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

Sustainable Management Criteria Projects and Management Actions Water Budgets



January 14, 2021

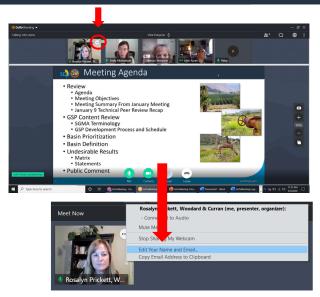
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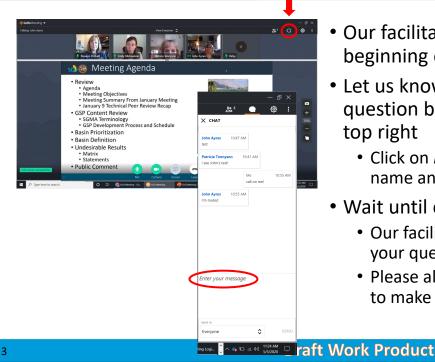
ы 🍪 GoToMeeting – Please Enter Your Name



- Please identify yourself with your full name and organization
- Hover over your photo and click on the 3 dots, then Edit Your Name and Email
 - TPR members please include "TPR – Name, Entity"
 - AC members please include "AC – Name, Entity"
 - All other participants please include "Name, Entity"

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- Our facilitator will mute everyone at the beginning of the meeting
- Let us know you have a comment or question by clicking the **Chat** icon in the top right
 - Click on Enter your message, type your name and organization and hit SEND
- Wait until our facilitator calls on you:
 - Our facilitator will unmute you to relay your question or comment
 - Please also check your phone/computer to make sure you're not muted there too

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San Pasqual Valley GSP Technical Peer Review Meeting

REVIEW



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ы 🍪 Meeting Agenda

- 1. Roll Call and Introductions
- 2. Review
 - Agenda
 - · Meeting Objectives
 - Meeting Summary
 - · Comments Received
- 3. Preliminary Analysis Results
 - Sustainable Management Criteria
 - · Minimum Thresholds
 - Adaptive Management Thresholds

- Projects and Management Actions
 - Adaptive Management Strategy
 - · Refined PMA list
- 4. Refined Analysis
 - · Groundwater Model
 - · Water Budgets
- 5. Public Comments
- 6. Next Steps & Closing Remarks



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SD) 🚳 Meeting Objectives, Summary, and Comments Received

- Meeting Objectives
 - Share and discuss draft sustainable management criteria
 - Share and discuss draft projects and management actions
 - Share and discuss refined analysis from groundwater modeling
- Meeting Summary
 - See Handout 1
- Summary of Comments Received
 - See Handout 2

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ы 🤯 Updated Public Comment Format

- Those wishing to comment should place their name and organization in the Chat; participants will be called on in the order received
- Public comment will take place at the conclusion of all TPR discussion; members of the Core Team and the TPR will not engage in dialogue with those making public comment
- If TPR or AC members have responses to public comment, they should be e-mailed to Karina Danek (kdanek@sandiego.gov)

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San Pasqual Valley GSP **Technical Peer Review Meeting**

TPR COMMENT REVIEW



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SD) TPR Comments Received - Overview

- 1. Model documentation should be included with the GSP
- 2. Concern about no flow boundary affecting model utility
- 3. Suggest incorporating subsurface flow as specified flux
- 4. Hydraulic conductivity assigned to residuum seems high
- 5. Reminder that Bulletin 118 does not include layers below residuum
- 6. Insufficient evidence to draw correlation between head differentials, groundwater flow, and granite pumping

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San Pasqual Valley GSP Technical Peer Review Meeting

TPR COMMENT REVIEW

AC COMMENTS



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TECHNICAL INPUT – ANALYSIS RESULTS Sustainable Management Criteria

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sb) 🚳 Sustainable Management Criteria (SMC)

Sustainability Indicator	Measurement Process
Groundwater Levels	Groundwater elevations
Groundwater Storage	Groundwater elevations
Seawater Intrusion	Location of isocontour
Degraded Groundwater Quality	Water quality measurements
Land Subsidence	Groundwater Elevations —
Depletion of Interconnected Surface Waters	Groundwater Elevations

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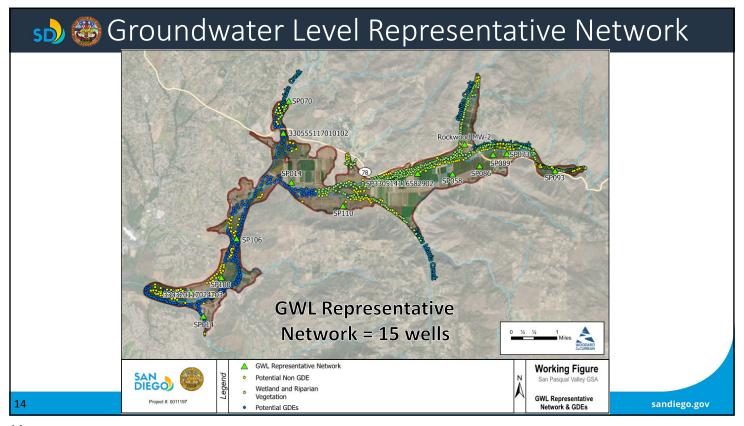
Groundwater Levels

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so) @ Approach to Groundwater Level Thresholds

Groundwater Levels

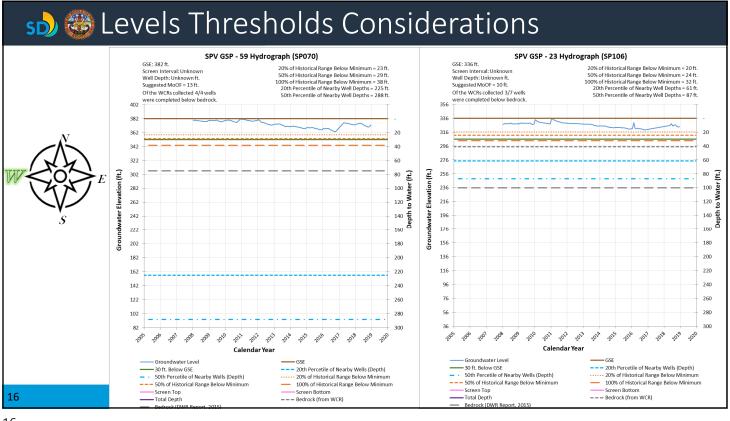
- Thresholds for 15 representative wells in the levels monitoring network:
 - Minimum Threshold
 - Adaptive Management Threshold
 - Measurable Objective
- Thresholds needed to consider:
 - Nearby well infrastructure
 - Groundwater Dependent Ecosystems
 - Historical changes in groundwater level

