



Groundwater Sustainability Plan

for the
Indian Wells Valley Groundwater Basin

December 12, 2019

Presentation Overview

- Purpose of GSP
- Indian Wells Valley Stakeholders
- Basin Setting
- Current Basin Conditions - Undesirable Results
- Predicted Future Conditions if GSP is not Implemented
- Sustainability Goal
- Sustainable Management Criteria
- Projects and Management Actions
- Predicted Future Conditions with GSP implementation
- GSP Implementation
- Potential Impacts to Stakeholder Groups
- Stakeholder Involvement
- GSP Public Review Draft

The Groundwater Sustainability Plan (GSP)

- Is a planning document to provide the framework and roadmap for Basin management to reach sustainability by 2040.
- Considers the unique beneficial uses and users and hydrogeologic conditions of the Basin.
- Includes an adaptive management approach that will be flexible to adapt to changing conditions.

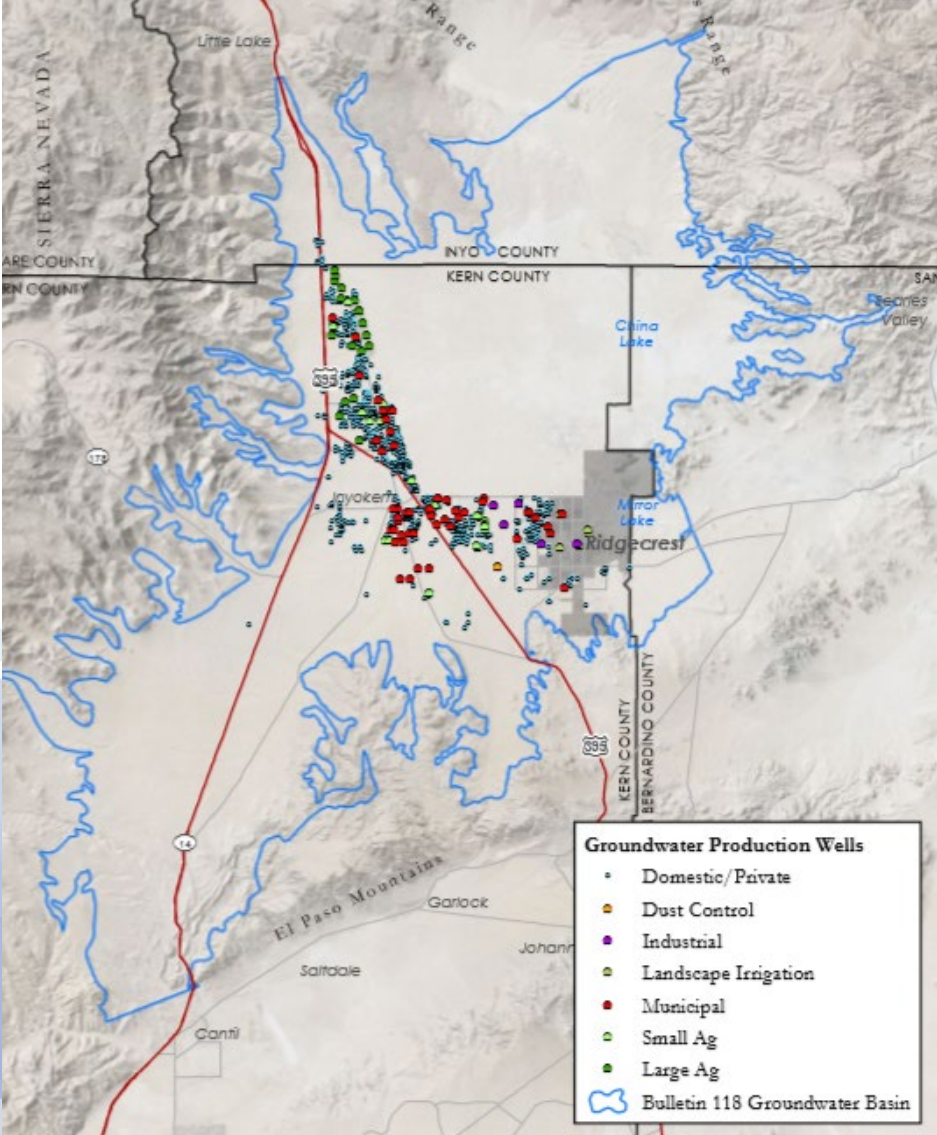
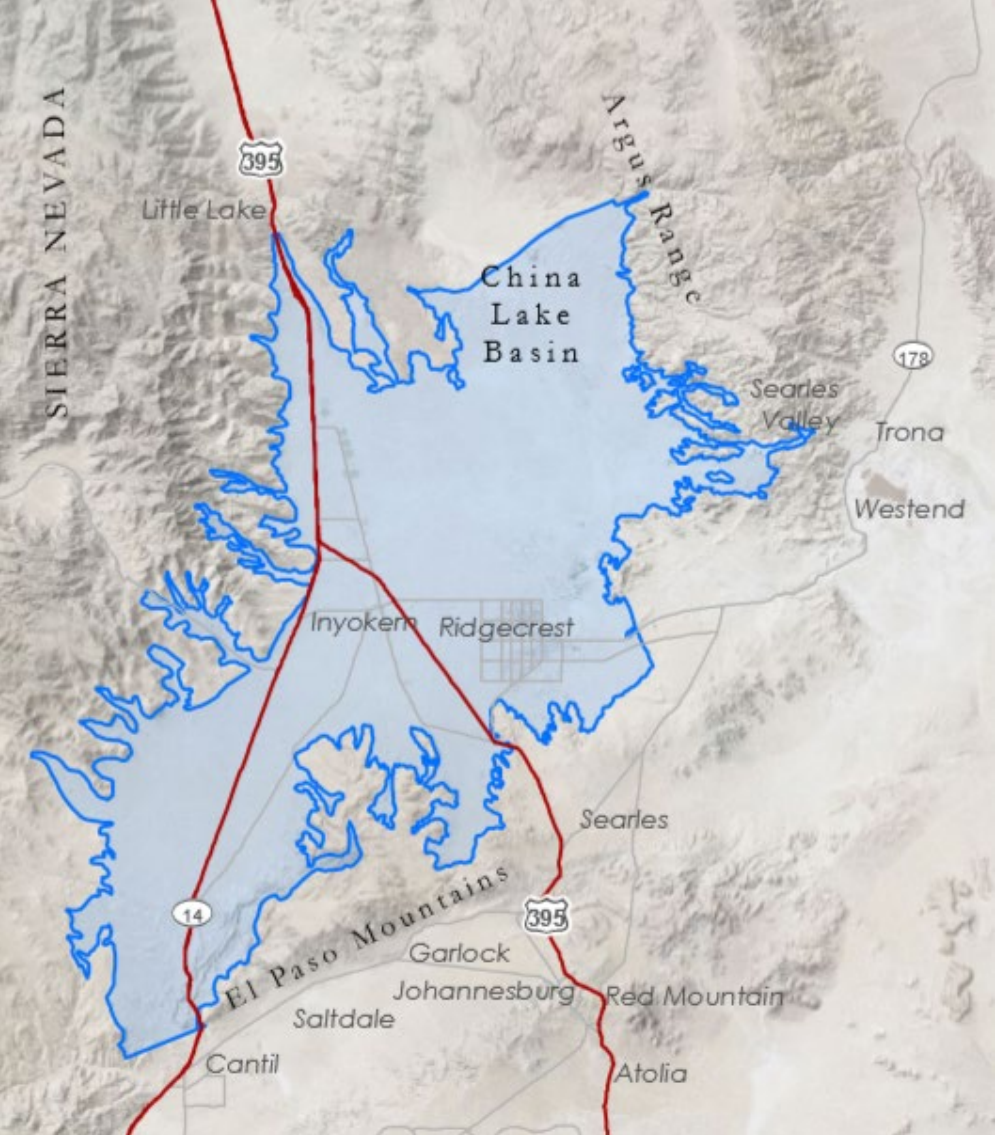
Indian Wells Valley Stakeholders

