San Pasqual Valley Groundwater Sustainability Plan (GSP) Stakeholder Workshop

Management Action No 7 – Initial Surface Water Recharge Evaluation

Task 2 – Streambed Investigation

Task 3 – Water Sources for Potential Recharge Projects

January 31, 2023

The City of SAN DIEGO

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Stakeholder Input Format

- This is a stakeholder workshop and anyone is welcome to ask questions or provide comments
- Public comment will take place at the end of each agenda item
- Those wishing to speak should place their name and organization in the **Chat**; participants will be called on in the order received
- Follow-up comments and questions can be sent to **Staci Domasco (SDomasco@sandiego.gov)**

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Meeting Agenda

1. Welcome and Introductions
2. Scope of Project Management Action (PMA) No. 7: Initial Surface Water Recharge Evaluation
3. Revisions to TM 1 – Evaluation Criteria
4. Task 2 - Streambed Investigation
5. Task 3 - Water Sources for Potential Recharge Projects
6. Public Comment
7. Next Steps and Closing Remarks

San Pasqual Valley GSP Stakeholder Workshop

Scope of Initial Surface Water Recharge Evaluation

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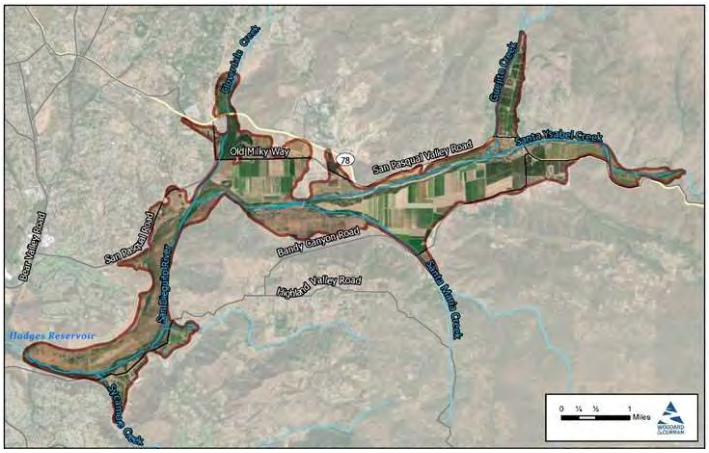
Surface Water Recharge Evaluation: Scope

A *Preliminary Feasibility Study* will be developed to summarize surface water recharge opportunities in San Pasqual Valley.

The *Preliminary Feasibility Study* will include the following sections:

- Development of Evaluation Criteria (**Task 1**)
- Streambed Investigation (**Task 2**)
- Water Sources for Potential Recharge (**Task 3**)
- Potential Recharge Strategies (**Task 4**)
- Model Simulations and Results (**Task 5**)
- Evaluate Benefits to GDEs (**Task 6**)



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Review of Technical Memoranda (TMs)

- **TM 1: Evaluation Criteria TM** – review of criteria and options for water recharge and basis for subsequent TMs.
- **TM 2: Streambed Investigation** – field data collection and modeling to provide site-specific data to update model and understand best options for surface recharge
- **TM 3: Water Sources for Potential Recharge** – evaluating options for where recharge water might come from
- **TM 4: Potential Recharge Strategies** – an evaluation of recharge strategies and their feasibility
- **TM 5: Model Updates and Simulations** – documentation of model refinements and simulation of selected recharge strategies
- **TM 6: Potential Benefits to GDEs** – an evaluation of potential effects of recharge strategies on groundwater dependent ecosystems

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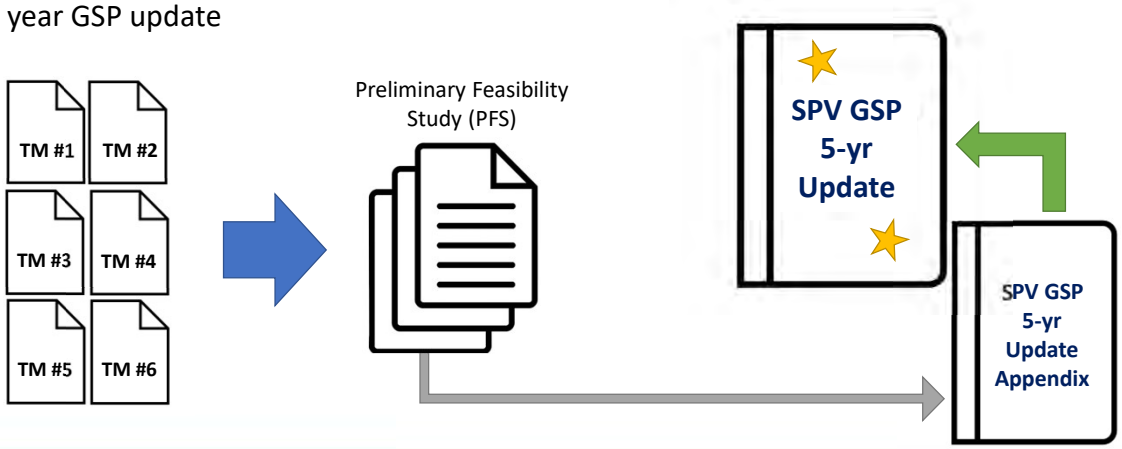
Relationship to GSP

