Santa Margarita Groundwater Basin Toolbox for Management

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County of Santa Cruz

Topics

- Objectives
- Potential Tools
- What we have done so far
- What has been evaluated and probably won't work for our area
- What we are currently looking at
- How will we evaluate tools for the Groundwater Sustainability Plan (GSP)

OBJECTIVES FOR MANAGEMENT
(Based on Guiding Principles)

- Restore and maintain groundwater levels
- Provide reliable supply for current and future users
- Restore and maintain streamflow that is fed by groundwater
- Take into account projected effects of climate change

These objectives will be quantified during plan development

HIGH LEVEL POTENTIAL APPROACHES

- Reduce pumping
  - Water use efficiency
  - Water use limits
  - Land use management
- Increase capture and storage
  - Surface Storage: onstream or off-stream
  - Groundwater storage
- Redistribute groundwater pumping
- Develop additional sources of water

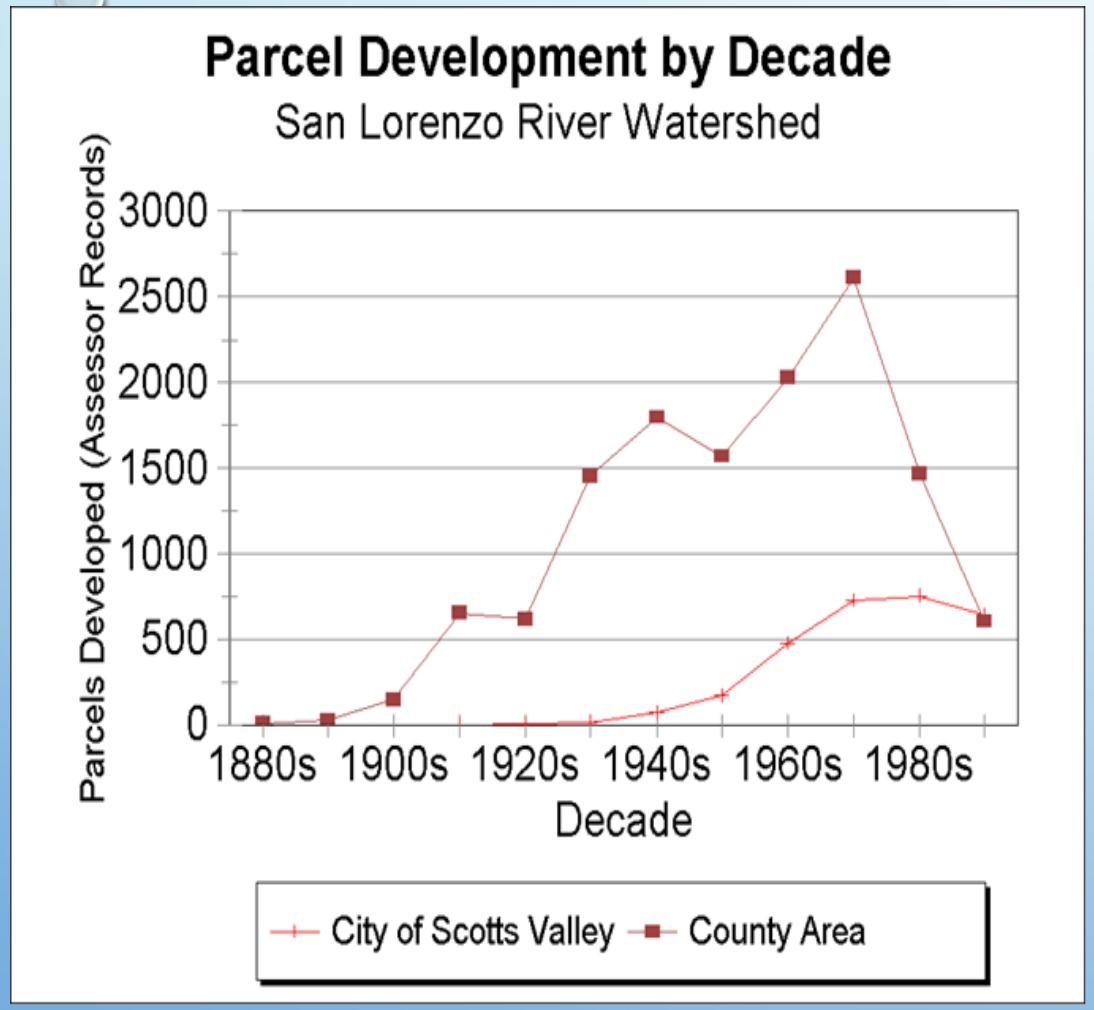
POTENTIAL SOURCES OF WATER

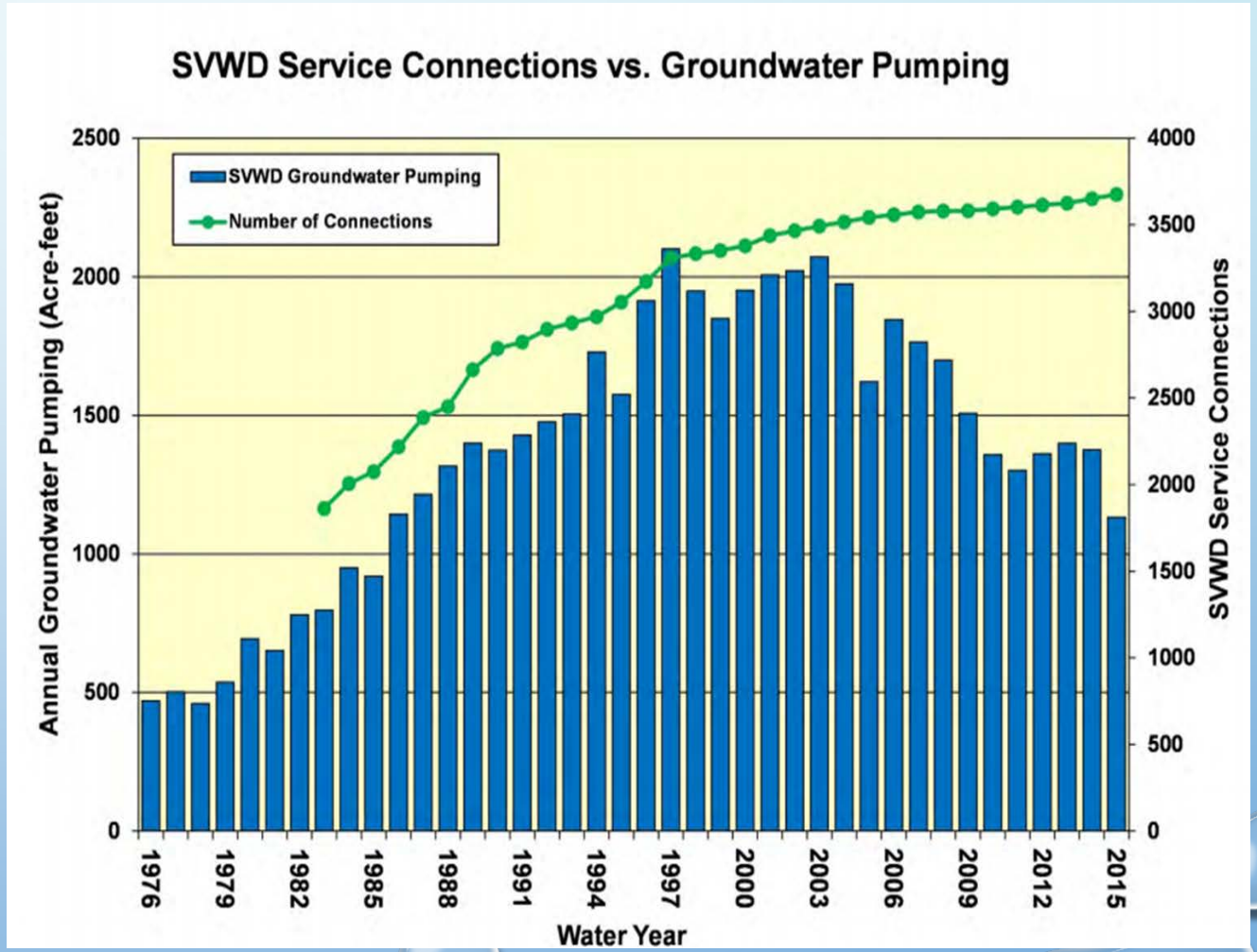
- Diversion and treatment of excess surface water
- In-lieu recharge/use of surface water instead of groundwater
- Aquifer Storage and Recovery
- Recycled water
  - Non-potable reuse
  - Purified Recycled Water Recharge - Indirect potable reuse
  - Direct potable reuse
- Managed recharge/stormwater capture
- Integrated Water Use - Conjunctive Use – Interties – Multiple approaches

MANAGEMENT MEASURES ALREADY IMPLEMENTED

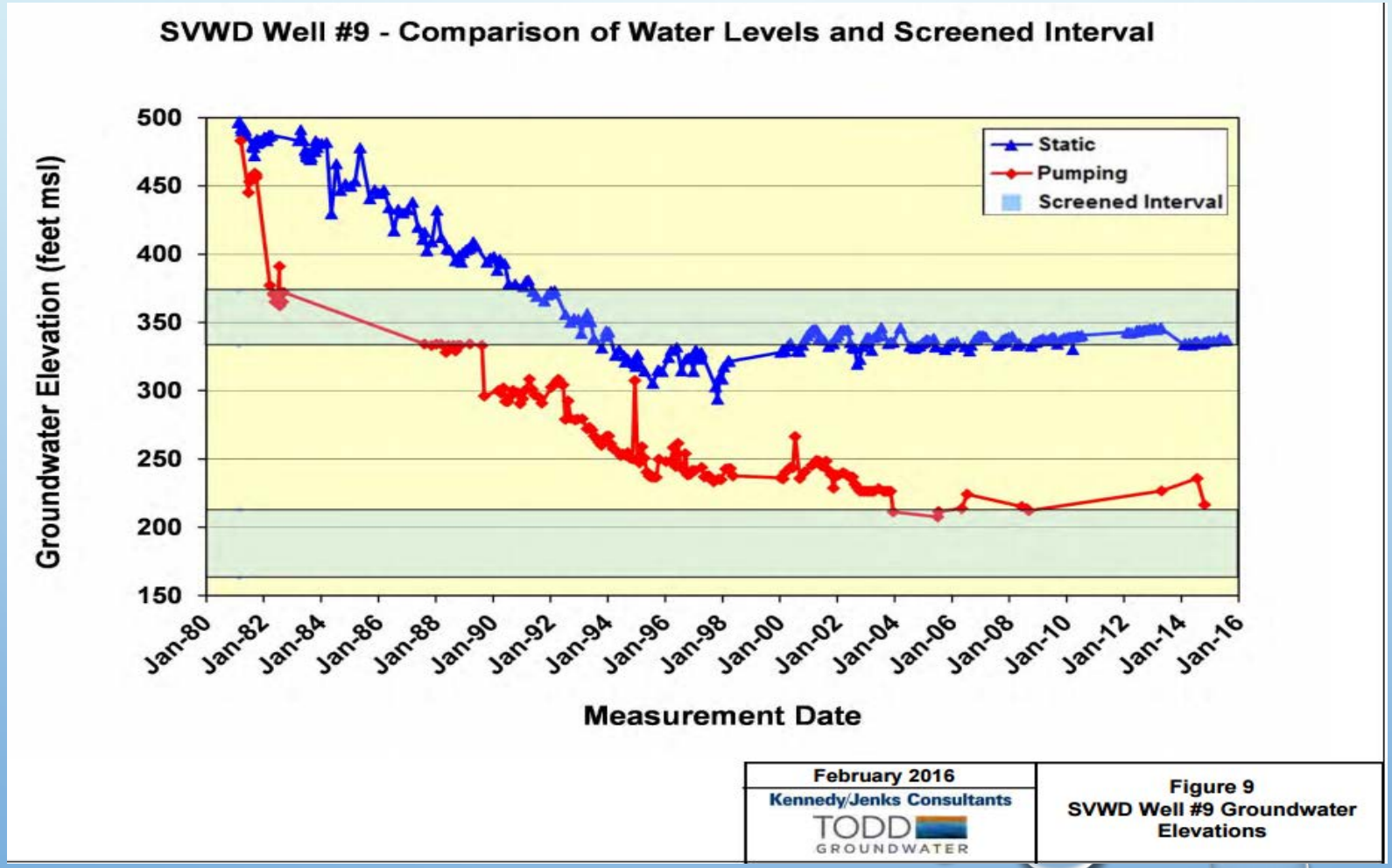
- Water use efficiency - conservation
- Growth Management - County
- Recycled water reuse for irrigation – Scotts Valley
- Stormwater capture and recharge – Scotts Valley
- Conjunctive use - SLVWD
- Surface water storage – Loch Lomond, Felton Diversion, Santa Cruz City

