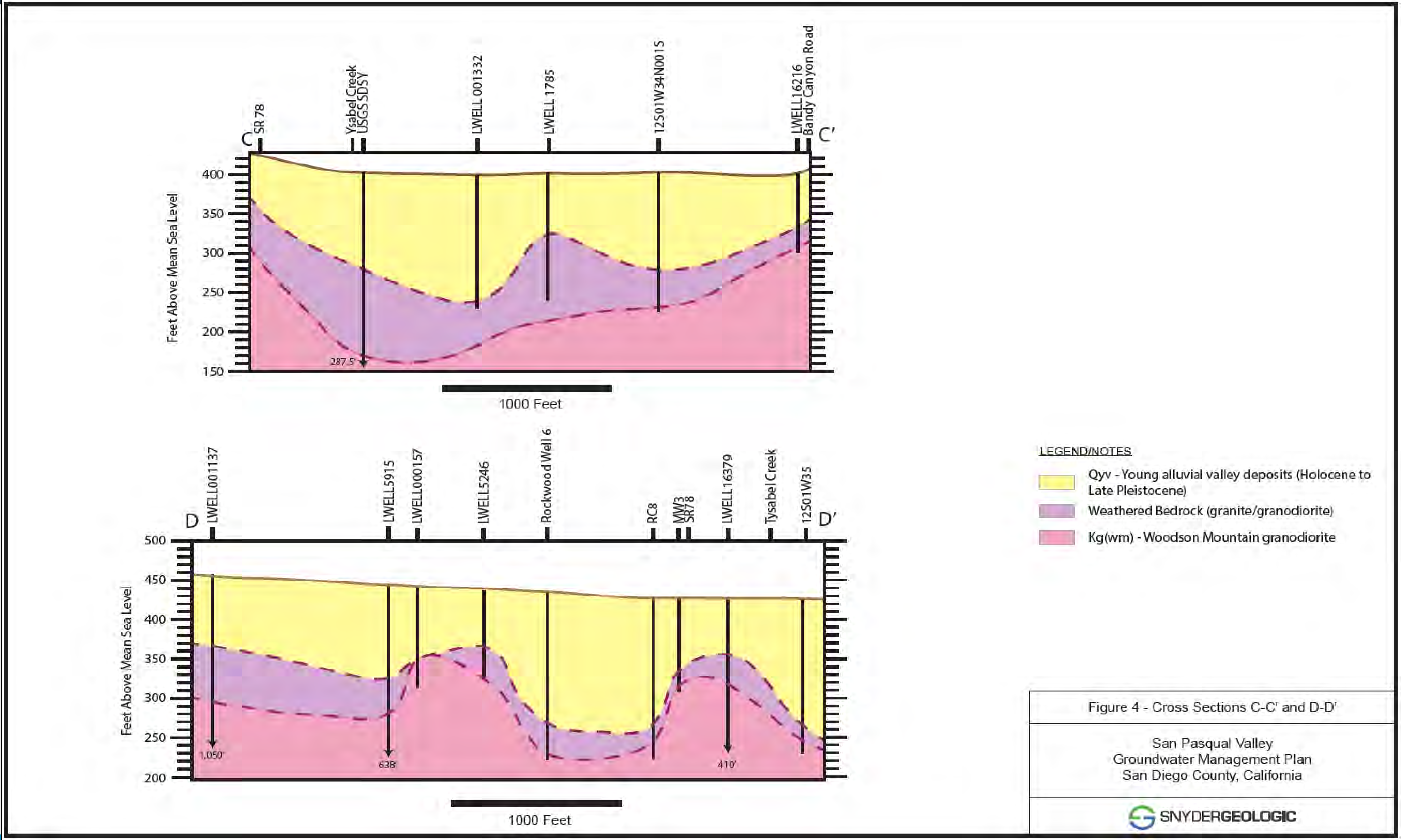
- Cross Sections
- C-C’
- D-D’