- Current GSP and estimates show the Basin is sustainable
- If future Basin sustainability conditions change *and* GSA determines enhanced recharge strategies are needed, the *Preliminary Feasibility Study* may be used to help inform decisions on mitigation planning
- The *Preliminary Feasibility Study*, created from these TMs, will be a new appendix in the 5-year GSP update



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Surface Water Recharge Evaluation: Schedule

Scope Task		2022											2023												2024
#	Task	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Planning and Management Action No. 7																									
Task 1	*Development of Evaluation Criteria*																								
	Develop draft evaluation criteria and scoring				Δ																				
Task 2	*Reevaluate Streambed Characteristics*																								
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	Public Review (45 days)																					Δ			
	Revised Feasibility Study + Responses (30 days)																								
	Prepare final Feasibility Study Report																								

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Task 1 Draft Final Evaluation Criteria TM

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Evaluation Criteria

- Surface Water Recharge Evaluation will consider recharges strategies, which include those explored in Task 3 and Task 4
- Strategies will be evaluated against the criteria developed in Task 1
- Evaluation criteria were discussed at June 2022 workshop




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Revised Evaluation Criteria Weighting

Criterion	Proposed Weighting
1. Reduction of modeled deficit in cumulative groundwater storage	13%
2. Maintenance of shallower groundwater levels in the Basin	7%
3. Reduction in projected groundwater declines to minimum thresholds (MTs)	18%
4. Efficiency of recharge	18%
5. Improvements in groundwater quality	7%
6. Benefits to groundwater-dependent ecosystems	7%
7a. Costs of implementation and maintenance	6%
7b. Benefits of implementation and maintenance	6%
8. Feasibility of implementation and maintenance	18%
TOTAL CRITERIA WEIGHTING	100%

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Task 2 Streambed Investigation

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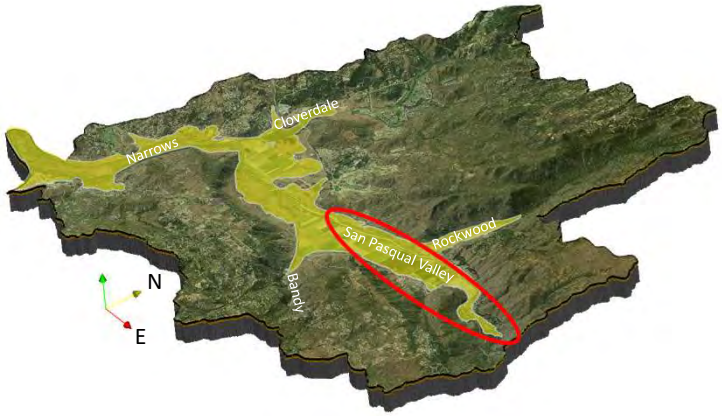
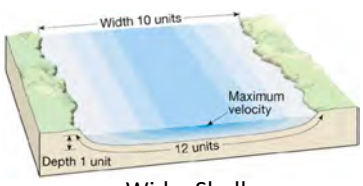
Streambed Investigation

- Focused on eastern portion of Basin where groundwater recharge from streams occurs
- Goal
  - Reduce uncertainty in streambed characteristics and improve confidence in modeled water budgets along Santa Ysabel Creek
- Scope
  - Stream channel survey
  - Streambed infiltration testing
  - Photographic survey