GROWTH AND WATER USE





IMPACT OF CHANGES IN GROWTH AND IMPROVED WATER EFFICIENCY



MEASURES EVALUATED BUT NOT PURSUED

- Additional surface storage
  - Zayante Dam: cost, geologic issues, environmental impact
  - Raising Loch Lomond: dam safety, geologic issues
  - Quarry storage: limited storage, geologic issues, endangered species, water rights challenges
- Water use restriction: legal issues, water rights, equitability

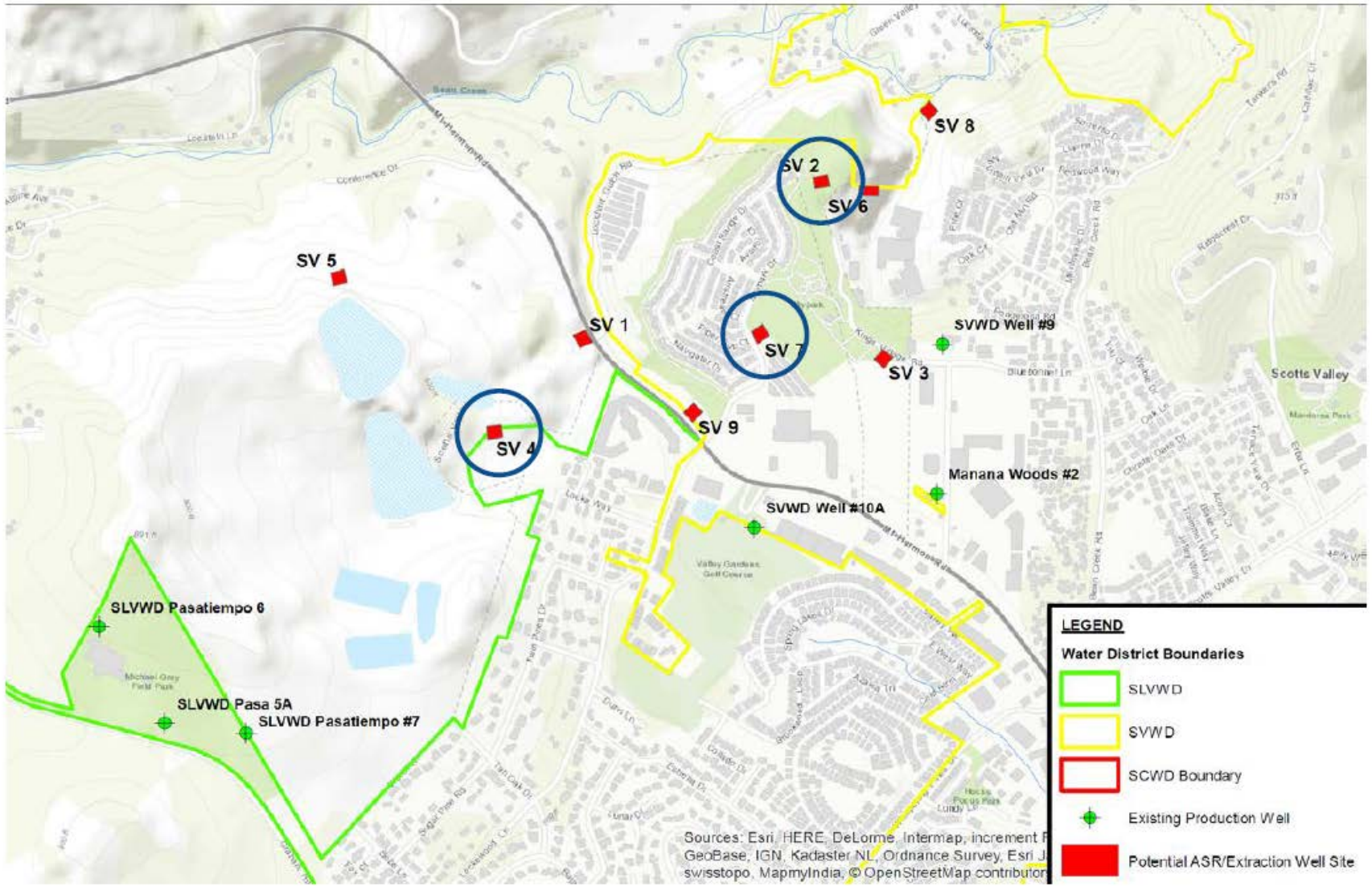
PROJECTS CURRENTLY BEING EVALUATED

- Use of excess winter surface water
  - In lieu recharge – SLVWD, Santa Cruz City
  - Aquifer Storage and Recovery (ASR) – Santa Cruz City
  - Use of Loch Lomond water – SLVWD
- Purified Recycled Water Recharge – SVWD
- Additional conjunctive use, Use of interties and collaboration for resiliency and efficiency
- Ongoing Stormwater capture and water use efficiency