Alluvium

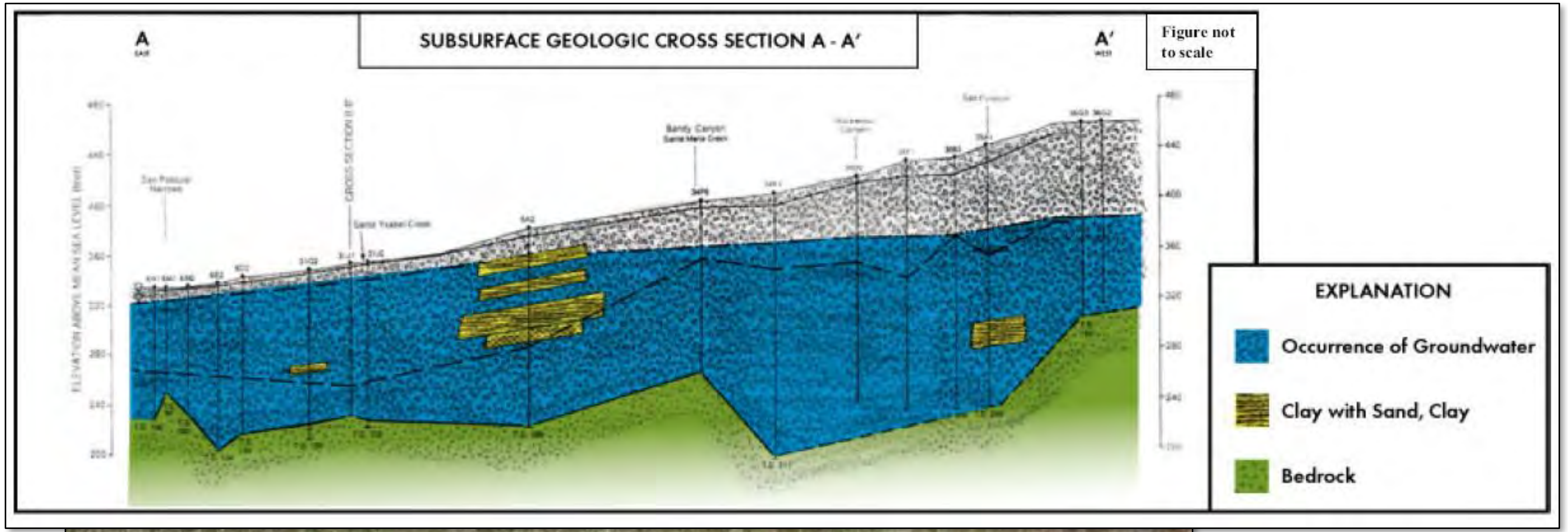
Alluvium (wet)