- Local Public Agencies
- Groundwater Pumpers
- U.S. Navy
- Businesses/Industries
- Agriculture
- Land Owners
- Residents

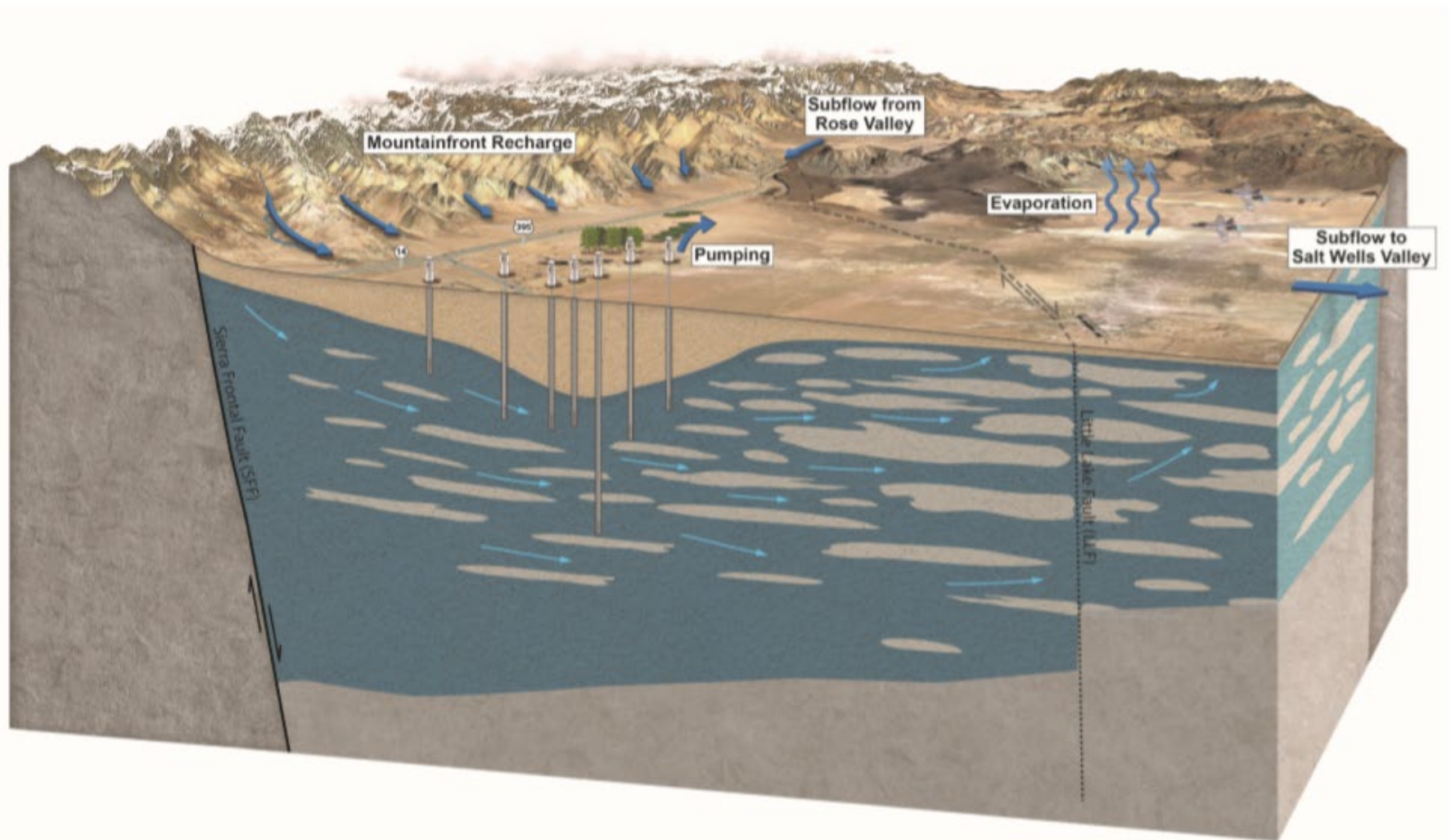
GSP Public Review Draft

- GSP Contents
 - Section 1: Introduction
 - Section 2: Plan Area
 - Section 3: Basin Setting
 - Section 4: Sustainable Management Criteria
 - Section 5: Projects and Management Actions
 - Section 6: Plan Implementation