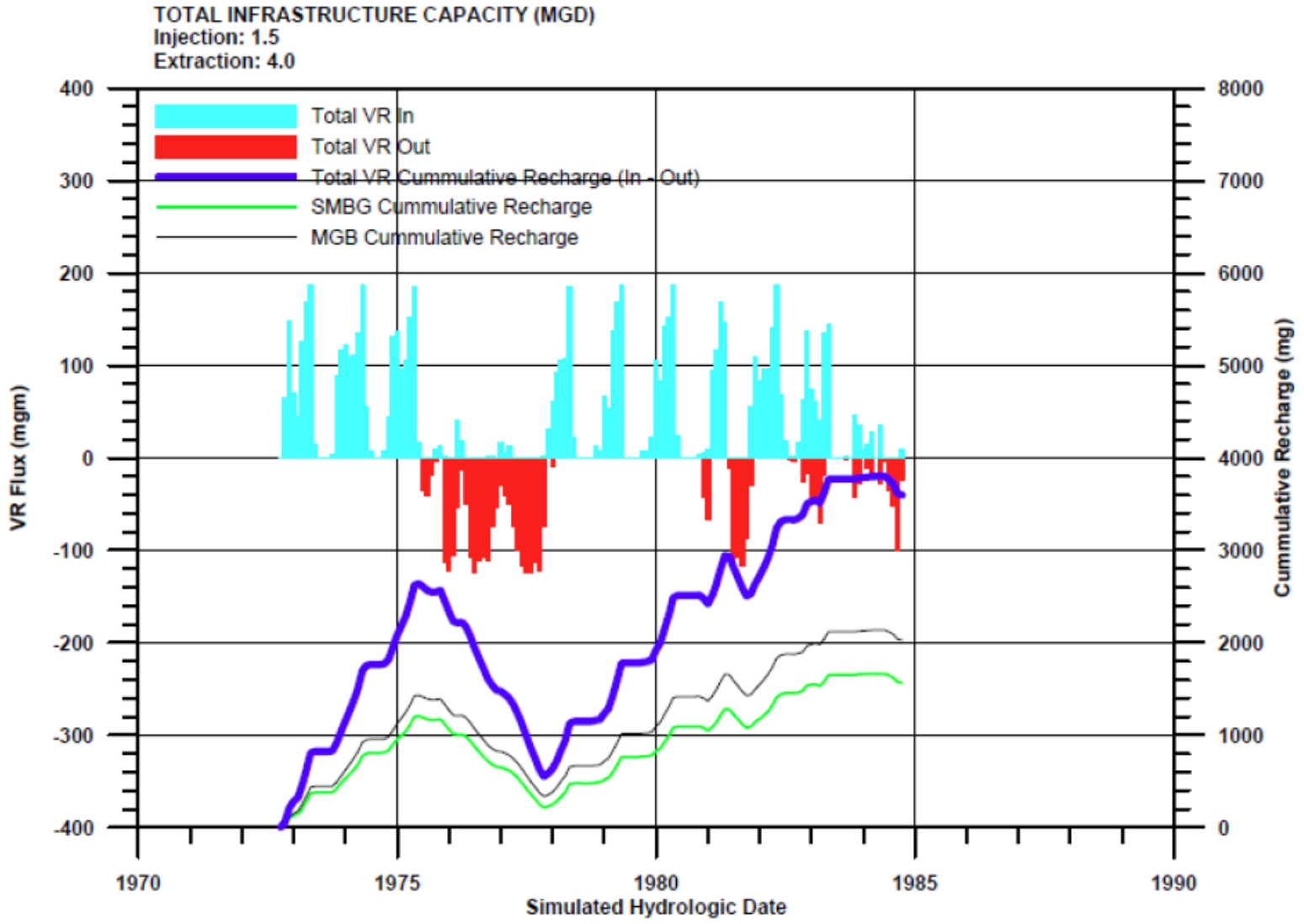
IN LIEU RECHARGE AND ASR

- In lieu recharge: increase groundwater storage by using treated surface water instead of pumping groundwater
- Aquifer Storage and Recover (ASR): Inject treated surface water into aquifer to increase storage. Pump out during dry periods. 80-85% recovery possible. Over 25 active projects nationwide.
- City of Santa Cruz has evaluated feasibility based on geology and groundwater model.
- Pilot testing now underway in Md-County
- Future pilot testing in Santa Margarita Basin