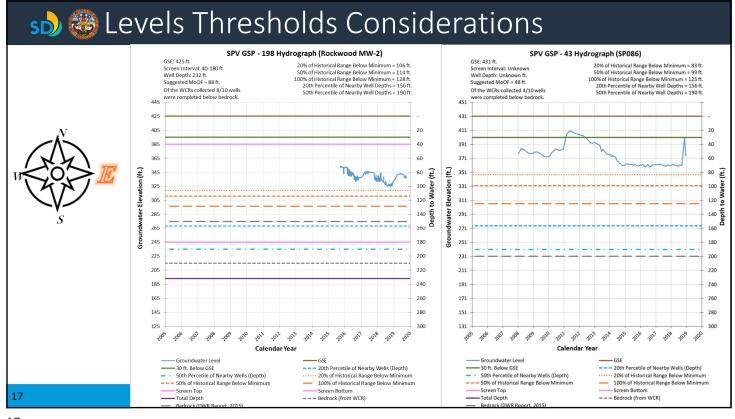
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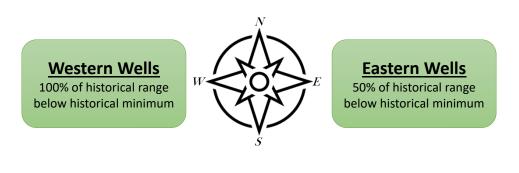




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- Intentionally designed to be:
 - Deeper than historical low, above bedrock, and above 20th percentile of nearby wells
 - Responsive to local monitoring well conditions
 - Below this threshold would be considered significant and unreasonable



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- An <u>Adaptive Management Threshold (AMT)</u> is an intermediate threshold used to inform the GSA when adaptive management strategies may be implemented to avoid future undesirable results
 - Why is it useful? Think of it as a less stressful low fuel light on your dash. "You are getting close, lets think about finding the next gas station."
 - NOT required per SGMA regulations
 - Prompts GSA to begin Adaptive Management

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🚮 🚳 Adaptive Management Threshold (AT)

- Intentionally designed to be:
 - Shallower than minimum thresholds and deeper than measurable objective
 - Closer to minimum threshold than measurable objective
 - Responsive to local monitoring well conditions

Western Wells

80% of historical range below historical minimum



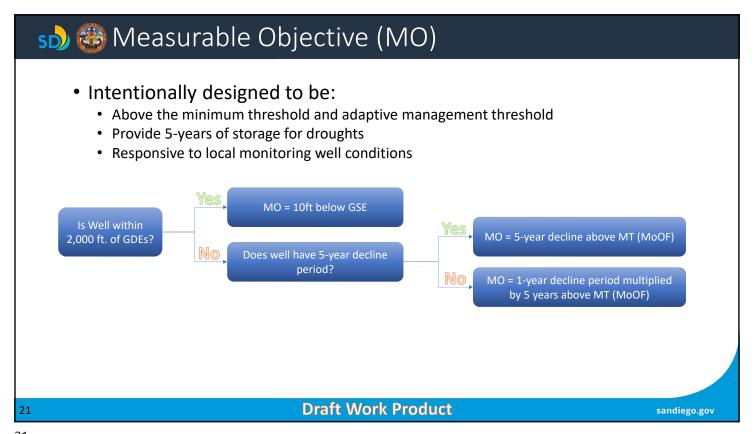
Eastern Wells

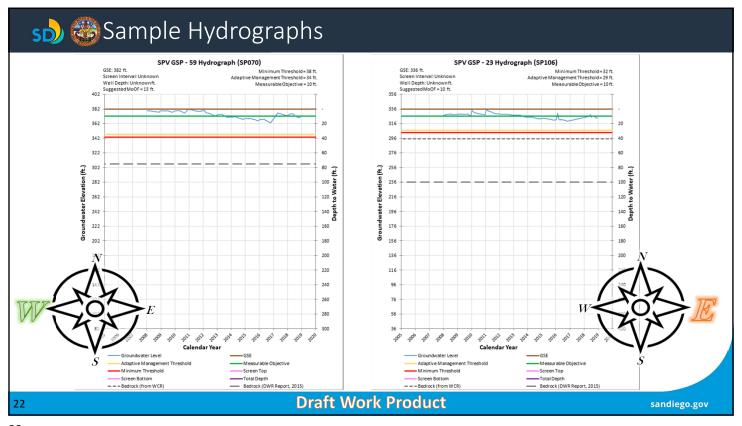
30% of historical range below historical minimum

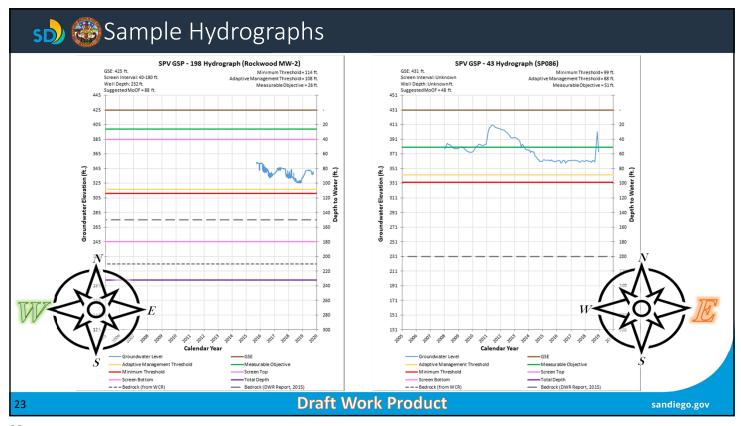
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Groundwater Storage The City of Society Work Product

sb) @ Groundwater Storage

- Uses groundwater levels as a proxy
 - Permitted by SGMA
 - San Pasqual Valley does not have a regional confined aquifer
 - Simple and straight forward (no additional calculations, no implementation costs, no annual modeling work)
 - Groundwater level sustainability criteria are protective of groundwater storage