Basin Setting



Basin Setting – Hydrogeologic Conceptual Model



Current Basin Conditions – Undesirable Results

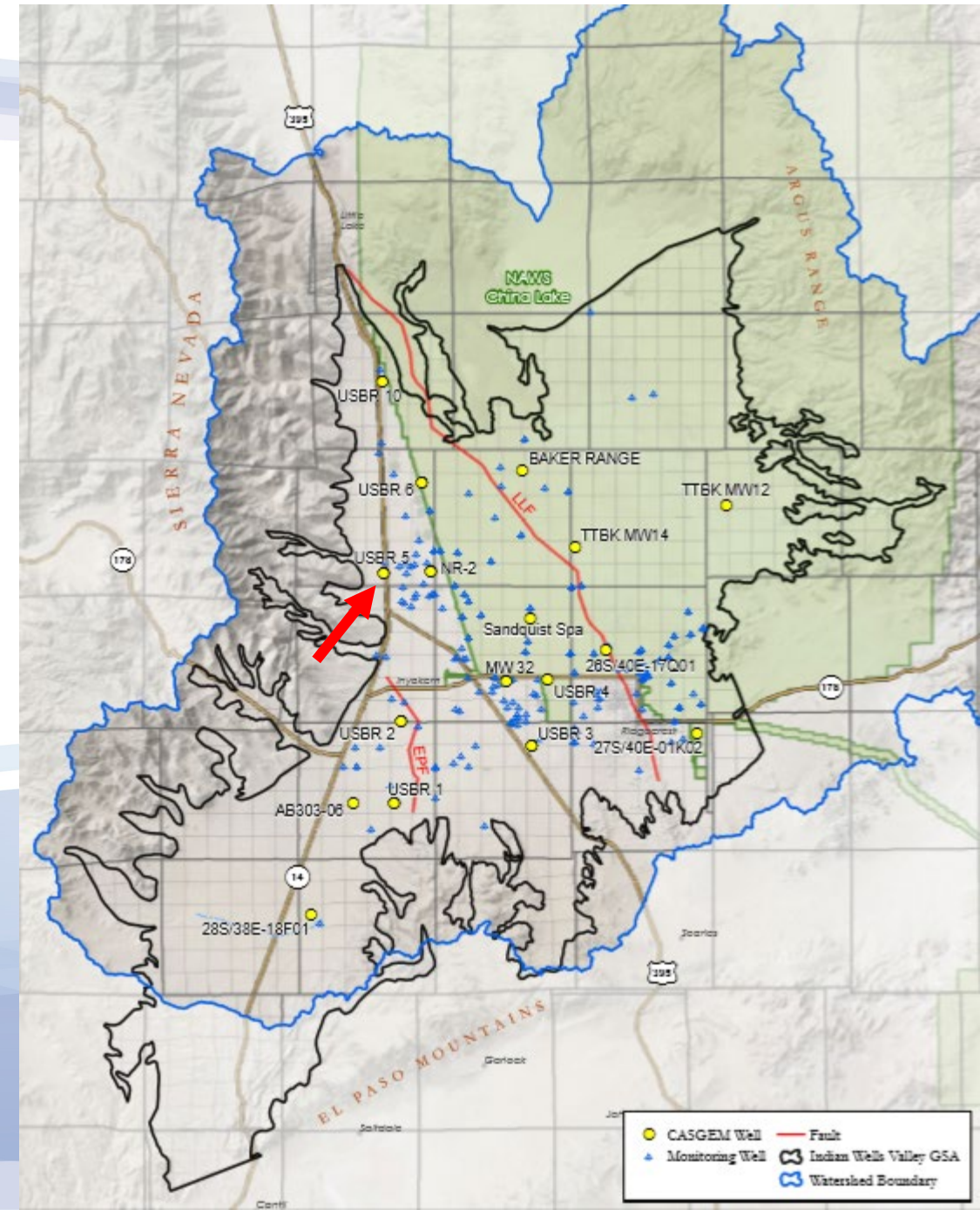
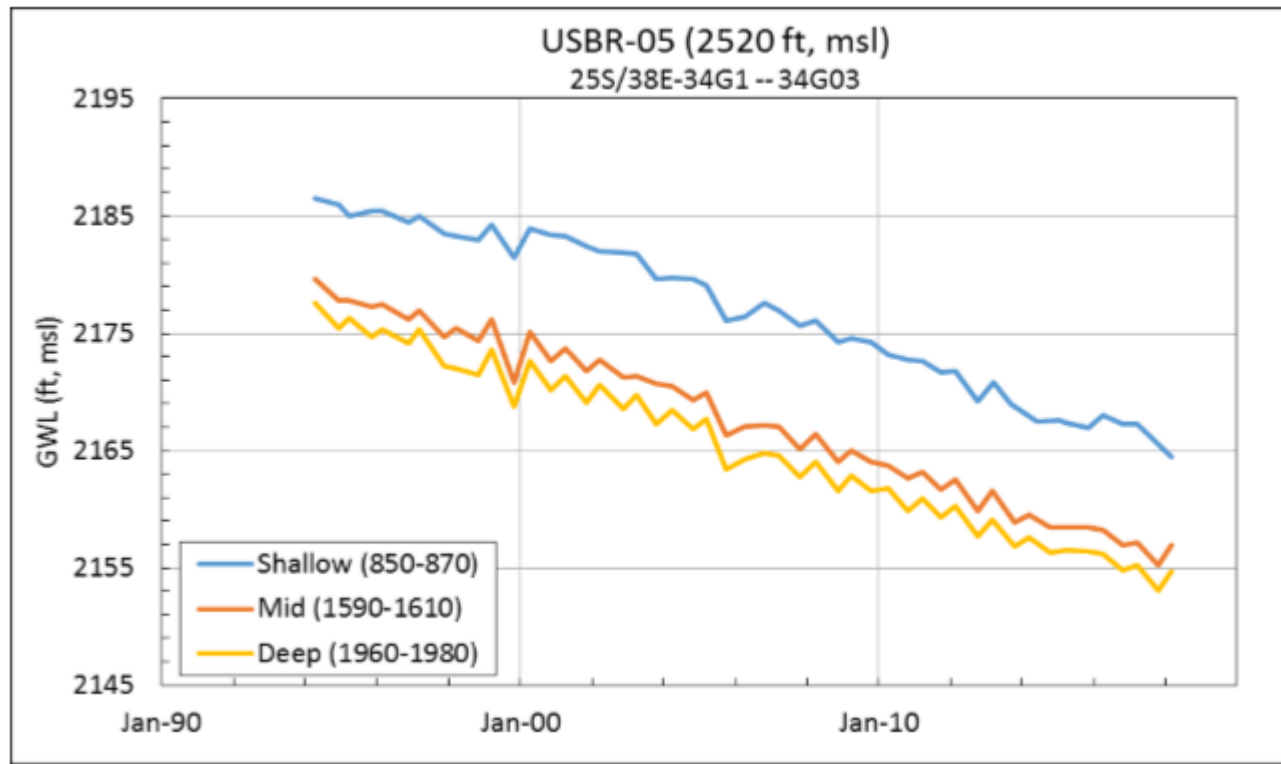
- Groundwater from the Basin is the sole source of potable drinking water in the Indian Wells Valley.
- The Basin has been in overdraft since at least the 1960s.
- Overdraft means the volume of outflows (primarily groundwater extractions) exceed the volume of inflows (natural recharge)
- Result is annual loss of groundwater in storage and chronic lowering of groundwater levels
- These impacts then can lead to shallow well impacts, water quality degradation, and land subsidence.

Water Budget Element	Estimated Volume (AFY)
<i>Inflows</i>	
Mountain Front Recharge	7,650
Total Inflow	7,650
<i>Outflows</i>	
Evapotranspiration	4,850
Interbasin Subsurface Flow	50
Groundwater Extractions	27,740
Total Outflow	32,640
Change of Groundwater in Storage	-24,990