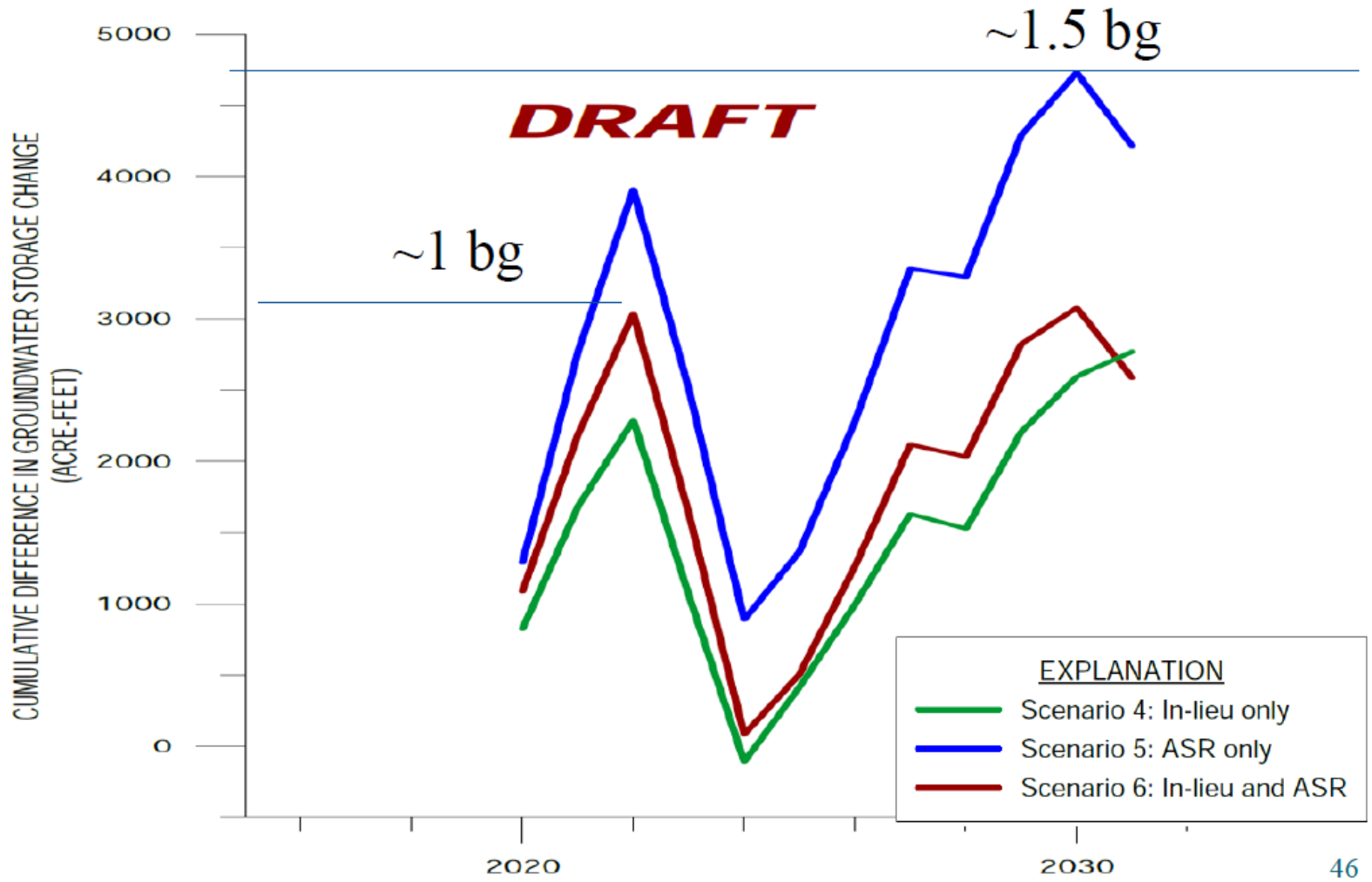
Scenario 6 – In-Lieu plus ASR
Simulated ASR Wells - SMGB



Scenario 6 – In-Lieu plus ASR Recharge – Recovery Flows



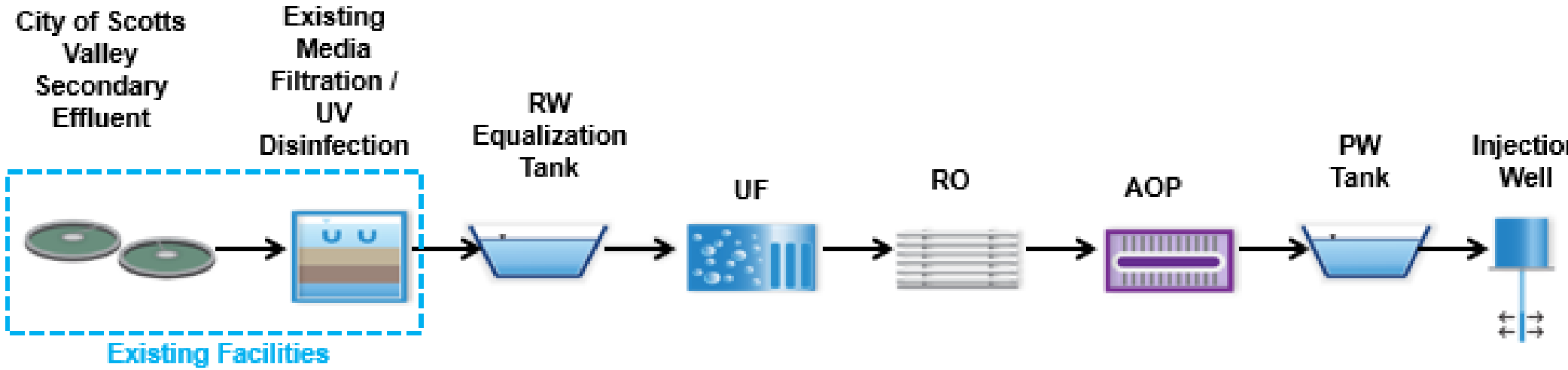
Scenarios 4 – 6 Results
Cumulative Storage Changes - SMGB



PURIFIED RECYCLED WATER RECHARGE (PRWR)