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Groundwater Quality



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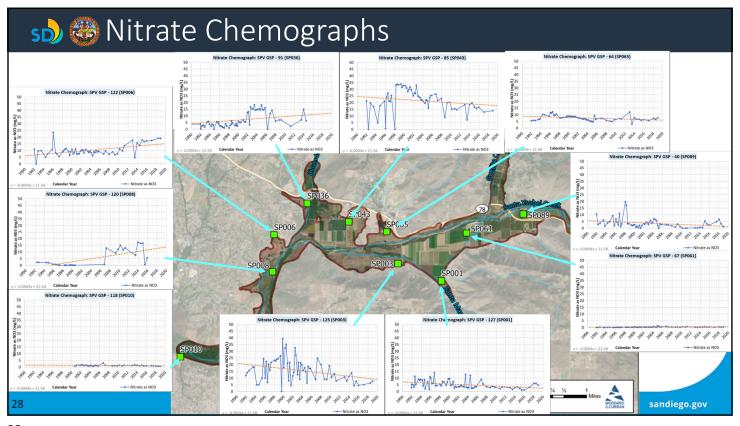
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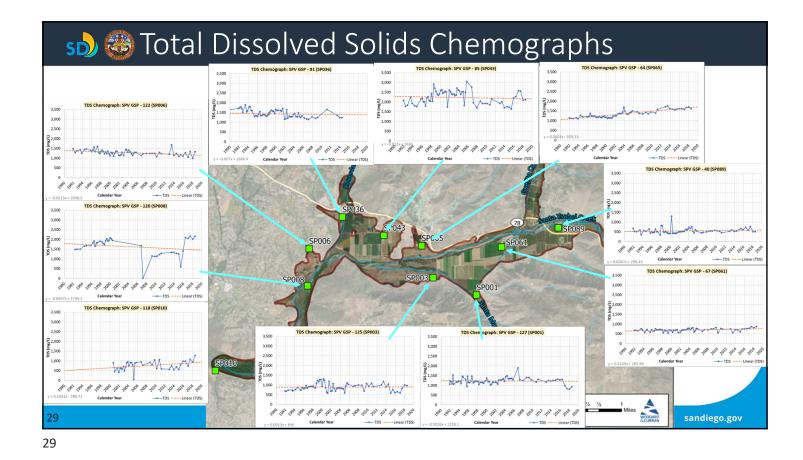
so) 🚳 Groundwater Quality Thresholds

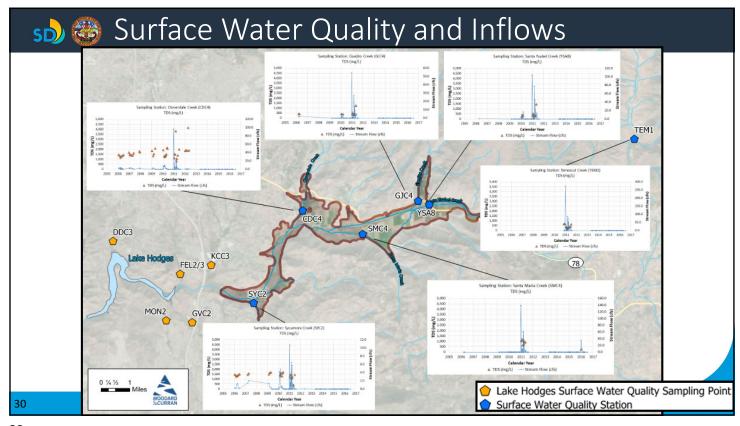
- Considerations
 - · High concentration of TDS and nitrate in some creek inflows
 - Groundwater concentrations for Total Dissolved Solids (TDS) and Nitrate were highest around 2000, and have declined in many areas and increased in some areas since then
 - Salt Nutrient Management Plan indicates largest sources of loading are fertilizer use and evapoconcentration
- We want to set thresholds on constituents that are reflective of the tools the GSA has that may affect groundwater quality, which means:
 - 1. Constituent can be affected by water volume management
 - 2. Thresholds should be set within a range that the GSA can perform costappropriate management
 - 3. Rely on monitoring directly for reporting at each well site

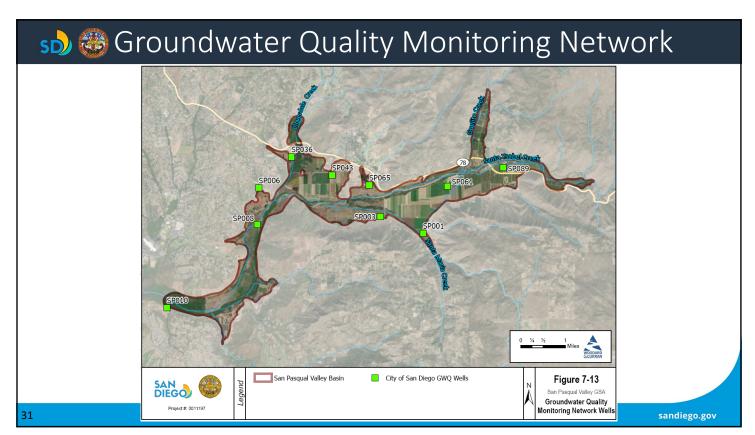
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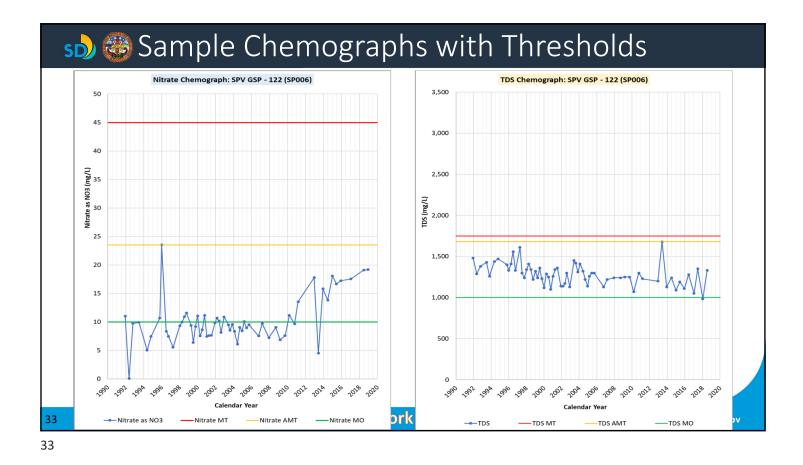
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🔂 🚳 Groundwater Quality Thresholds

SMC methodology for the other 9 monitoring sites:

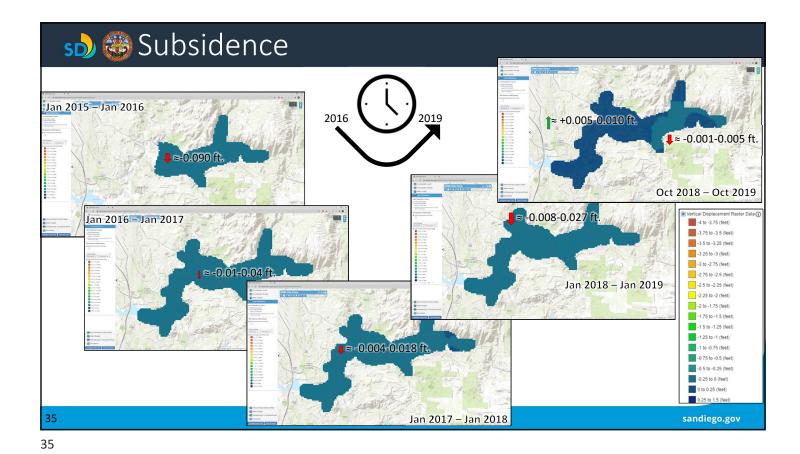
- Nitrate (NO3):
 - Minimum Threshold = Basin Plan Water Quality Objective (45 mg/L)
 - Adaptive Management Threshold = Historic high measurement *or* measurable objective, whichever is higher in concentration
 - Measurable Objective = SNMP Water Quality Objective (10 mg/L)
- TDS:
 - Minimum Threshold = 10% of range above the historic high measurement
 - Adaptive Management Threshold = historic high measurement
 - Measurable Objective = 1,000 mg/L
- Adaptive management is triggered when 30% (3 of 9) well's concentration rises about the Adaptive Management Threshold for 12 months for either constituent
- Undesirable result is detected when 30% (3 of 9) well's concentration rises about the Minimum Threshold for 24 months for either constituent

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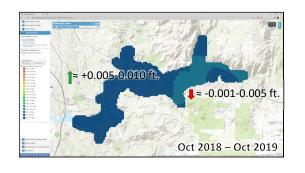
Subsidence

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sb) 🚳 Subsidence

- Subsidence is not a sustainability indicator that is likely to cause an undesirable result in the San Pasqual Valley Basin and will not be monitored
 - No historical inelastic subsidence
 - No major infrastructure
 - Few clays present in alluvium limits possibility of future subsidence
 - Limited loss of storage capacity possible



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Interconnected Surface Water



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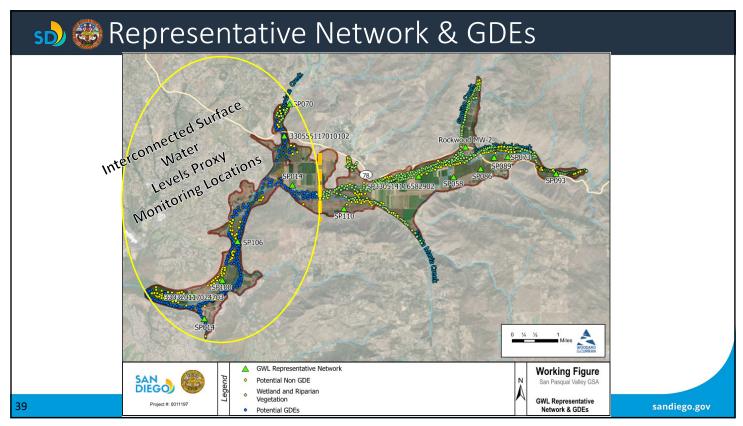
sb) 🚳 Depletions of Interconnected Surface Water

- 1. Streams in the eastern portion of the basin are mostly disconnected from groundwater (due to high depth to water)
- 2. Based on current GW conditions, beneficial uses of groundwater (as they related to interconnected surface waters) are not at risk of degradation, outside of the portion of the basin with potential Groundwater Dependent Ecosystems (GDE)s.
- 3. The GDE Adaptive Management Threshold (AMT) helps address future conditions that may put these beneficial uses at potential risk, and levels thresholds are protective of other depletion concerns by being similar to current conditions

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Sustainable Management Criteria

AC COMMENTS



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TECHNICAL INPUT – ANALYSIS RESULTS Projects and Management Actions

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sp) 🚳 Projects and Management Actions

- GSP Regulation 354.44 (a):
 - "Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin."
- We are meeting this regulation through Adaptive Management framework

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sp) 🚳 Projects and Management Actions

- GSP Regulation 354.44 (b)(1):
 - "A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent."
- Categories of projects and management actions
 - GSP Implementation Activities that will be conducted regardless of basin conditions
 - Adaptive Management Activities that will be conducted only as needed
 - Projects
 - Management Actions

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Adaptive Management Process: Step-by-Step



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- Provides adequate "warning time" to the GSA so that projects and management actions can be implemented to address a problem *before* an undesirable result occurs
- Adaptive Management An
 Adaptive Management Threshold
 (AMT) is an intermediate threshold
 used to inform the GSA when
 adaptive management strategies
 may be implemented to avoid
 future undesirable results



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sb) 🚳 Management Triggers

Adaptive Management

 Adaptive management is triggered when 30% (5 of 15 for levels or 3 of 9 for quality) well's concentration rises about the Adaptive Management Threshold for 12 months for either constituent

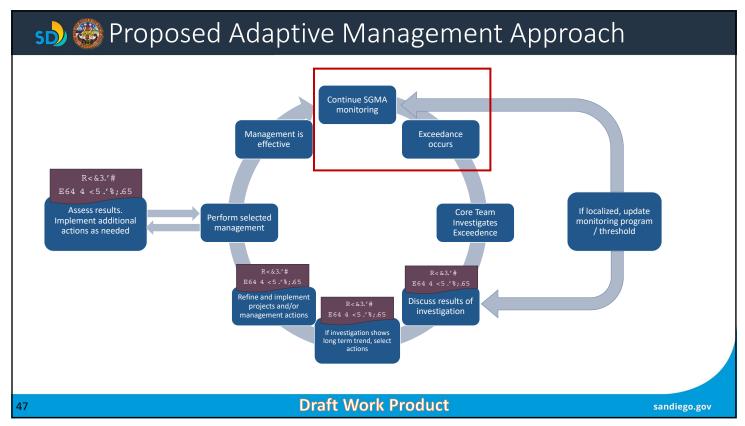
Undesirable Results

 Undesirable result is detected when 30% (5 of 15 for levels or 3 of 9 for quality) well's concentration rises about the Adaptive Management Threshold for 24 months for either constituent

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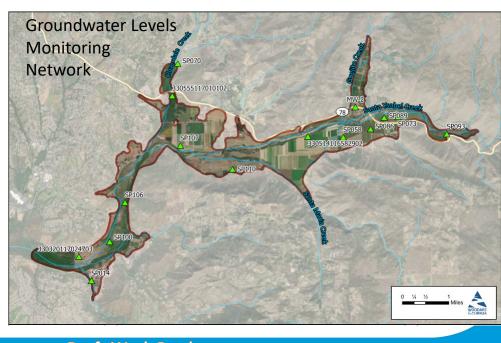
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sb) 🚳 Perform SGMA Monitoring and Assess