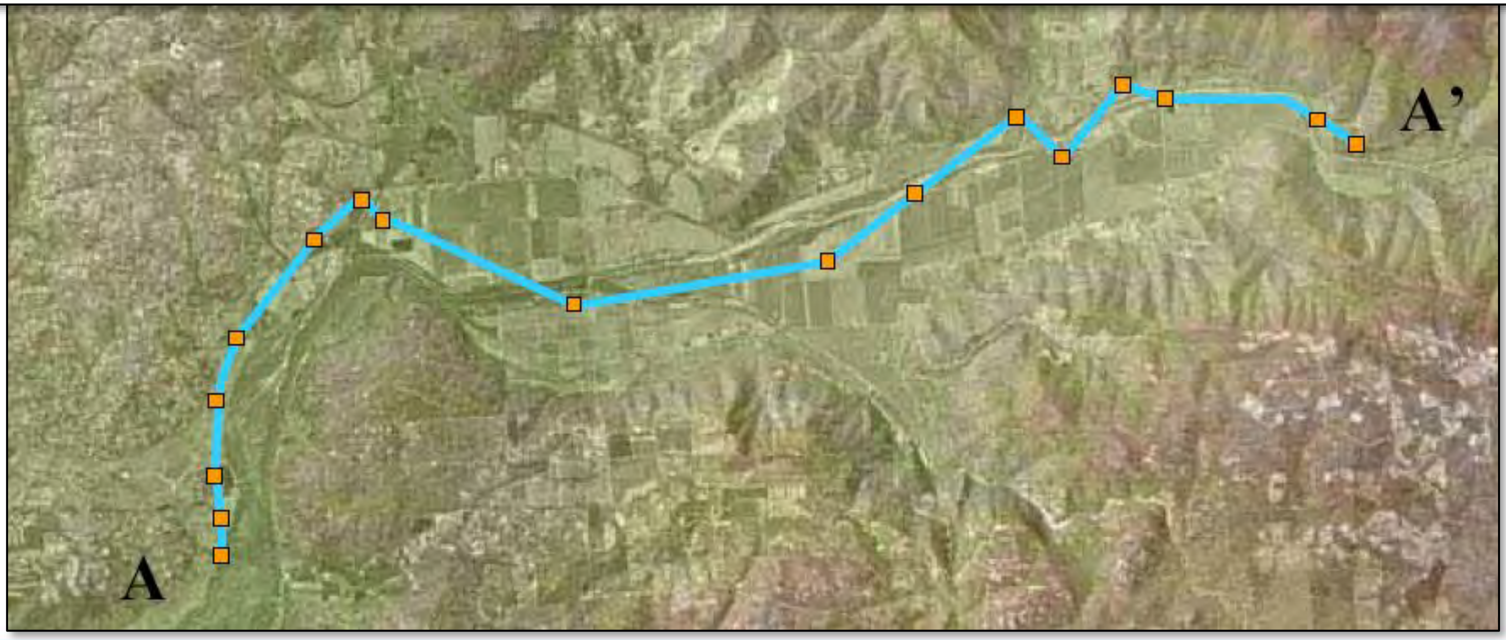
Residuum

Bedrock



- Geologic Cross Sections
  - Greeley and Hansen 1991





Data Request Check-in

- Additional Data Needs
  - Groundwater Level Monitoring Sites?