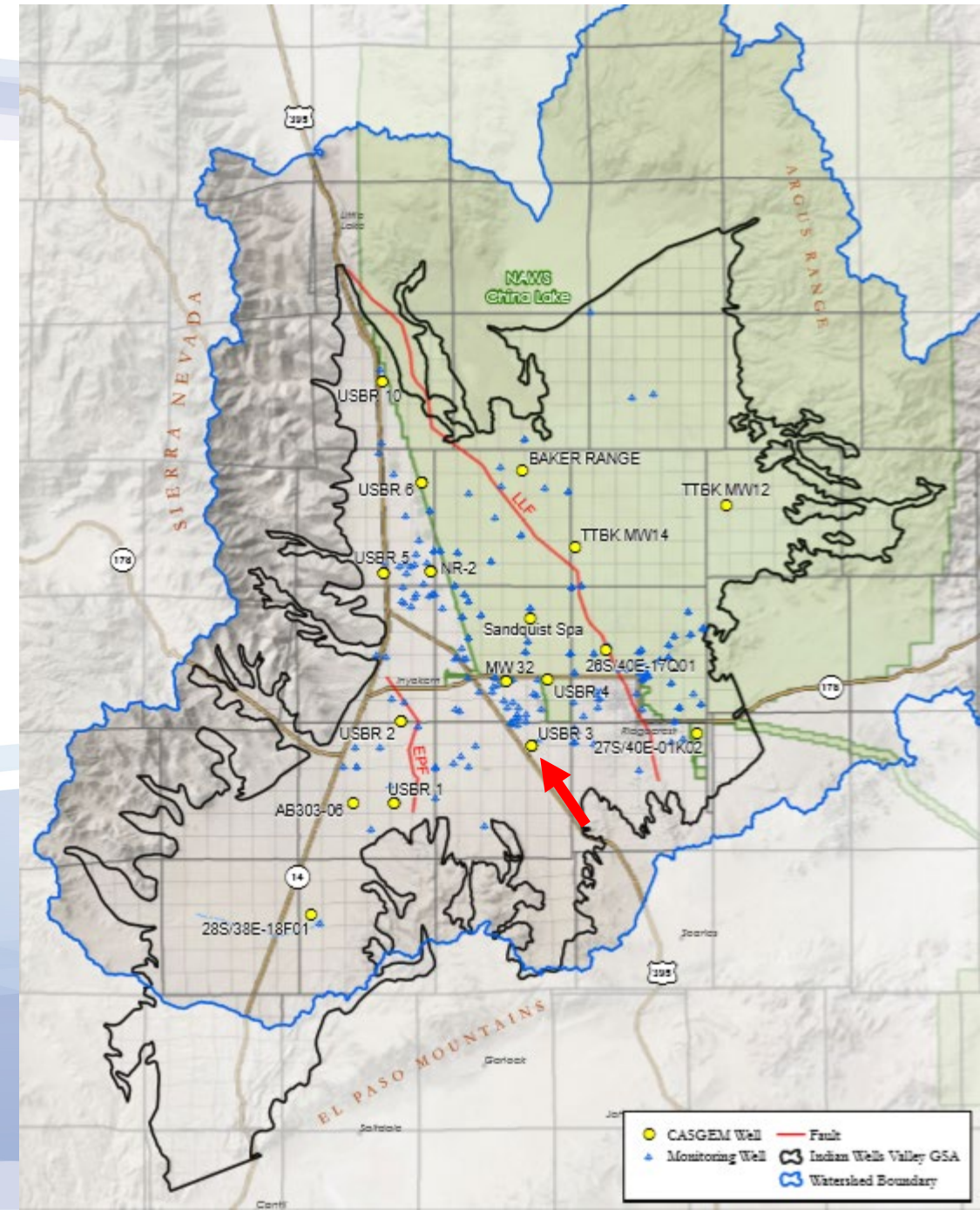
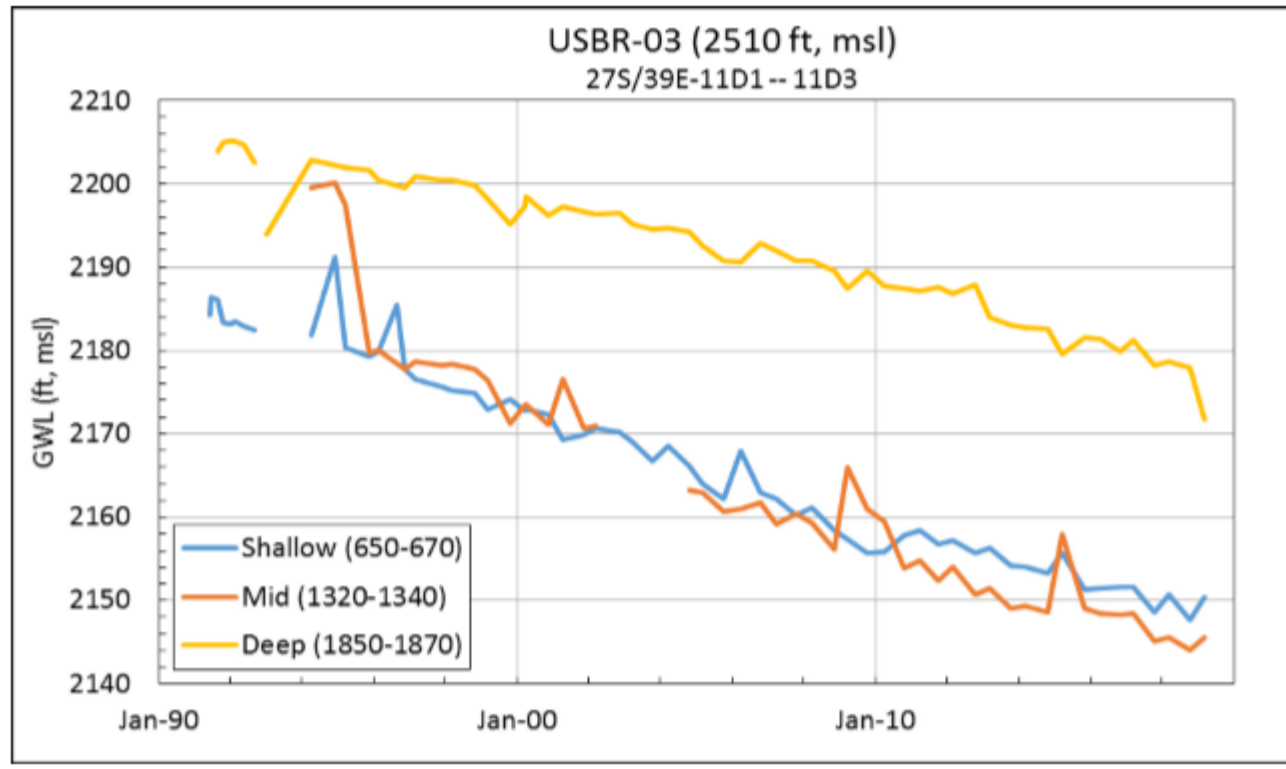
- Water Budget Conclusion: taking approximately 25,000 acre-feet per year (AFY) more out of the Basin than nature is returning