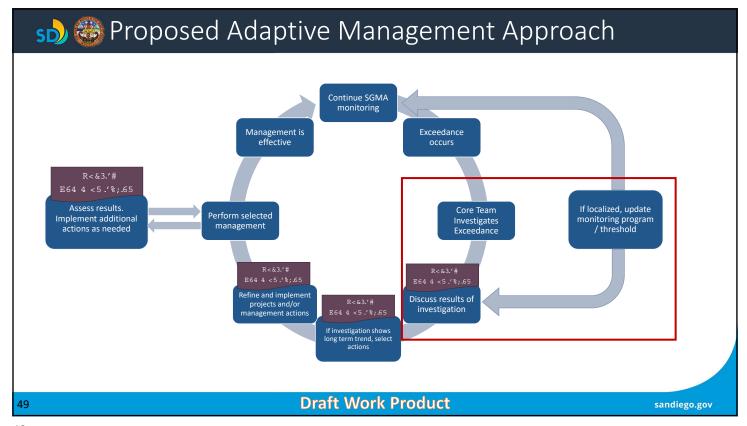
- The GSA will implement its monitoring program to measure groundwater levels and quality over time
- GW level and quality measurements will be compared to AMTs to determine if an exceedance has occurred

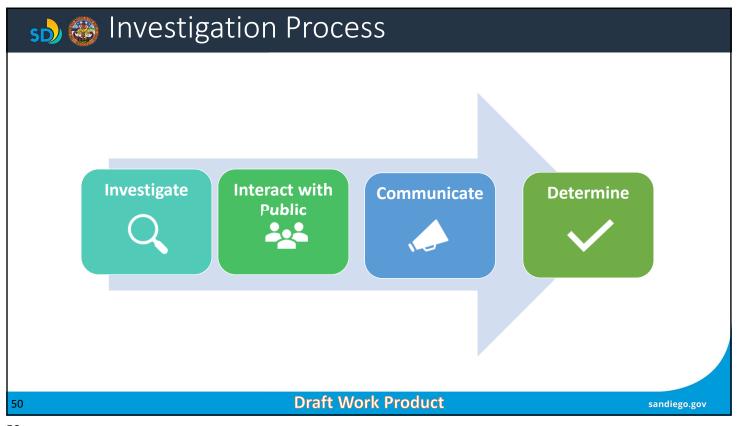


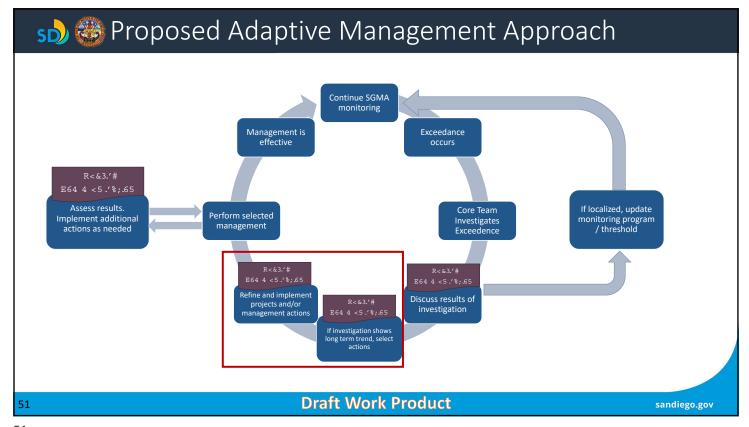
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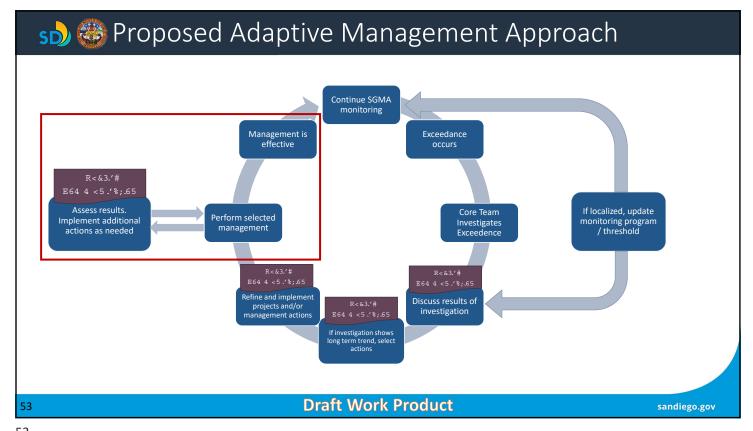


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sb) 🚳 Implementation of Projects & Mgmt Actions

- If investigation shows a long-term regional trend, the GSA Core Team will consider benefits and cost to determine the best approach to address the exceedance
 - This may include implementing a management action, project, or combination of the two
- Project & Management Action implementation steps:
 - Public communication: the GSA Core Team may hold a public workshop to discuss the proposed options and receive feedback
 - · Determine costs and benefits
 - Identify funding sources and assign costs
 - Environmental documentation (if needed)
 - Design and construction (if a capital improvement)

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sb) 🚳 Perform Selected Management

- The GSA Core Team will implement the chosen option in accordance with the MOU
- Following implementation, SGMA monitoring will continue and will assess the results
- If the implemented action(s) do not perform as expected, the GSA Core Team will revisit the list of projects and management actions and may select an additional option(s) to implement
- Management effectiveness is evaluated by comparing levels and quality monitoring with Adaptive Management Thresholds

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Projects and Management Actions List



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sb) 🚳 SGMA Regulations for Projects and Management Actions

• GSP Regulation 354.44 (b)(1):

"A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent."

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- Two Major Groupings:
 - GSP Implementation Tasks
 - Conducted on an as needed or annual basis regardless of SPV's physical conditions
 - Mostly administrative
 - Projects and Management Actions
 - Includes Projects
 - Includes Management Actions
 - Implemented as directed by the Core team under Adaptive Management

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ы 🍪 GSP Implementation Tasks

- GSP Implementation tasks are undertaken by nearly all Subbasins following submission of their GSP
- · Activities included:
 - 1. Monitoring (Groundwater Levels and Quality)
 - 2. Meetings (Public and Core Team)
 - 3. Reporting (Annual Report and GSP 5-year Update)
 - 4. Numerical Model Updates as Needed
 - 5. Pursue Funding Opportunities
 - 6. Groundwater Monitoring Improvements
 - 7. Public Outreach and Website Maintenance
 - 8. Education and outreach for TDS / Nitrate loading
- Schedule, cost and funding source will need to be identified for each task
- Recommendation: include all implementation tasks in the GSP

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ы 🚳 List of Projects & Management Actions

- An appendix will be included in the GSP describing the screening process and listing the screened-out projects and management actions
- The following list of projects & management actions will be included in the main GSP section.