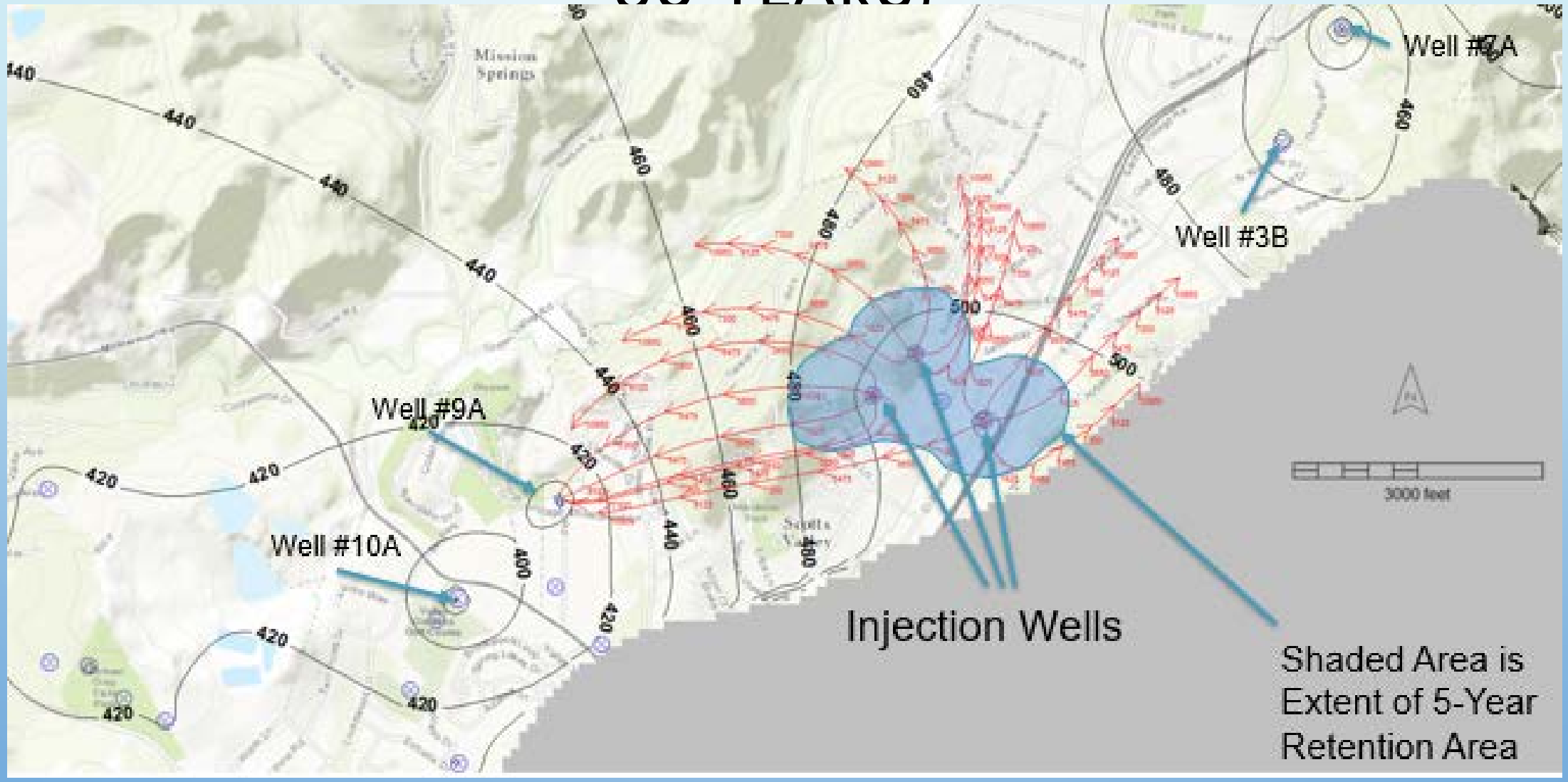
- Recycled water treated through an advanced purification process to comply with Title 22 regulatory requirements
- Active injection of approximately 180 MGY (560 AFY) into Lompico aquifer in Scotts Valley El Pueblo area of Santa Margarita basin
- Groundwater levels could increase 150 to 190 feet over 20 years and contribute about 6,000 AF of stored water
- Estimated capital costs $15M-$20M, annual operating costs $0.5m
- Environmental study (CEQA) under way with anticipated completion in Spring 2020