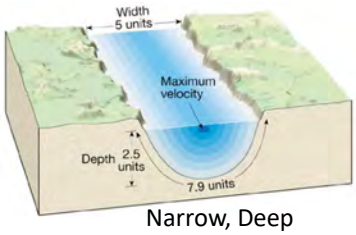


Stream Channel Survey: Locations

Channel shape affects streamflow retention and recharge characteristics



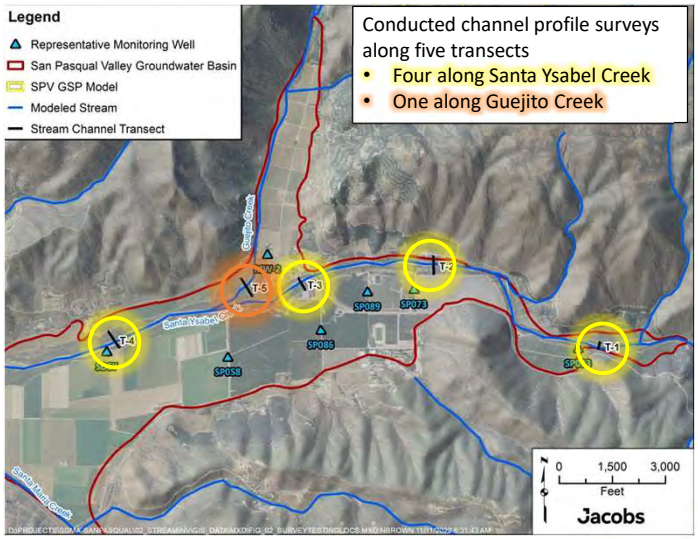
Wide, Shallow Channel



Narrow, Deep Channel

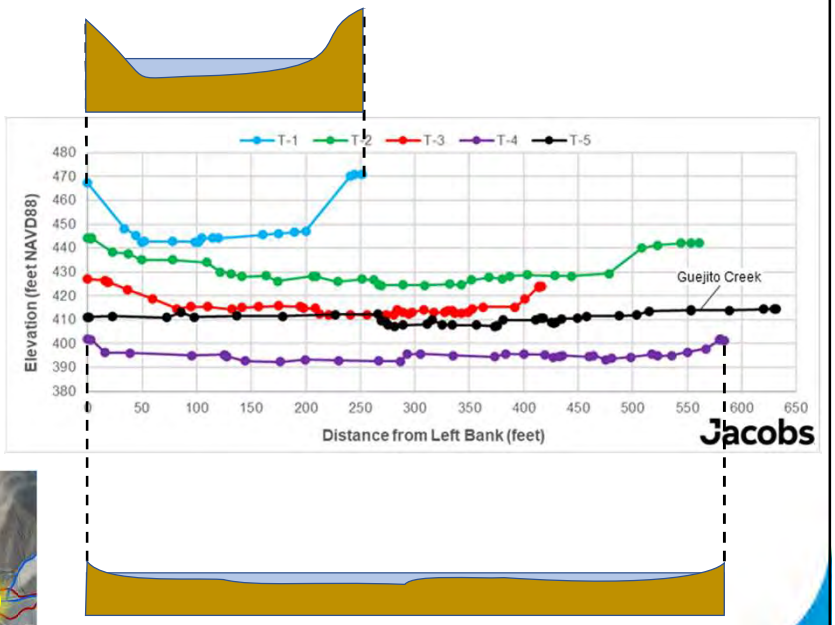
Image Source
https://courses.missouristate.edu/emantei/creative/glg110/streams.html#page217

Wider Channels Provide Greater Opportunity for Infiltration



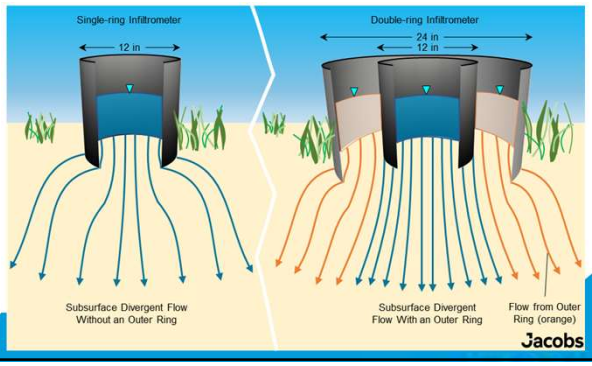
Stream Channel Survey: Results

- Completed in June 2022
- Channel generally becomes wider and flatter in downstream direction
- This information along with other elevation data will be used to update modeled stream channels



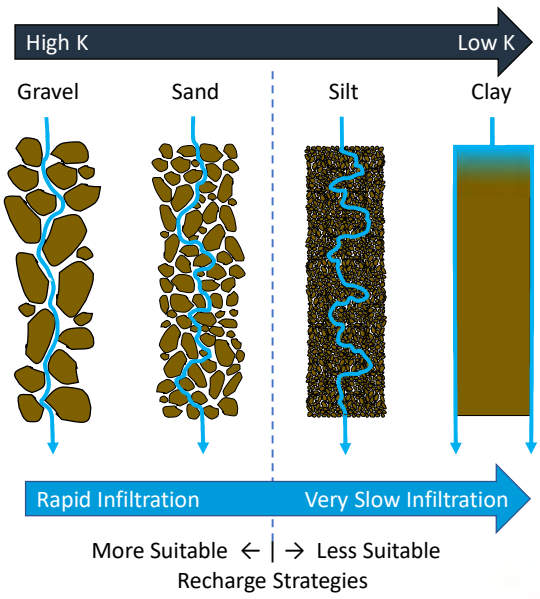
Streambed Infiltration Testing: Setup

- Goal
  - Assess site-specific infiltration characteristics along different points of San Ysabel Creek channel
- Approach
  - Water supplied from a water truck thru a flow meter
  - Measured flow rate to keep water level inside 12-inch diameter metal ring (infiltrometer) constant for 30 min to ~2 hours at T-1 thru T-4 locations
  - Used data to estimate streambed vertical hydraulic conductivity



What is hydraulic conductivity and why is it important?

- **Hydraulic conductivity (K)** is a measure of how easily a fluid (water in this case) can move through soil and rock
- Depends on how pore spaces in soil and rock are interconnected
- K is one of the key controlling factors for rate of infiltration, so it's important to have K data when assessing potential recharge strategies



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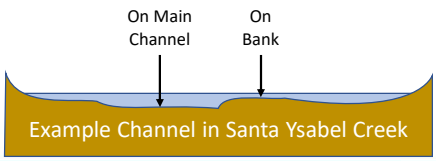
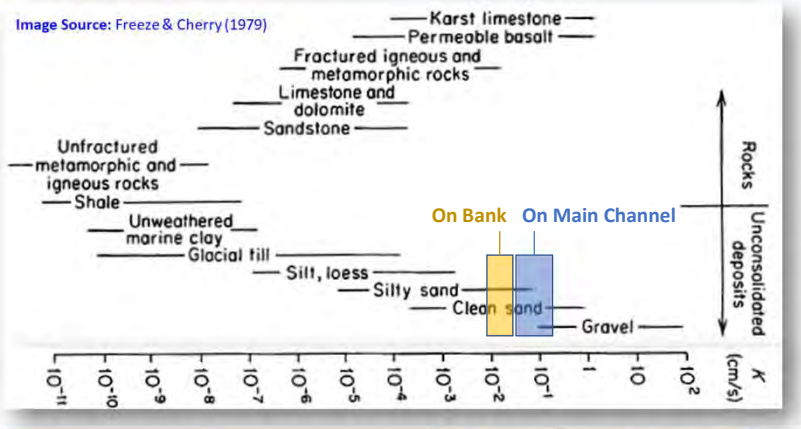
Streambed Infiltration Testing: Results