Management Actions

Projects

- Well Inventory
- Study of Groundwater Dependent Ecosystems (GDE)
- Basin wide Metering Program
- Education and Outreach to Encourage Demand Softening
- **Pumping Restrictions and Enforcement**
- **Farming Best Practices**
- Support WQIP actions to Update Agricultural Leases to include Nutrient Control Measures and Stormwater BMPs
- Coordinate and Collaborate with other entities and agencies to Implement Regional Projects

- Coordinate on the construction of Infiltration Basins at San Pasqual Union Elementary
- Coordinate on the implementation of Invasive Species Removal

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Projects and Management Actions

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TECHNICAL INPUT – REFINED ANALYSIS Groundwater Model and Water Budgets

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sb) 🚳 Role of Modeling on this Project

The SPV GSP Model is only one line of analysis being used to help the GSA develop its GSP. This model will not ultimately "decide" whether the Basin is being managed sustainably. Collection, reporting, and analysis of field data during GSP implementation will be used in conjunction with SMCs to demonstrate to DWR whether the Basin is being managed sustainably.

The main purpose of the model is to provide plausible water budgets to alert the GSA to potential future conditions, so it can develop a plan to responsibly manage the SPV GW Basin.

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sb) 🚳 Management Reminder

- Model Results do not determine sustainability monitoring and sustainability thresholds determine sustainability
- The SPV GSA takes action based on Adaptive Management:
 - Adaptive management is triggered when 30% (5 of 15 for levels or 3 of 9 for quality) well's concentration rises about the Adaptive Management Threshold for 12 months for either constituent
- Undesirable Results are determined based on exceedances of minimum thresholds:
 - Undesirable result is detected when 30% (5 of 15 for levels or 3 of 9 for quality) well's concentration rises about the Adaptive Management Threshold for 24 months for either constituent.

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Refined Analysis Results – Flow Model

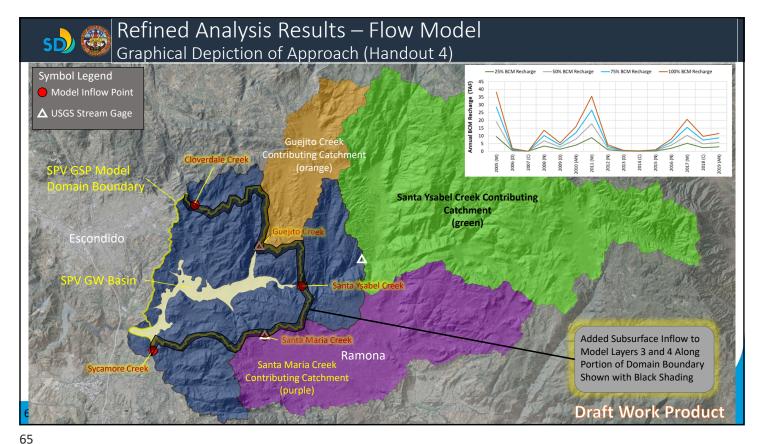
Sensitivity Analysis Approach to Evaluating Subsurface Inflow (Handout 4)

- A concern was raised during the 17-Dec TPR meeting regarding lack of subsurface inflow across no-flow boundaries from contributing catchments surrounding SPV GSP Model domain
- We evaluated five different ranges of subsurface inflow assumptions
 - 0%, 25%, 50%, 75%, and 100% of GW recharge estimated with Basin Characterization Model (BCM) over the historical 15-year calibration period (WY2005 thru WY2019)
 - We assigned monthly subsurface inflows as specified fluxes along the associated domain boundary cells in Model Layers 3 and 4 (deeper bedrock layers)
- Evaluated impacts of these boundary inflows to...
 - GW-level hydrographs at target wells within SPV GW Basin
 - Modeled outflows to Lake Hodges
 - Modeled GW pumping rates at ag wells within SPV GW Basin
 - Modeled change in Basin GW storage during calibration period

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- Modeled ag pumping rates are not sensitive to subsurface inflow rates
- Generally, global goodness-of-fit types of statistics worsen with increasing subsurface inflow
 - Local exceptions
 - A small amount (≤ ~25%) of BCM recharge could be tolerated and reasonably fit independent estimates of Lake Hodges inflows
 - Including 25% BCM recharge would also improve fits to GW levels at SP093, SP073, SP072, & SP086, but would slightly compromise fits at other calibration monitoring wells
- Although including subsurface inflow reduces average GW storage depletions, all sensitivity simulations indicate average GW storage deficits over the 15-year calibration period

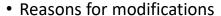
Recommendation

The modeling team will move forward incorporating 25% BCM recharge as subsurface inflow in Model Layers 3 and 4 along the northern, eastern, and southern boundaries of the SPV GSP Model domain. Doing so will slightly compromise global calibration statistics for GW levels, but will locally improve fits to eastern Santa Ysabel GW levels and inflows to Lake Hodges. Addition of some amount of subsurface inflow also addresses concerns around this topic raised by a TPR member during the 17-Dec TPR meeting.

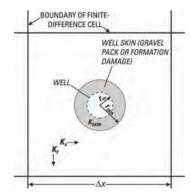
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Refined Analysis Results – Flow Model Changes Made to the SPV GSP Model

- The following modifications were made to the SPV GSP Model since the 17-Dec TPR meeting
 - Streambed K_v values have been reset to 0.1 ft/d (3.5×10⁻⁵ cm/s)
 - K_{skin} values for pumping wells have been reset to 1 ft/d (3.5×10⁻⁴ cm/s)
 - A correction in how runoff was handled in certain subareas has been implemented; runoff in these subareas is now assigned to the nearest SFR segment, where applicable
 - A sensitivity analysis on subsurface inflow was conducted and resulted in retaining 25% BCM recharge as subsurface inflow along the northern, eastern, and southern SPV GSP Model domain boundaries



- To improve model stability and reduce mass balance discrepancies, based on advice from the USGS developer of One Water code
- To improve consistency between conceptual and numerical models in terms of the runoff process
- To address concerns over the no-flow assumption for subsurface flow across the northern, eastern, and southern SPV GSP Model domain boundaries



Source: MNW2 Manual (USGS)