  - Groundwater Quality Monitoring Sites?

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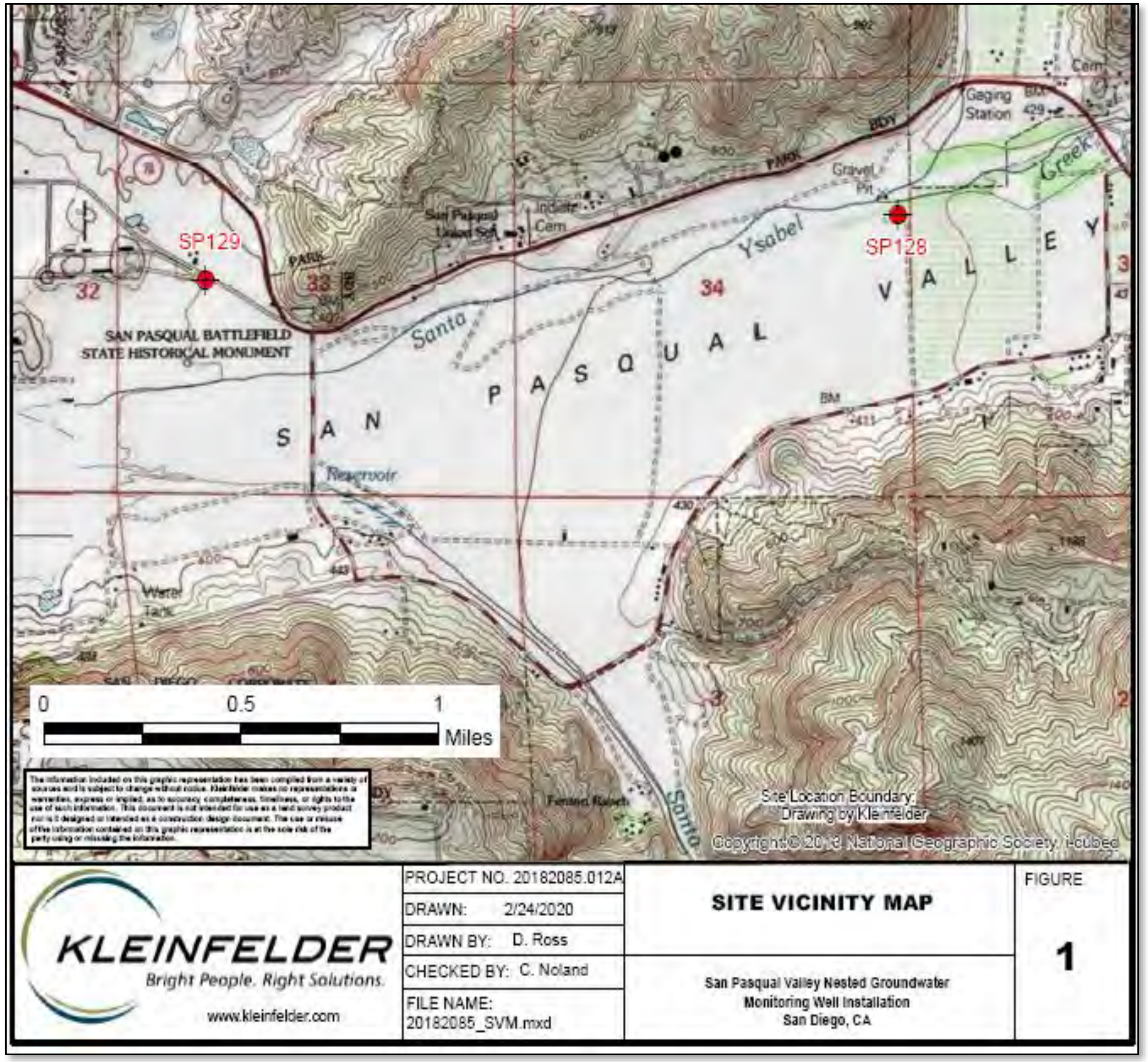
PRELIMINARY ANALYSIS RESULTS
AC COMMENTS