- Streambed sediments in Santa Ysabel Creek are permeable (high-K)
- This information will be used to update modeled streambed properties





Testing Location	Material	$K_{vertical}$ (ft/day)	$K_{vertical}$ (cm/sec)
On Main Channel	Poorly Graded Sand (SP)	116 to 552	4.1×10^{-2} to 1.9×10^{-1}
On Bank	Sandy Silt (ML) Silty Sand (SM)	24 to 83	8.5×10^{-3} to 2.9×10^{-2}
Mid Range	---	~ 100	3.5×10^{-2}

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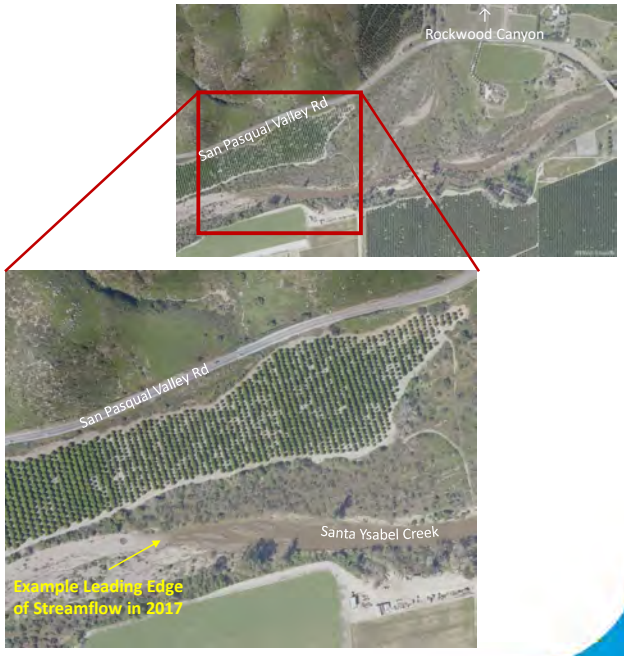
Photographic Survey

- Goal is to document how far surface water flows in Santa Ysabel Creek in Basin after large storm event
- Consulting Team scoped for one photographic survey
- Jacobs has been monitoring weather/ streamflow data with on-call staff to decide when to complete survey
- Large storm in mid-January provided opportunity to complete the photo-graphic survey



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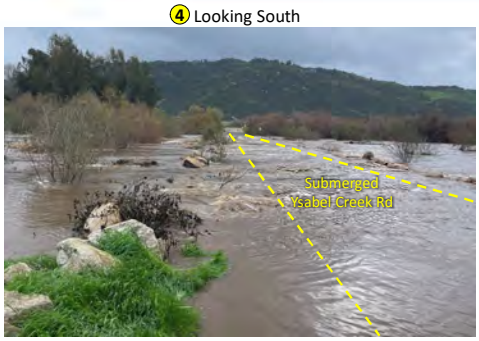
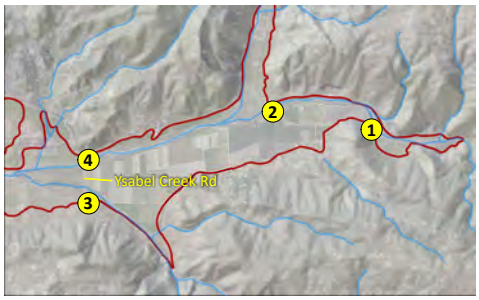
Photographic Survey: Stream Conditions 1/16/2023

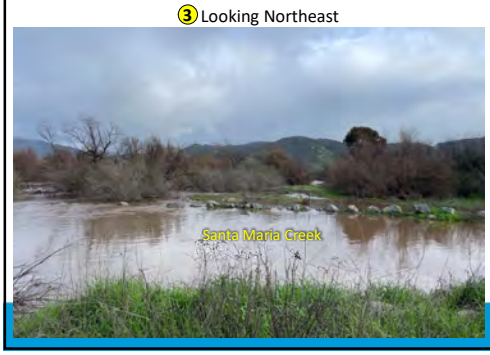
4 Looking South



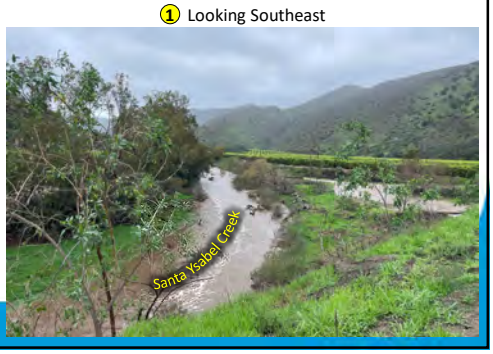
2 Looking Northeast



3 Looking Northeast



1 Looking Southeast



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Photographic Survey: Stakeholder Support

We appreciate your willingness to text us if you notice any streamflow in Santa Ysabel Creek or Guejito Creek, especially at the red circle locations below

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Task 3 Water Sources for Potential Recharge Projects