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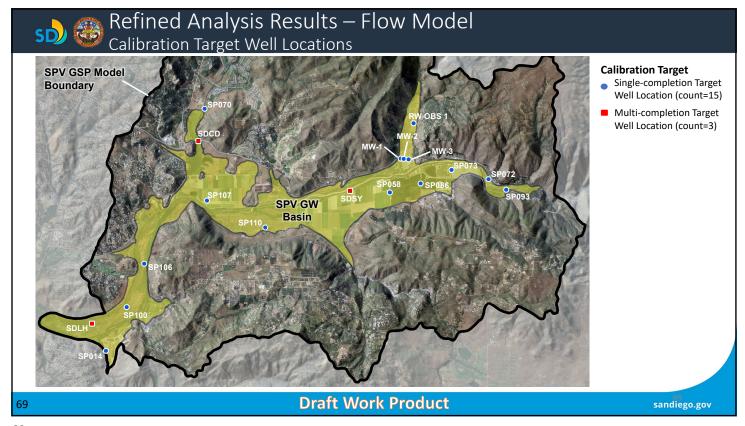
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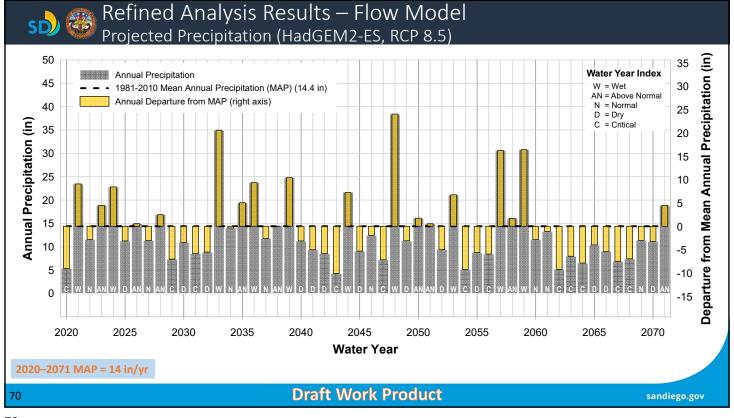
Updated Hydrographs with Projections

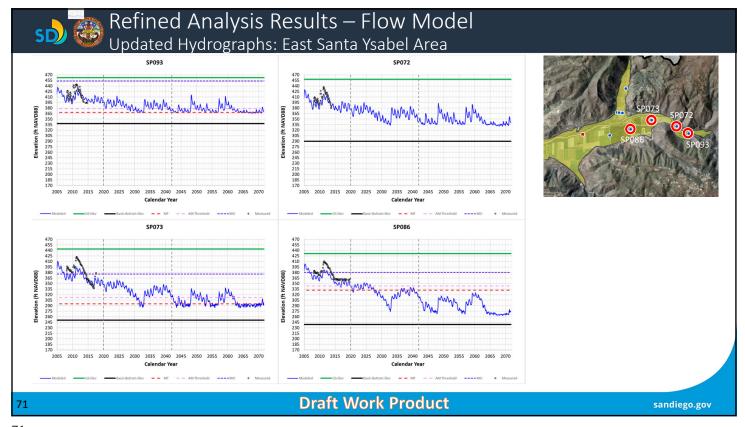


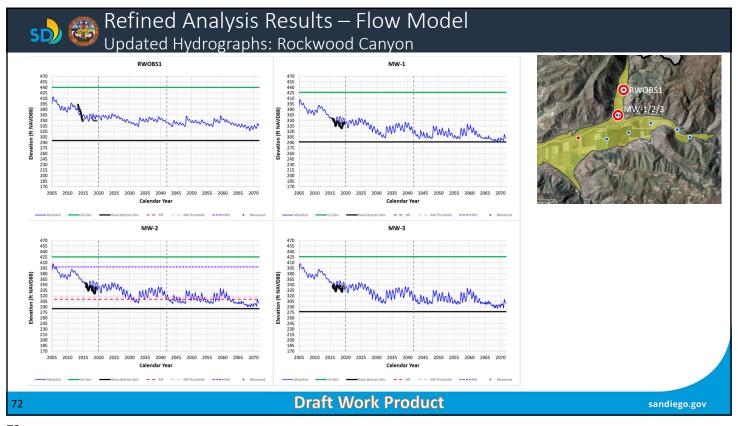
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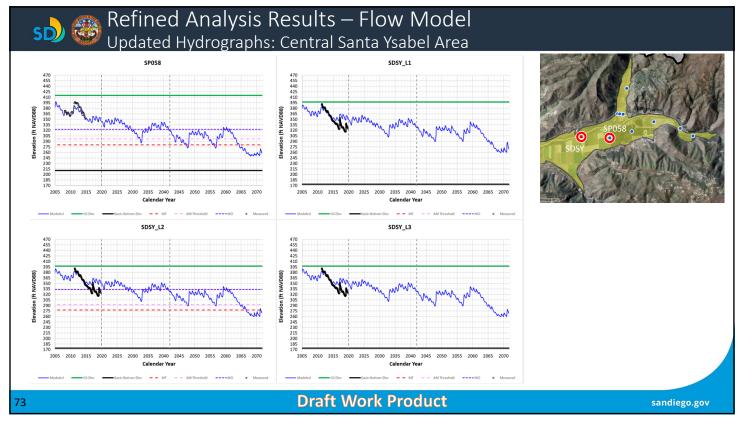
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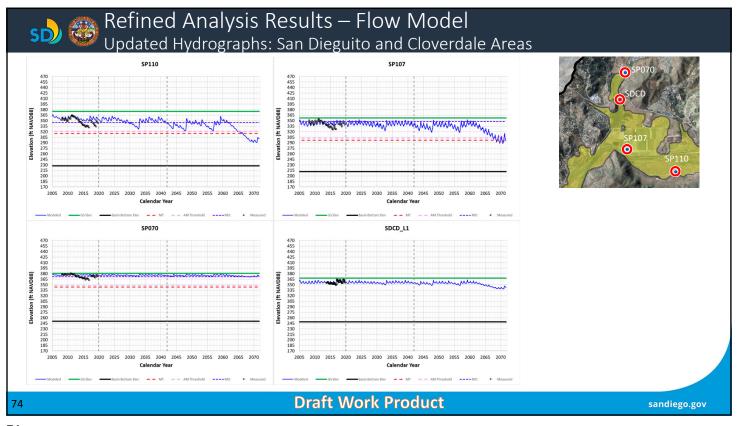