ADVANCED PURIFICATION TREATMENT PROCESS

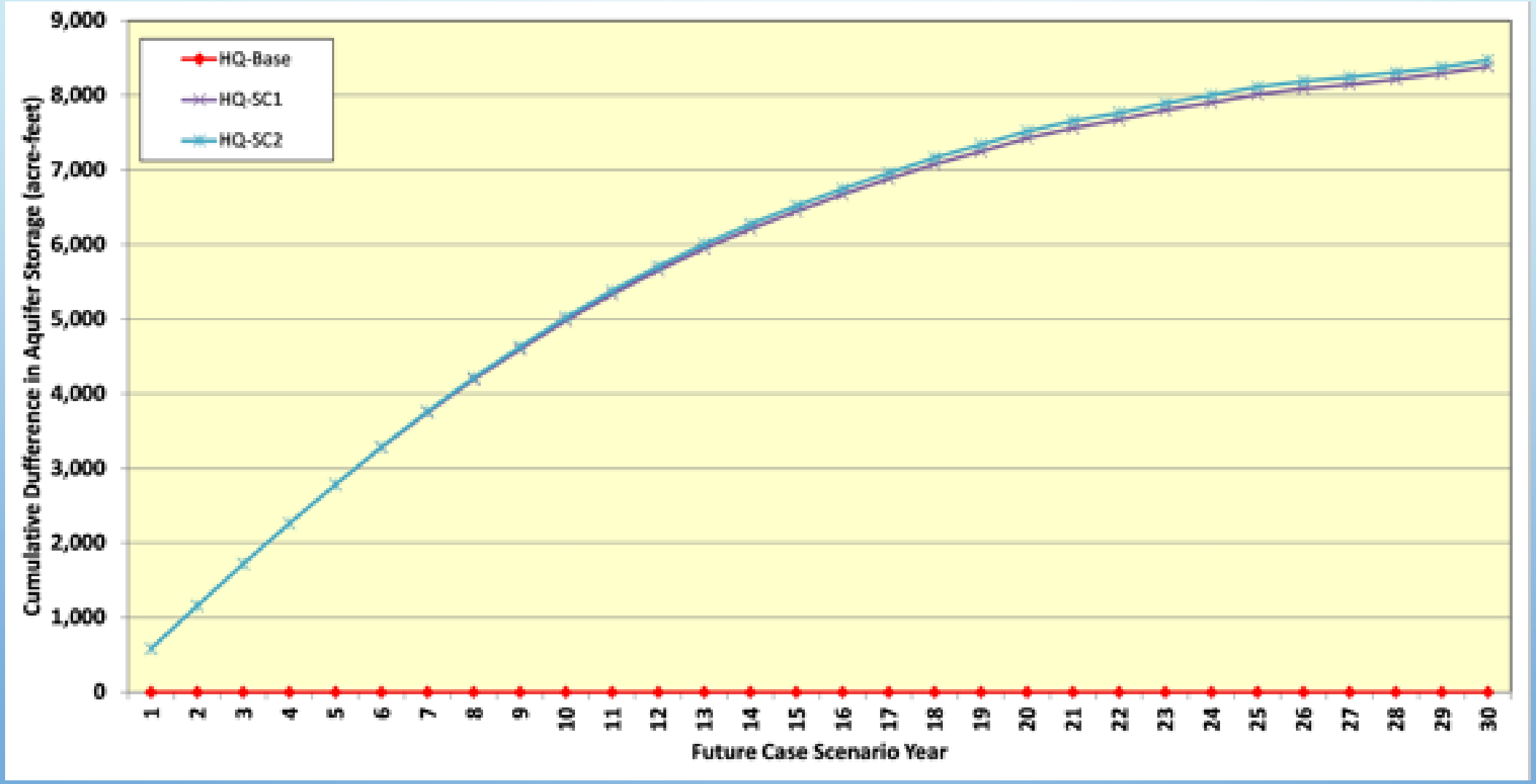


	Target Process Log Removal / Inactivation Credits								
Treatment Processes	Scotts Valley WWTP	Scotts Valley WRF	UF	RO	UV/ AOP	Aquifer	Total Log Removal/ Inactivation	DDW Required Log Removal/ Inactivation	Additional Safety Factor Log
Pathogen									
Virus	1	4	0	1	6	6	18	12	6
Giardia	1	1	4	1	6	0	13	10	3
Crypto	1	1	4	1	6	0	13	10	3

PARTICLE TRACKING AND GW ELEVATIONS (AT 30 YEARS)