Current Basin Conditions – Undesirable Results

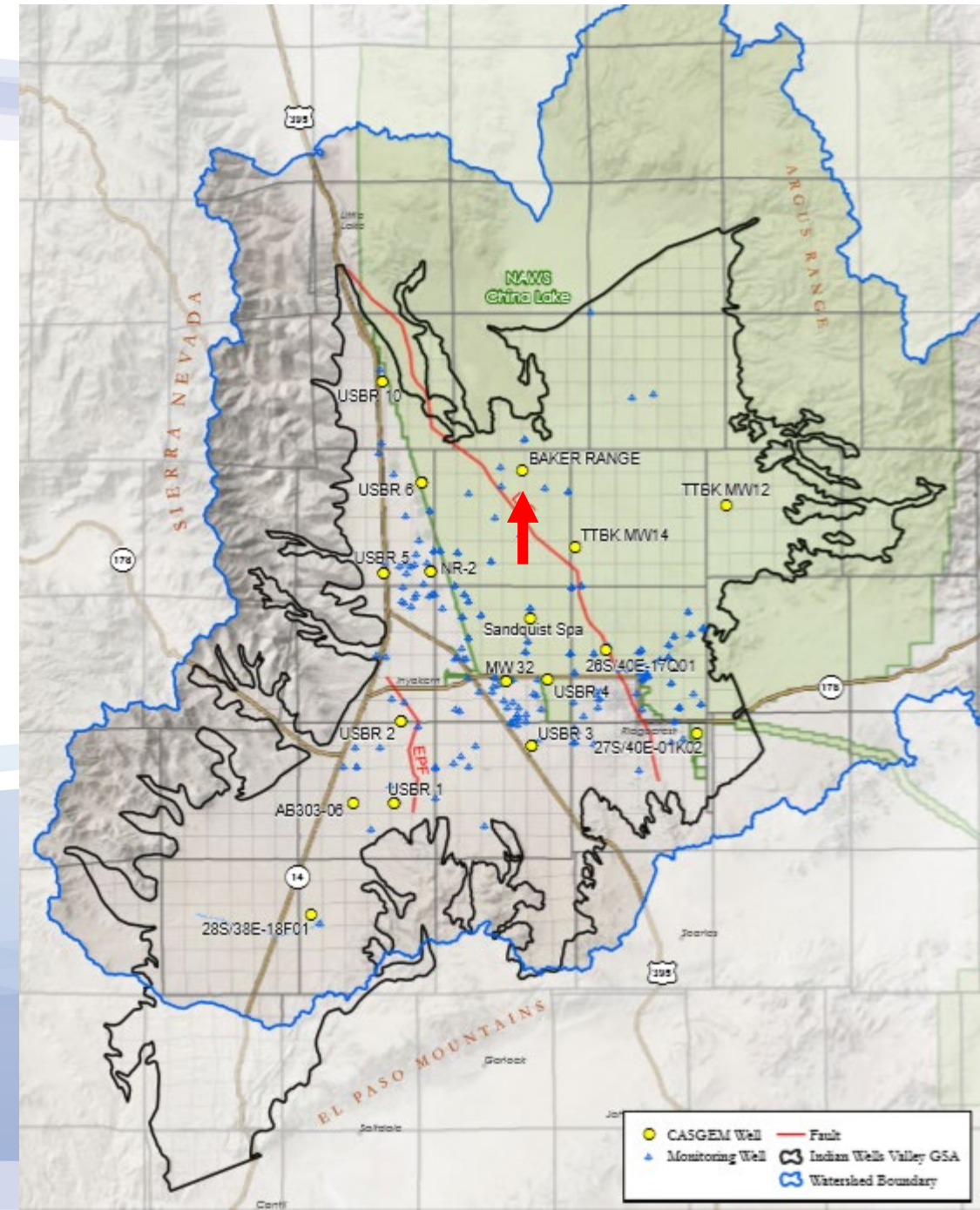
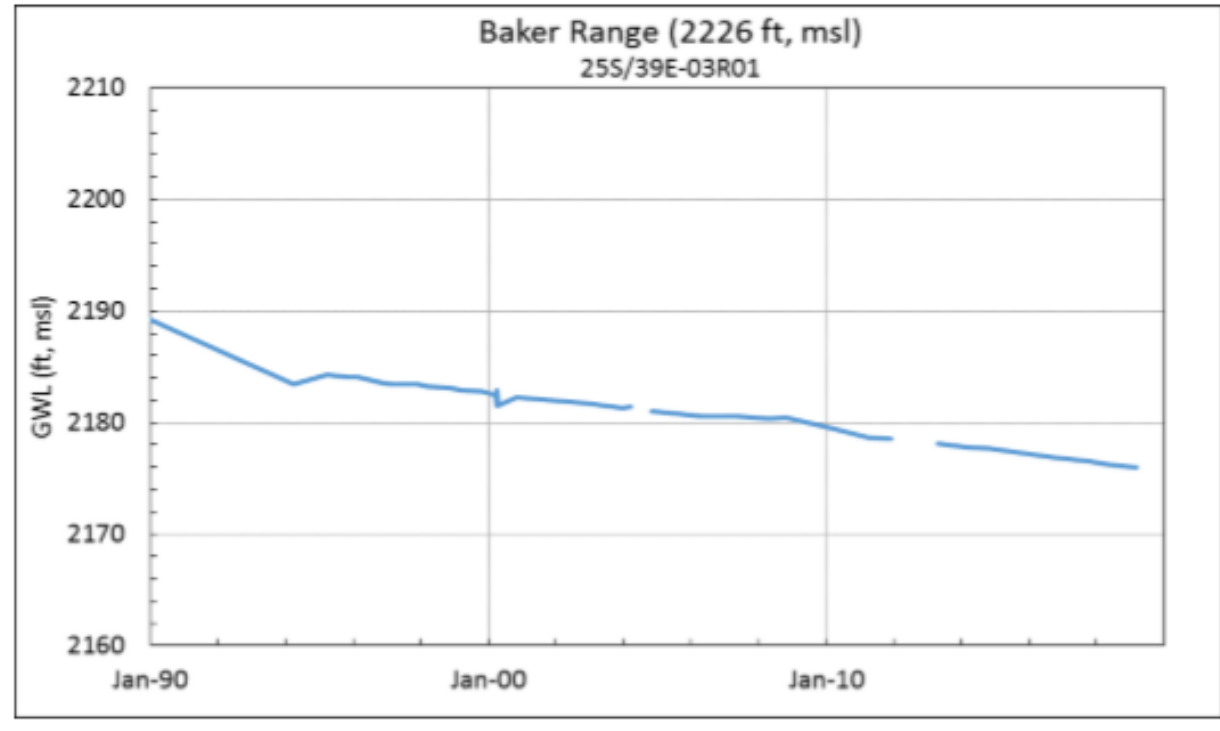
- Hydrographs show chronic lowering of groundwater levels



Current Basin Conditions – Undesirable Results

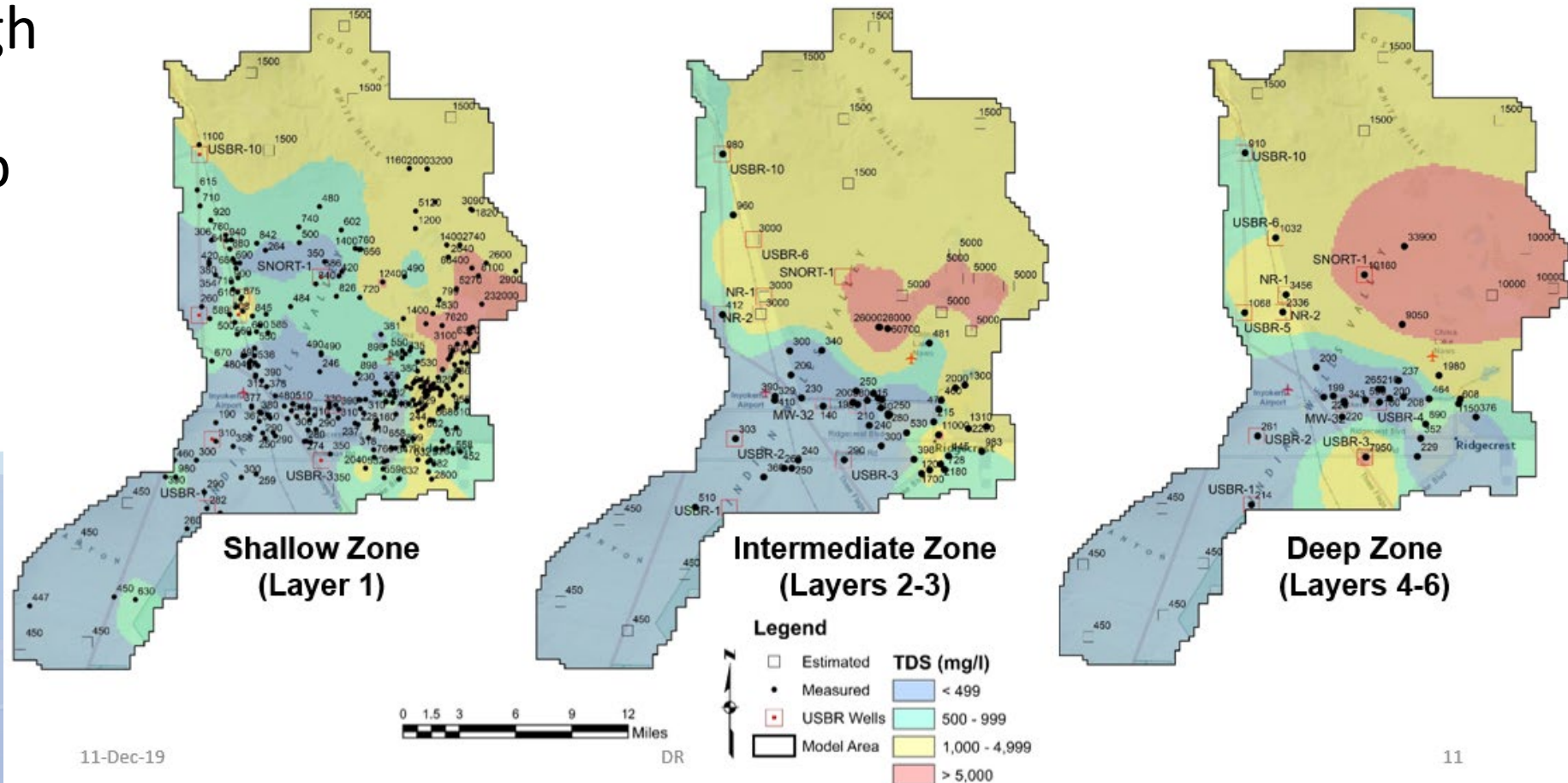


Current Basin Conditions – Undesirable Results



Current Basin Conditions – Undesirable Results

- Current TDS data show areas of high concentrations (particularly deep in the Basin)