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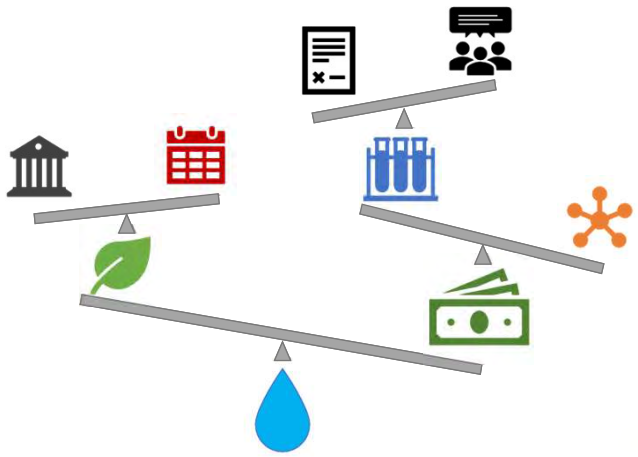
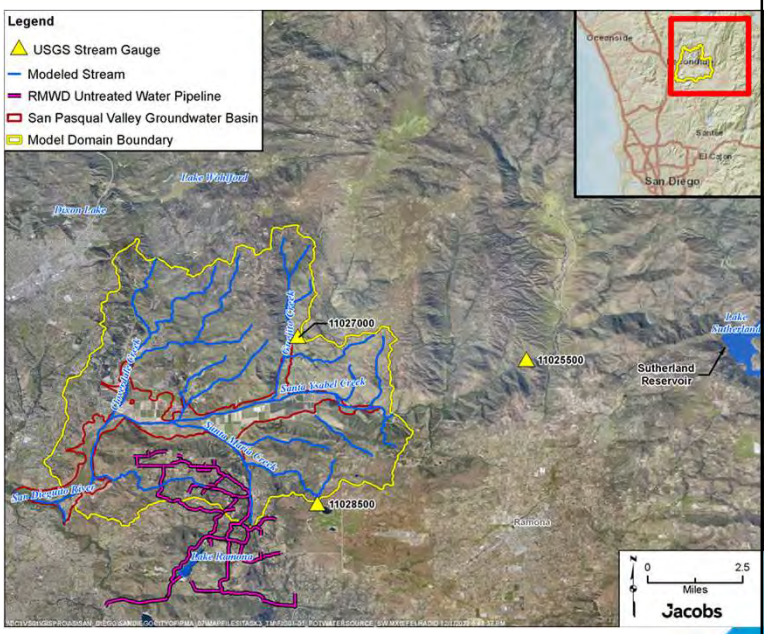
Water Sources for Potential Recharge Projects

- Assessing water sources is the first step in developing recharge concepts
- Subsequent steps involve cost estimates, permits, etc. (Task 4)
- "Water sources" must consider:
  - Quantity
  - Timing
  - Reliability/consistency
  - Operations
  - Legality



Water Sources for Potential Recharge Projects

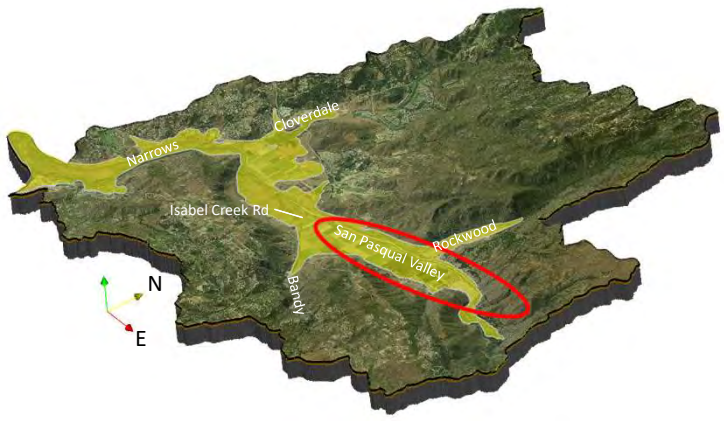
- Results from this assessment include hypothetical water source availability (quantity and frequency)
- Water sources considered:
  1. Streamflows – Stormwater Capture
  2. Sutherland Uncontrolled Releases
  3. Sutherland Controlled Releases
  4. Raw water delivered through Ramona Municipal Water District (MWD) from San Diego County Water Authority



1: Streamflow – Stormwater Capture

Findings – Best location for stormwater capture is in Santa Ysabel Creek east of Ysabel Creek Rd, based on modeled streamflows

- Advantages
  - Potential for large quantities of water
  - Large surface area for infiltration along creek
    - Potential strategy: capture and recharge excess streamflow passing by Ysabel Creek Rd
  - Up to 11,000 AFY available (2005-2019)
- Challenges
  - Drought sensitive; excess streamflows only occur a couple times per decade during wetter years