San Pasqual Valley GSP
Technical Peer Review Meeting

FIELD PROGRAM UPDATE

Field Program Update – Monitoring Wells



Field Program Update – Monitoring Wells

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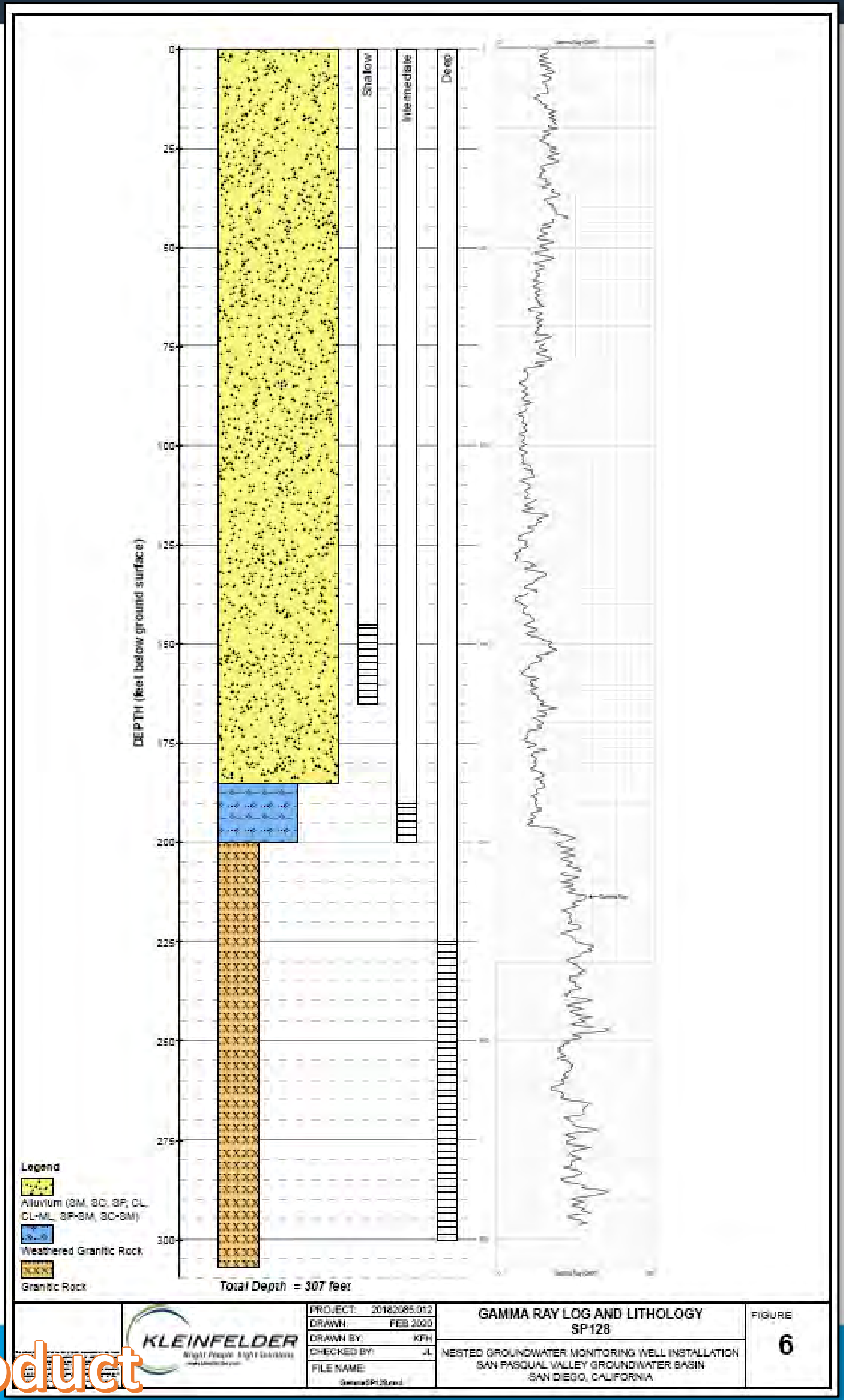
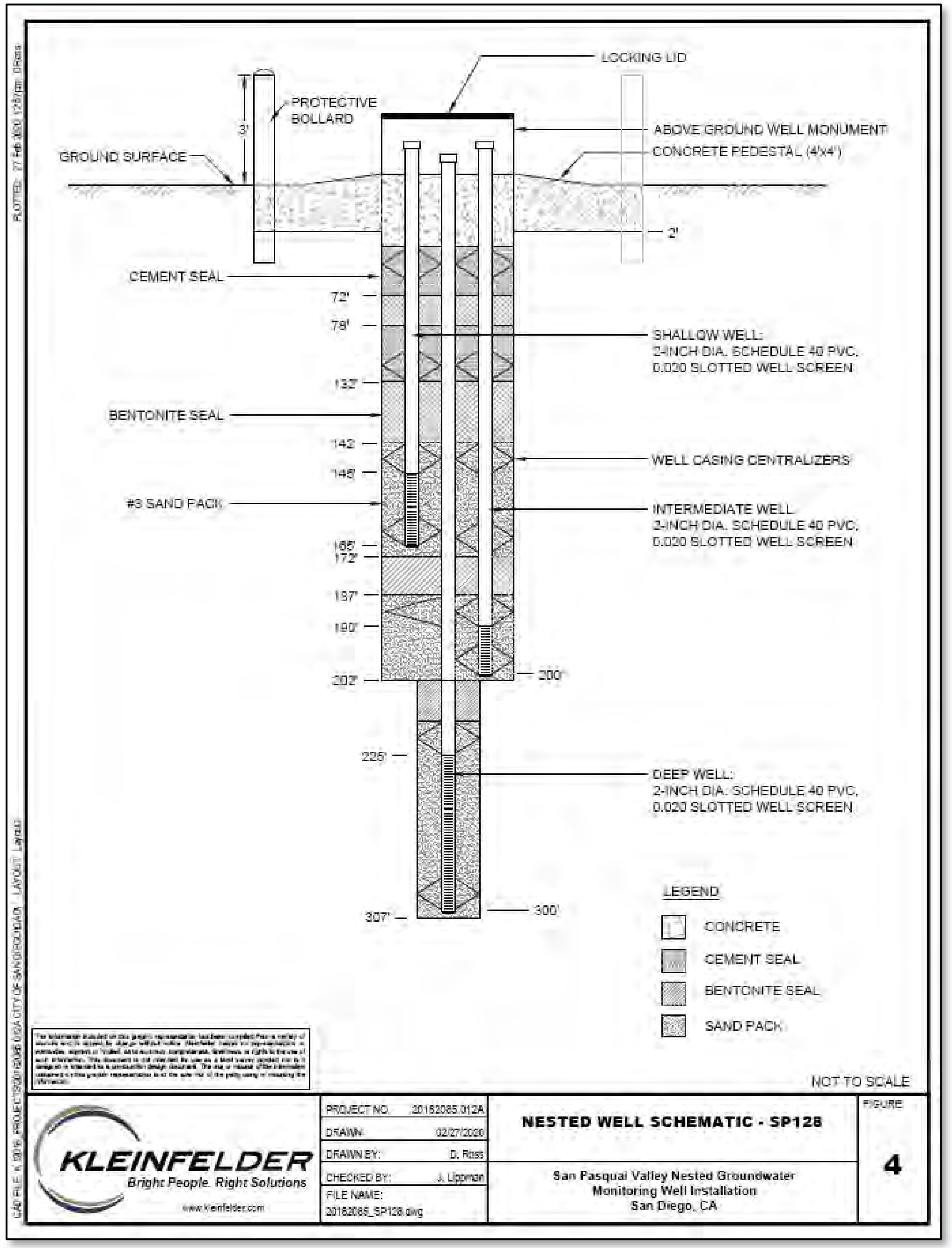
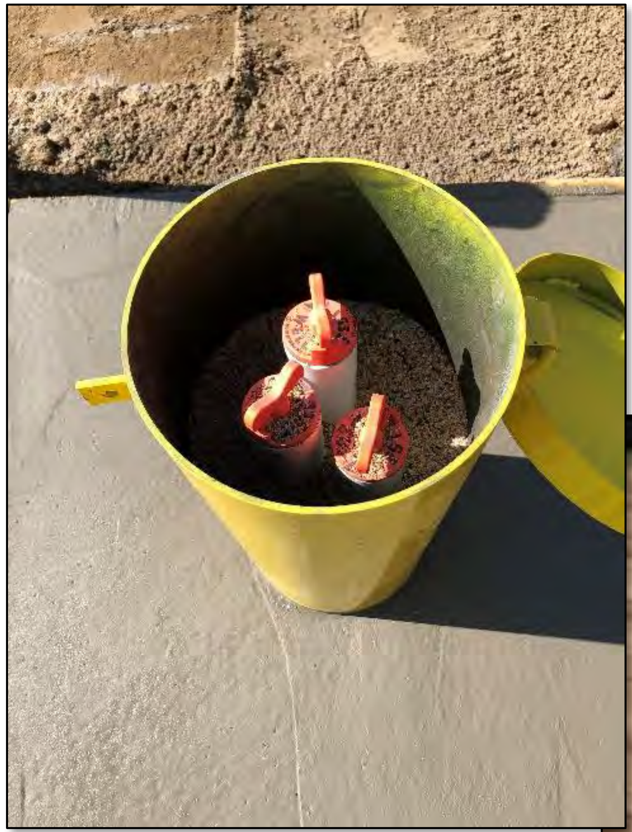
Field Program Update – Monitoring Wells