Current Basin Conditions – Undesirable Results

- Shallow Well Impacts

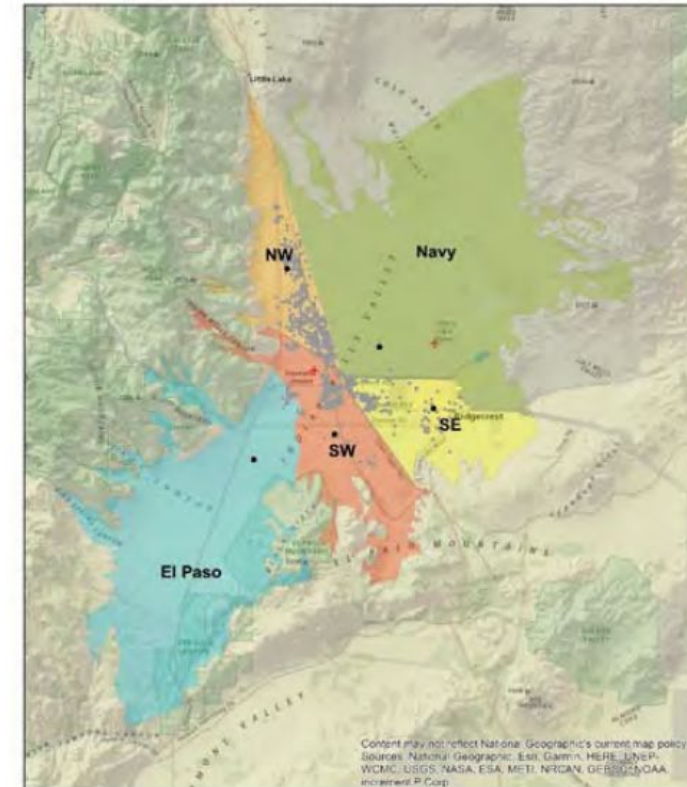
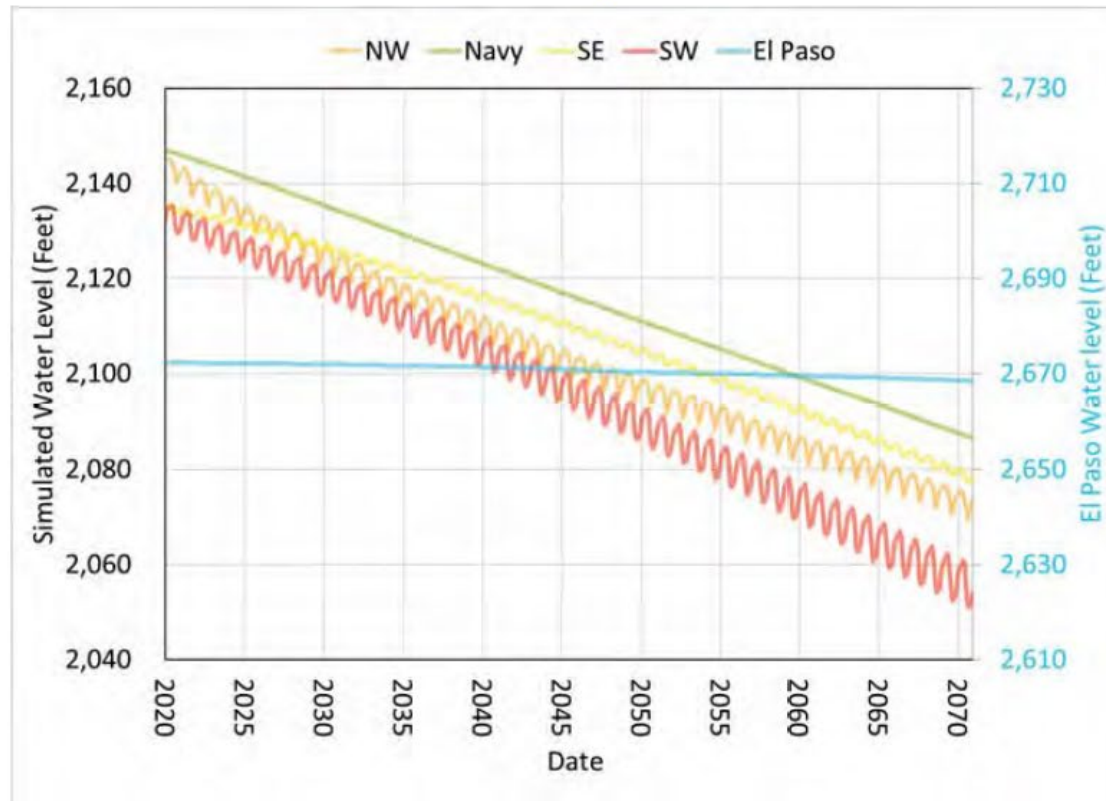
- Declining water levels have historically impacted and are currently impacting shallow production wells, requiring wells to be deepened, re-drilled, or abandoned as a water source.
- Results from the shallow well analysis estimate that approximately 97 shallow wells have been impacted from declining groundwater levels between 1980 and 2018.
- Additional shallow wells have been impacted from degraded water quality.

Predicted Future Conditions if GSP is not Implemented

- Current outflows in the Basin are 4 times current inflow.
- Overdraft conditions are anticipated to continue unless Basin management strategies are implemented.
- The Basin Numerical Model was used to simulate groundwater conditions through 2070 if the GSP were not implemented.