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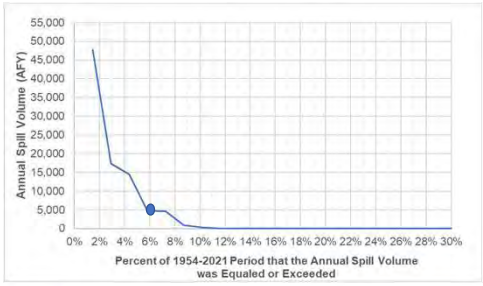
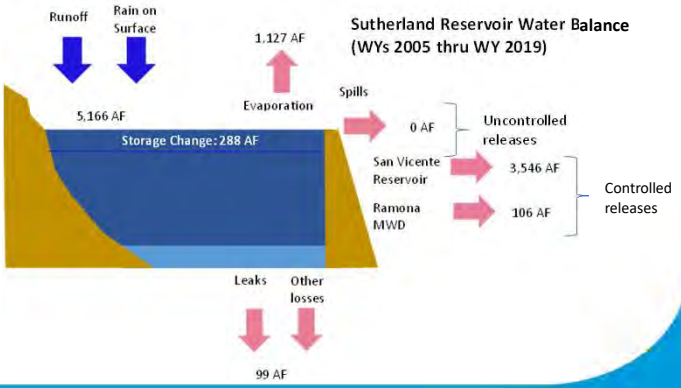
2: Sutherland Reservoir Uncontrolled Releases

Findings: Sutherland Reservoir has rarely reached maximum storage. Annual chance of uncontrolled releases greater than 5,000 AF is minimal (6%) (2005-2019)

- Advantage
  - Potential for large quantities of water during storm events
- Challenges
  - Drought sensitive; uncontrolled releases are rare (none occurred 2005-2019)
  - Releases would be subject to conveyance losses before reaching Basin
  - May need to be paired with another strategy to capture released water further downstream





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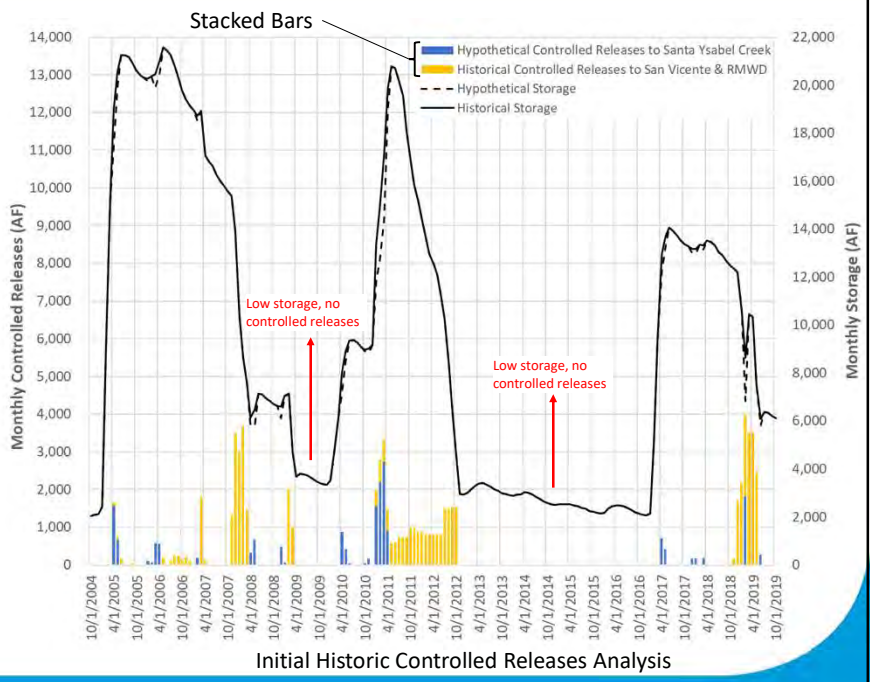
3: Sutherland Reservoir Controlled Releases

Findings: Water may be available for controlled releases while maintaining existing deliveries to San Vicente and Ramona MWD, and storage levels are kept close to historical levels

- Advantages
  - More predictable
  - No significant changes needed in infrastructure
- Challenges
  - Future amount unknown due to climate change and uncertainty around regulations
  - Drought sensitive
  - Releases would be subject to conveyance losses before reaching Basin
  - Would require additional operational agreements

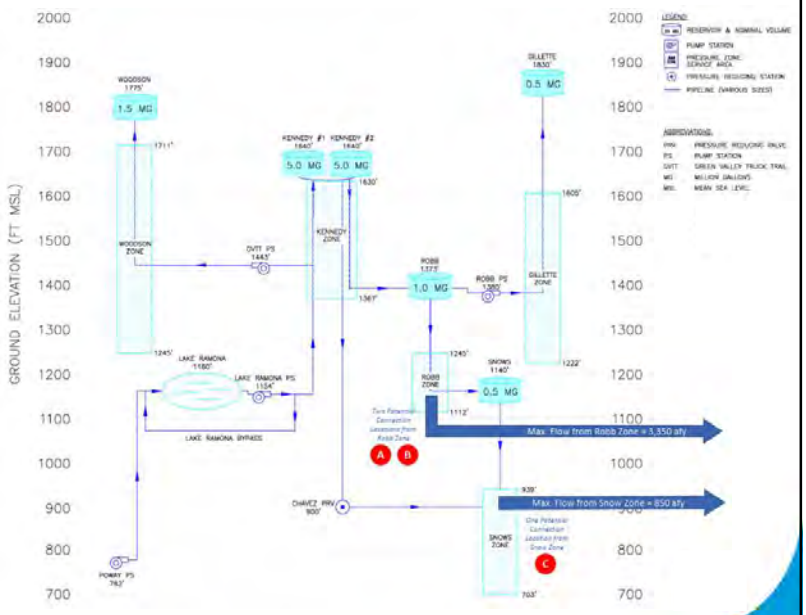


Initial Historic Controlled Releases Analysis

4: Raw Water from Ramona MWD

Findings: Estimated annual 850 AF to 3,350 AF could be delivered from Ramona MWD's raw water system for direct or in-lieu recharge