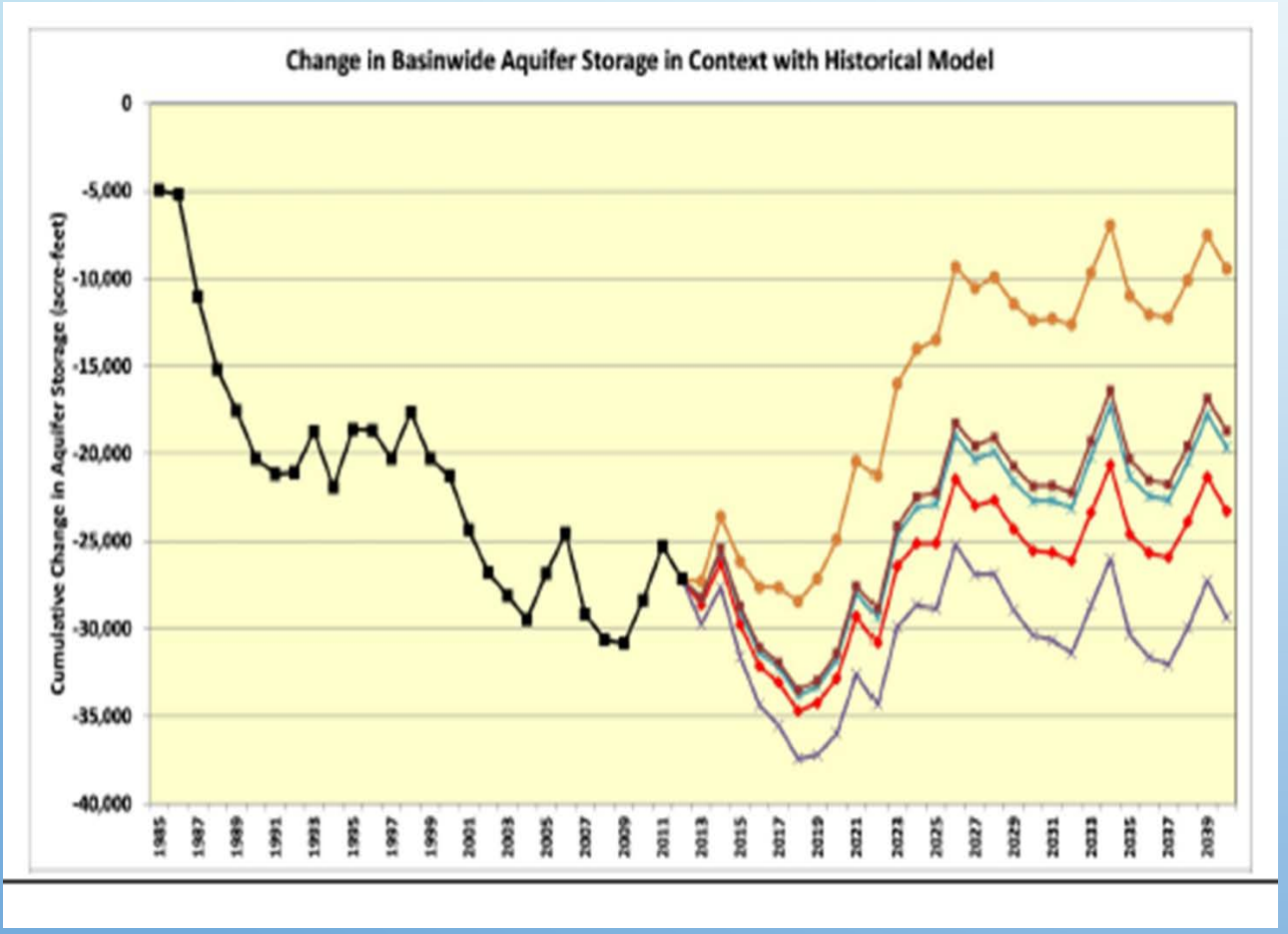
PROJECTED CHANGE IN AQUIFER STORAGE

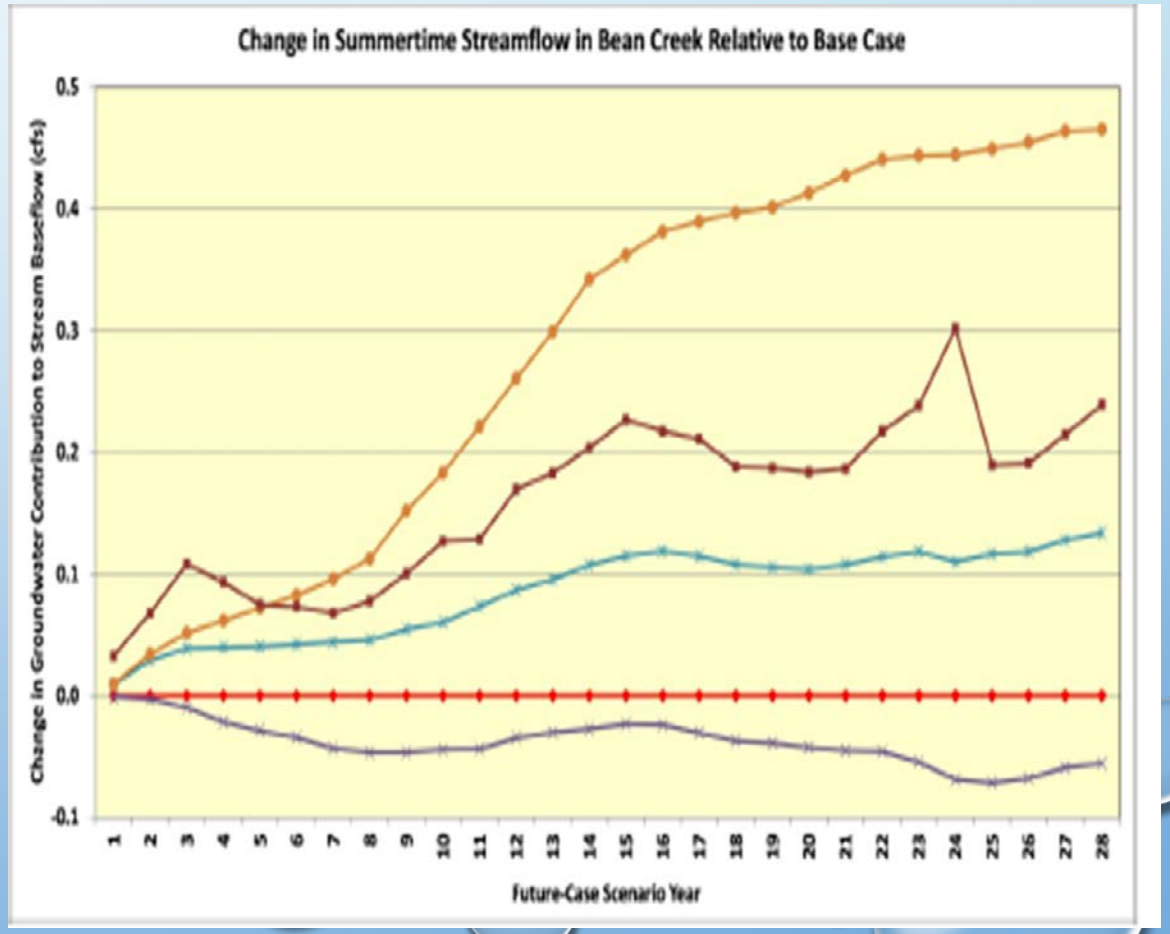


FACILITIES PLANNING REPORT ALTERNATIVES

Alternative	Quantity of Potable Water Produced/ Used	Cost of Water Delivered	Ease of Implementation	Environmental Benefits	Regional Benefits	Robustness against Climate Change Impacts
Local Irrigation Reuse	Medium	High	High	Low	Low	High
Expanded Irrigation Reuse	Low	High	Medium	Low	Medium	High
APF at Scotts Valley WRF and Groundwater Recharge	High	Low	Medium	Medium	High	High
APF at Hanson Quarry and Groundwater Recharge	High	Low	Low	Medium	High	High
APF at El Pueblo and Groundwater Recharge	High	Low	High	Medium	High	High
City of Santa Cruz Interconnection	Medium	Medium	Low	Low	Medium	Low to Medium
Stormwater Diversion and Delivery to Hanson Quarry	Low	Medium	High	Low	Low	Medium
Surface Water Diversion from Felton Diversion	Medium	Medium	Low	Medium	Medium	Low to Medium
Water Conservation/ Reduction	Low	High	High	Medium	Low	High
No Project Alternative	Low	High	High	None	None	Low to Medium

EFFECT OF ADDING 500 AFY TO BASIN





DEVELOPMENT OF GROUNDWATER SUSTAINABILITY PLAN

- Establish sustainability goals
- Evaluate the effect of projects to achieve those goals
- Evaluate costs, energy, environmental factors and determine most feasible projects
- Implement projects
- Monitor effectiveness
- Refine or implement additional measures as needed to meet goals

FOLLOW AND PARTICIPATE IN THE PROCESS

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