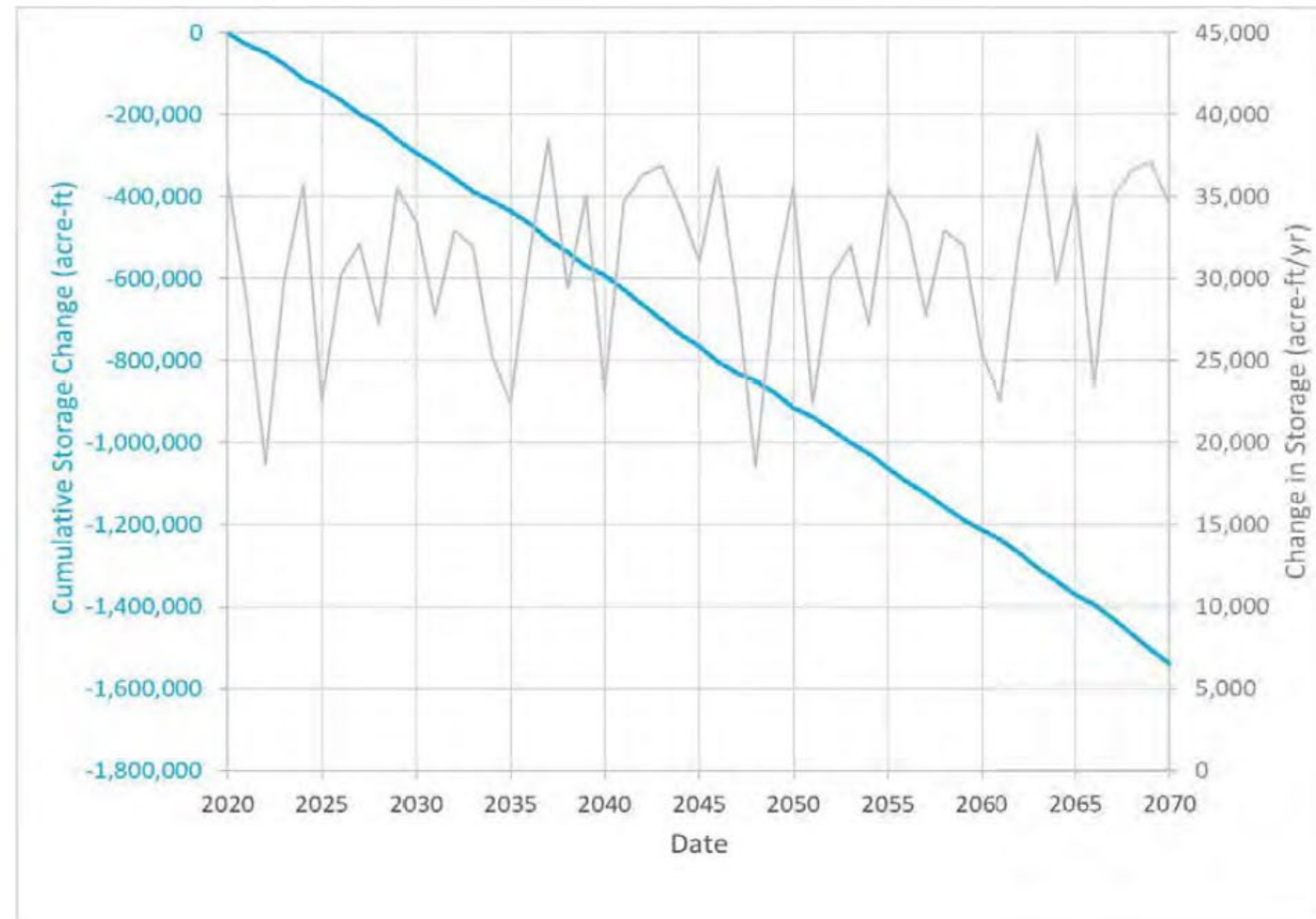
Predicted Future Conditions if GSP is not Implemented

Simulated Water Levels by Model Analysis Zones



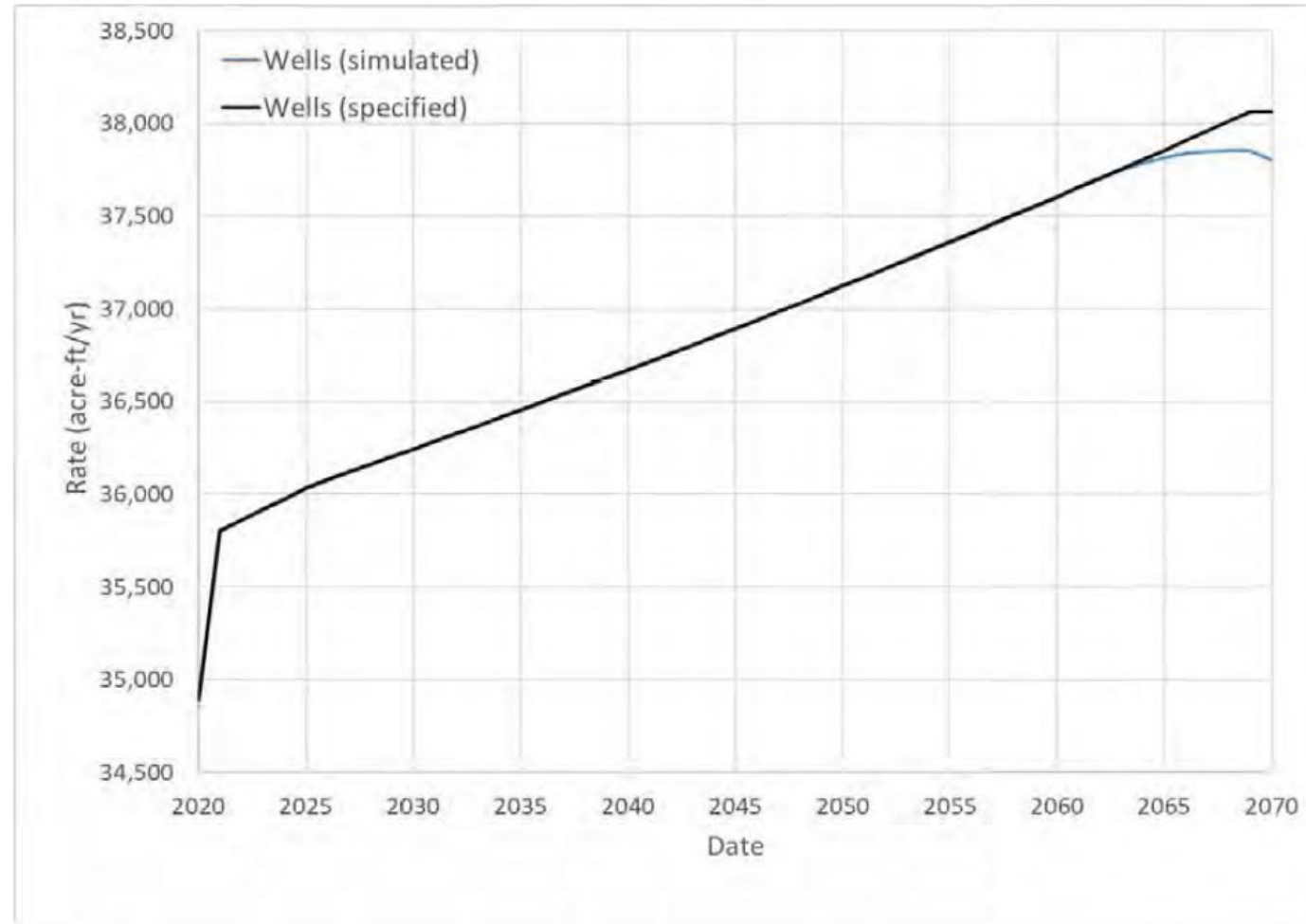
Predicted Future Conditions if GSP is not Implemented

Change in Groundwater Storage



Predicted Future Conditions if GSP is not Implemented

Simulated
Outputs
(Wells)