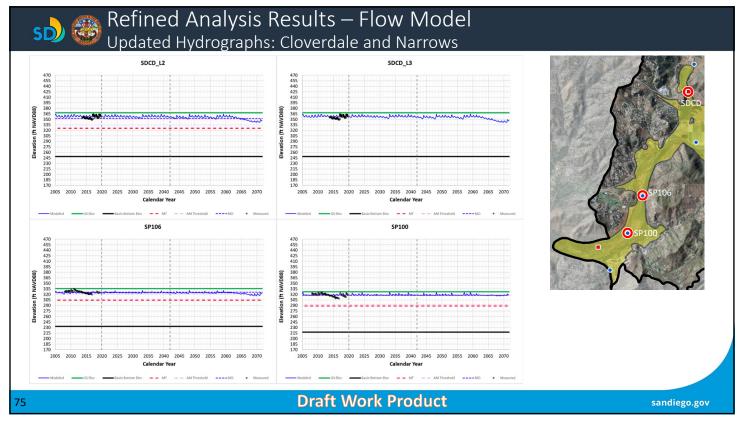


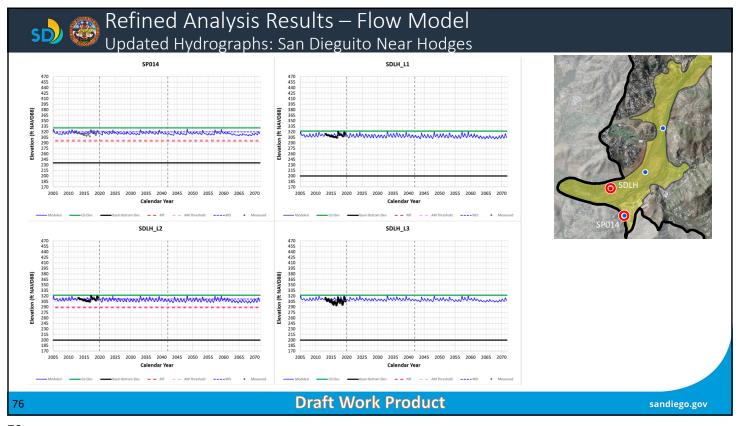










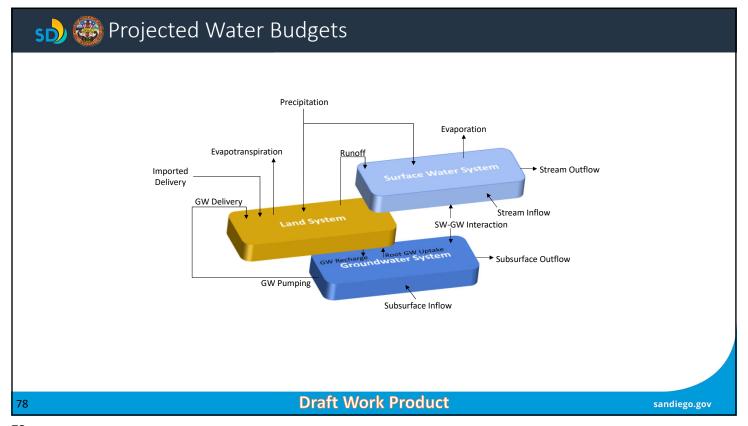


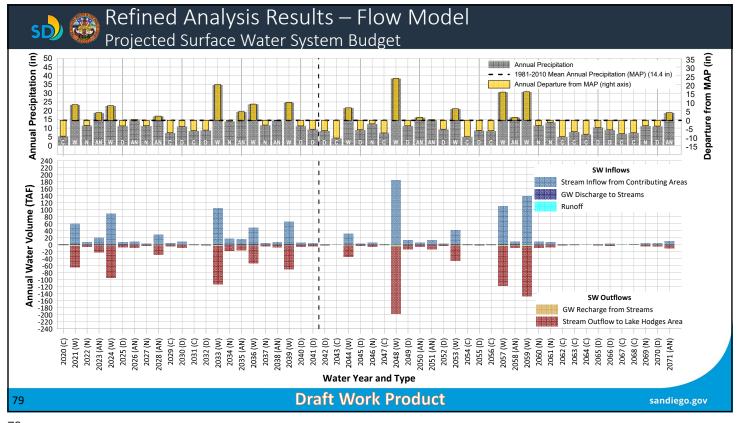
Refined Analysis Results – Flow Model Projected Hydrographs: Observations

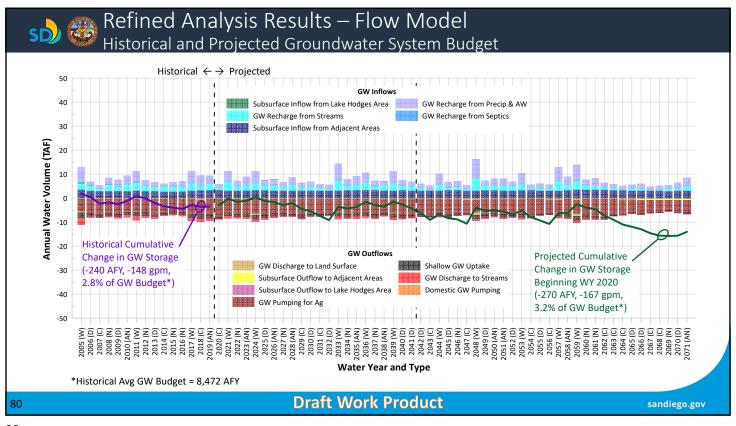
- Future GW levels in eastern portion of Basin could be lower than current GW levels (some additional depletion of GW storage could occur)
- Future GW levels at some monitoring wells in eastern portion of Basin could periodically be near/below proposed Minimum Thresholds
- Implementing adaptive management actions during GSP implementation period might be necessary; describing clear, defensible adaptive management actions in GSP will be important

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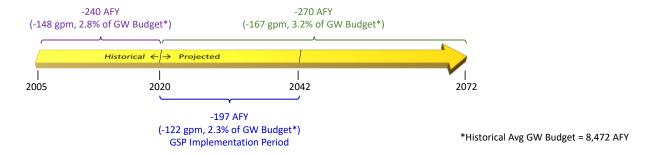






Refined Analysis Results – Flow Model Groundwater Budget Observations

 Projections indicate the potential for some depletion of GW storage, primarily in eastern portion of Basin; magnitude/rate of depletion depends on the hydrology of the averaging period



 Projections indicate potential need to implement adaptive management actions in the future

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San Pasqual Valley GSP Technical Peer Review Meeting

Groundwater Model and Water Budgets

AC COMMENTS



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1/8/2021 **SPV TPR Meeting**

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FINAL THOUGHTS BY TPR

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NEXT STEPS & CLOSING REMARKS



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• For additional information, please contact:

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Thank You!

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