Field Program Update – Monitoring Wells





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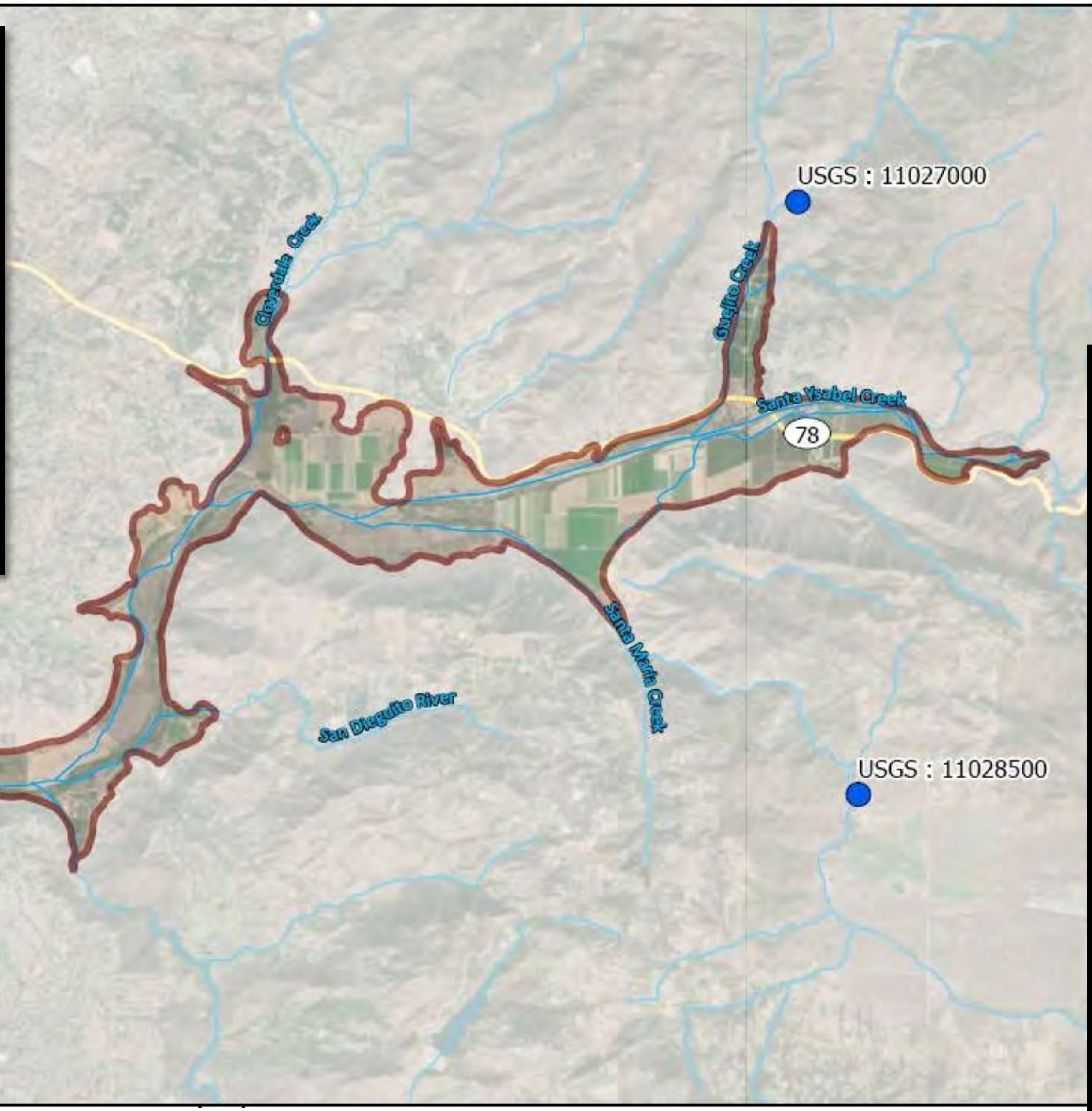
Guejito Creek




Santa Ysabel Creek


Santa Maria Creek

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FIELD PROGRAM UPDATE
AC COMMENTS

The City of SAN DIEGO

San Pasqual Valley GSP
Technical Peer Review Meeting

PUBLIC COMMENT

San Pasqual Valley GSP
Technical Peer Review Meeting

NEXT STEPS & CLOSING REMARKS

Next Steps

- Written comments on today's materials:
  - Due Thursday May 28, 2020 to Sandra Carlson: carlsons@sandiego.gov
- Next AC Meeting:
  - Thursday July 9, 2020, 2-4pm
- Public Notices are at:
  - Online: https://www.sandiegocounty.gov/content/sdc/pds/SGMA/san-pasqual-valley.html

Draft Work Product

- For additional information, please contact:

Sandra Carlson at (619) 533-4235
carlsons@sandiego.gov

Thank You!