- Advantages
  - Imported water source, less sensitive to local drought
  - Use of existing infrastructure and less conveyance loss
  - Seasonal delivery flexibility
- Challenges
  - Large construction project required
  - Connection point could limit recharge location options
  - Complexity of SDCWA 1st Aqueduct future operations and restrictions to ag customers

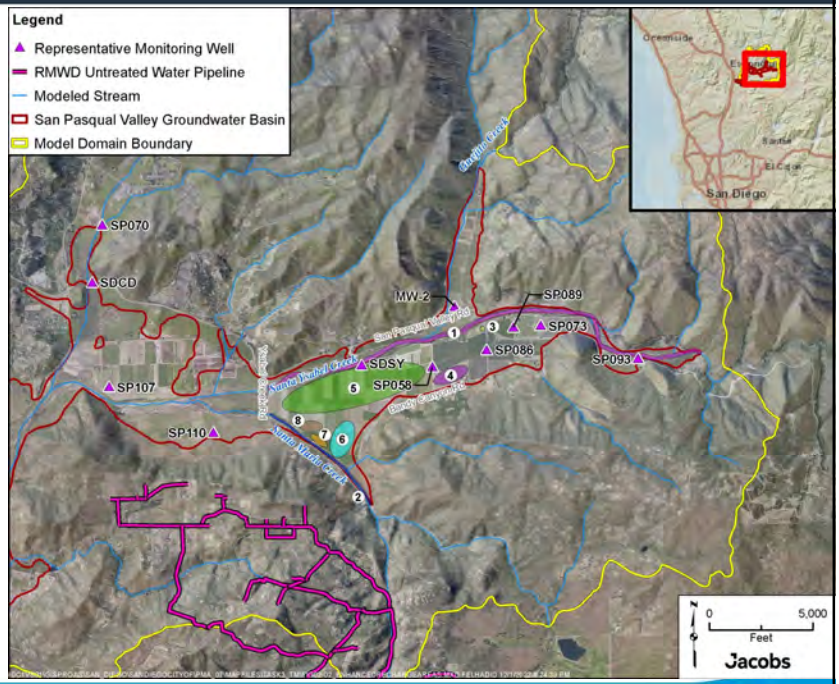


Recharge Location Criteria

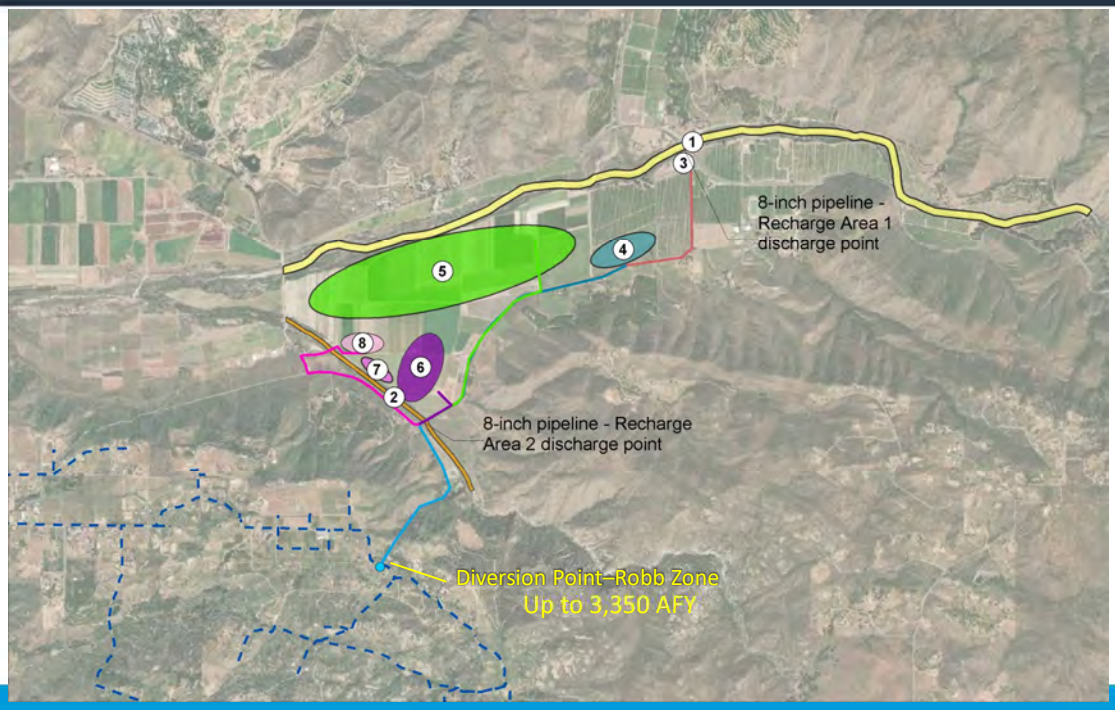
- Prioritize enhancing retention of water within eastern portion of Basin
- Prioritize recharge locations on City parcels
- Prioritize shorter pipelines between sources of recharge water and points of delivery
- Prioritize recharge areas near existing roadways for ease of access
- Prioritize recharge locations near representative monitoring wells
- Minimize disturbance to existing active agricultural lands

Potential Recharge Locations

- Eight potential recharge areas have been identified. These have not been vetted by stakeholders or permitting agencies, so they should be viewed as conceptual for this stage of study
- Area 1 and 2 correspond to permeable streambed along Santa Ysabel and Santa Maria Creeks, respectively
- Areas 3 to 8 are City-owned parcels



Potential Conveyance to Recharge Locations



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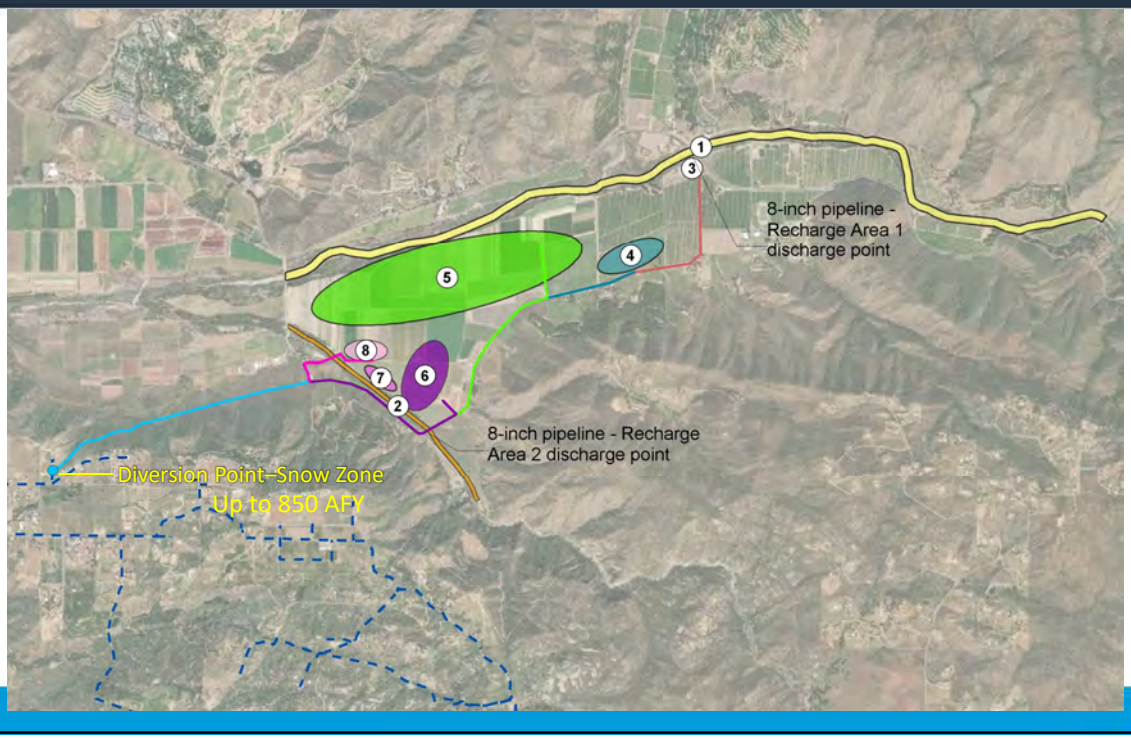
Potential Conveyance to Recharge Locations



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PUBLIC COMMENT

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Questions to Consider

- Is presented information on stream channels, streamflow, and infiltration consistent with your understanding and experience in Basin?
- Do you have any concerns about presented source water information?
- Do presented alignments for recharge conveyance seem reasonable?
  - If not, what suggestions do you have for us to consider when determining potential alignments?
- Are there other key criteria or considerations when determining feasibility of recharge basins, injection wells, or pipeline alignments?

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NEXT STEPS & CLOSING REMARKS

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Next Steps

- Develop potential recharge strategies (Task 4)
- Update model and run simulations of recharge strategies (Task 5)
- Next workshop in April
  - Provide update on model refinements
  - Discuss potential recharge strategies
- 2022 Annual Report is being compiled and will be submitted to DWR by April 1 – will be posted to website following submittal

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Surface Water Recharge Evaluation

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SPV GSP Implementation

Status of Management Action (MA) Implementation:

- **MA 3 –** Support Water Quality Improvement Plan (WQIP) Actions – *Continuous*
- **MA 4 –** Coordinate/Collaborate Regionally with Other Entities to Perform Monitoring & Implement Regional Projects – *Continuous*
- **MA 5 –** Education & Outreach for TDS & Nitrate – *Outreach materials are completed and will be emailed to Stakeholders and posted online soon*
- **MA 6 –** Coordinate with City on Hodges Watershed Improvement Project – *Continuous*
- **MA 7 –** Initial Surface Water Recharge Evaluation – *Underway!*
- **MA 8 –** Study GDEs*, Phase I Desktop Study – *Kicking off in February 2023*

*GDEs = Groundwater Dependent Ecosystems

GSP Resources

- San Pasqual Valley GSP Website
  - https://www.sandiegocounty.gov/content/sdc/pds/SGMA/san-pasqual-valley.html
- San Pasqual Valley GSP
  - https://sgma.water.ca.gov/portal/gsp/preview/75
- Annual Report for Water Years 2020 and 2021
  - https://sgma.water.ca.gov/portal/gspar/preview/140
- San Pasqual Valley GSP Data Management System (Opti)
  - https://opti.woodardcurran.com/sanpasqual/login.php

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THANK YOU!