Sustainability Goal

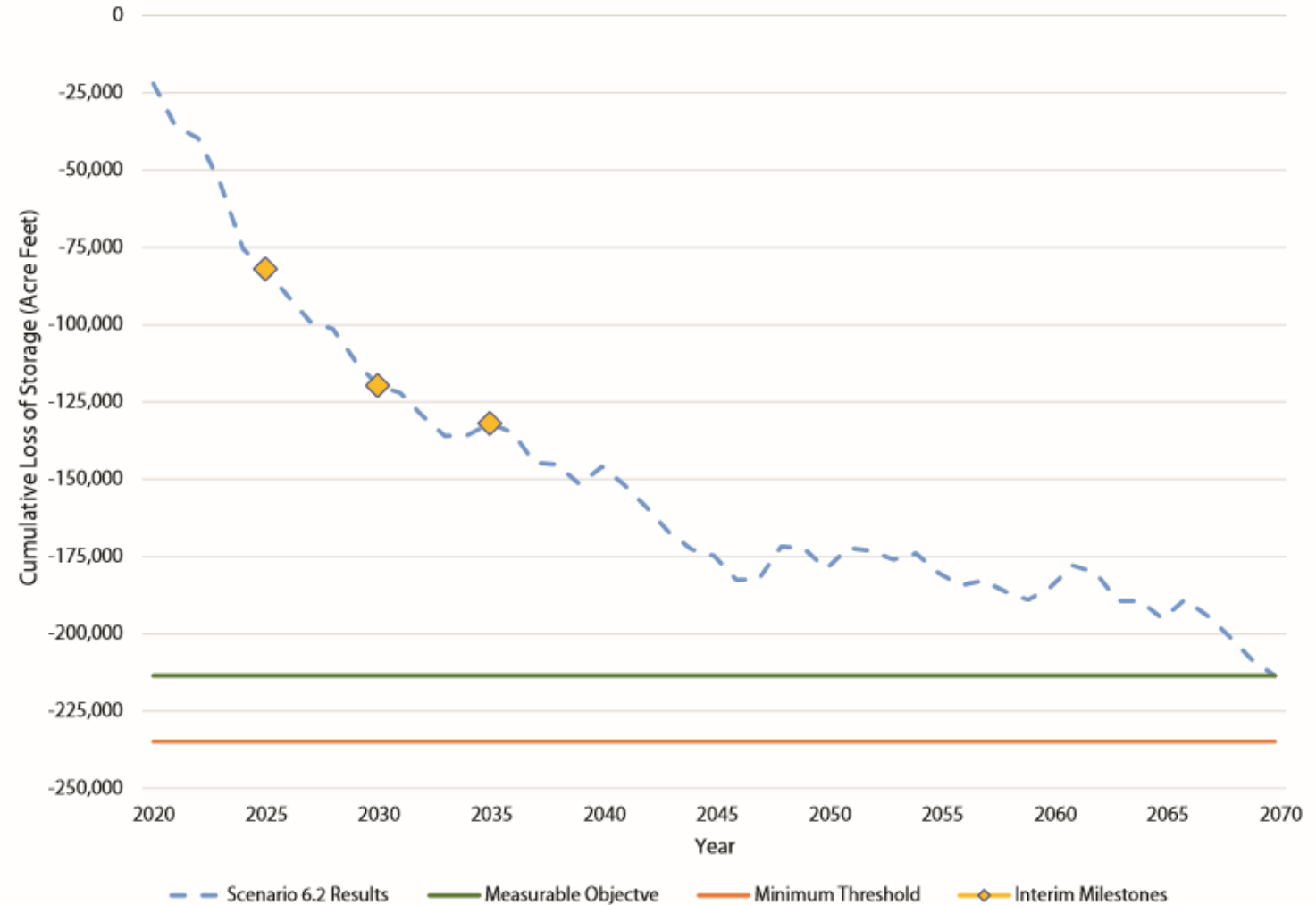
- The goal is to manage and preserve the Basin groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of Indian Wells Valley residents, and sustain the mission at Naval Air Weapon Station (NAWS) China Lake.
- The absence of undesirable results will indicate that the sustainability goal has been achieved.

Sustainable Management Criteria

- Used to satisfy SGMA requirement to quantify sustainability
- Numerical values are established for minimum thresholds, measurable objectives, and interim milestones in order to manage the Basin and track progress towards sustainability
- Basin conditions and the sustainable management criteria will be available for the public to monitor via the Data Management System website: www.iwvgsp.com

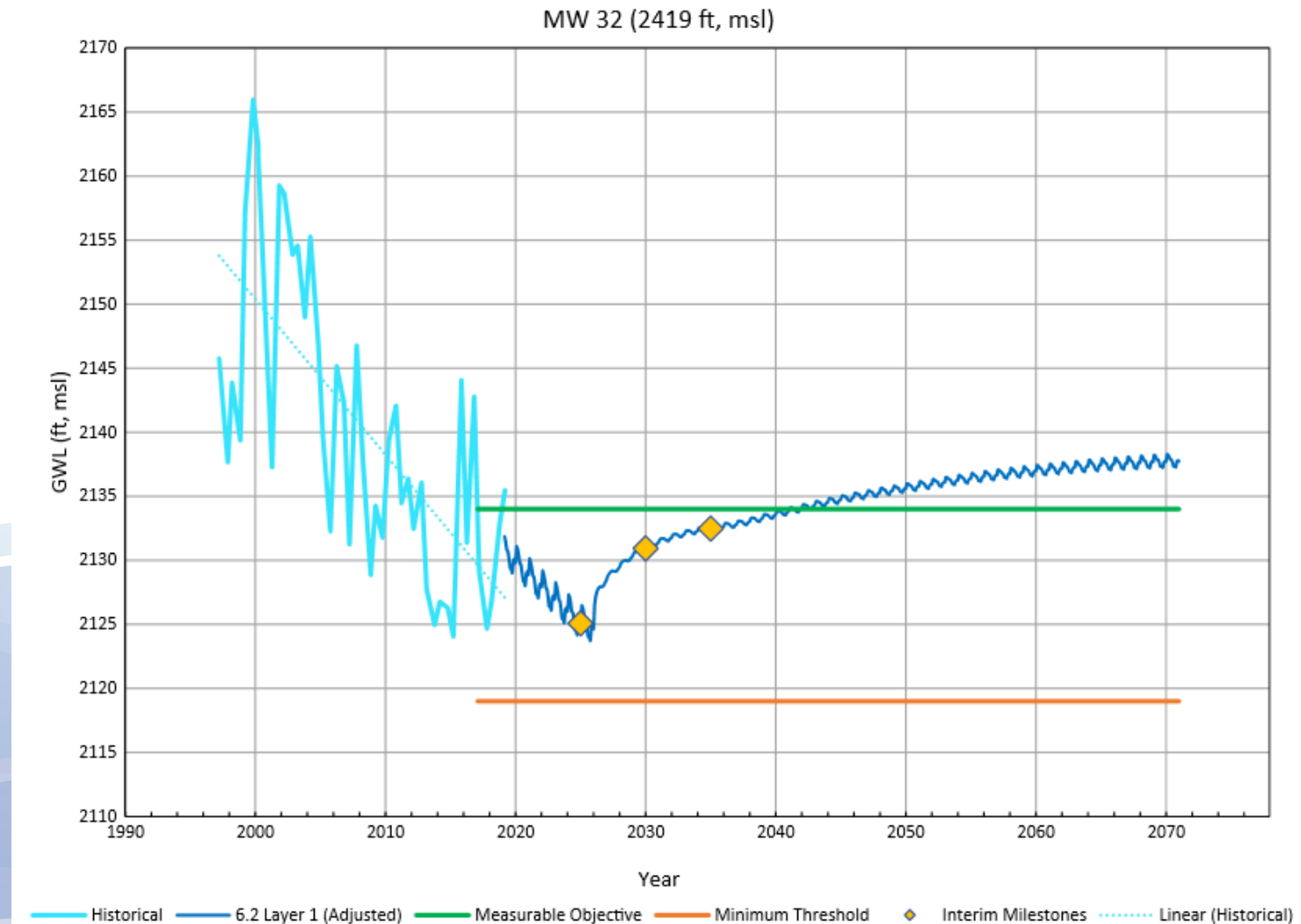
Sustainable Management Criteria

- Reduction of Storage



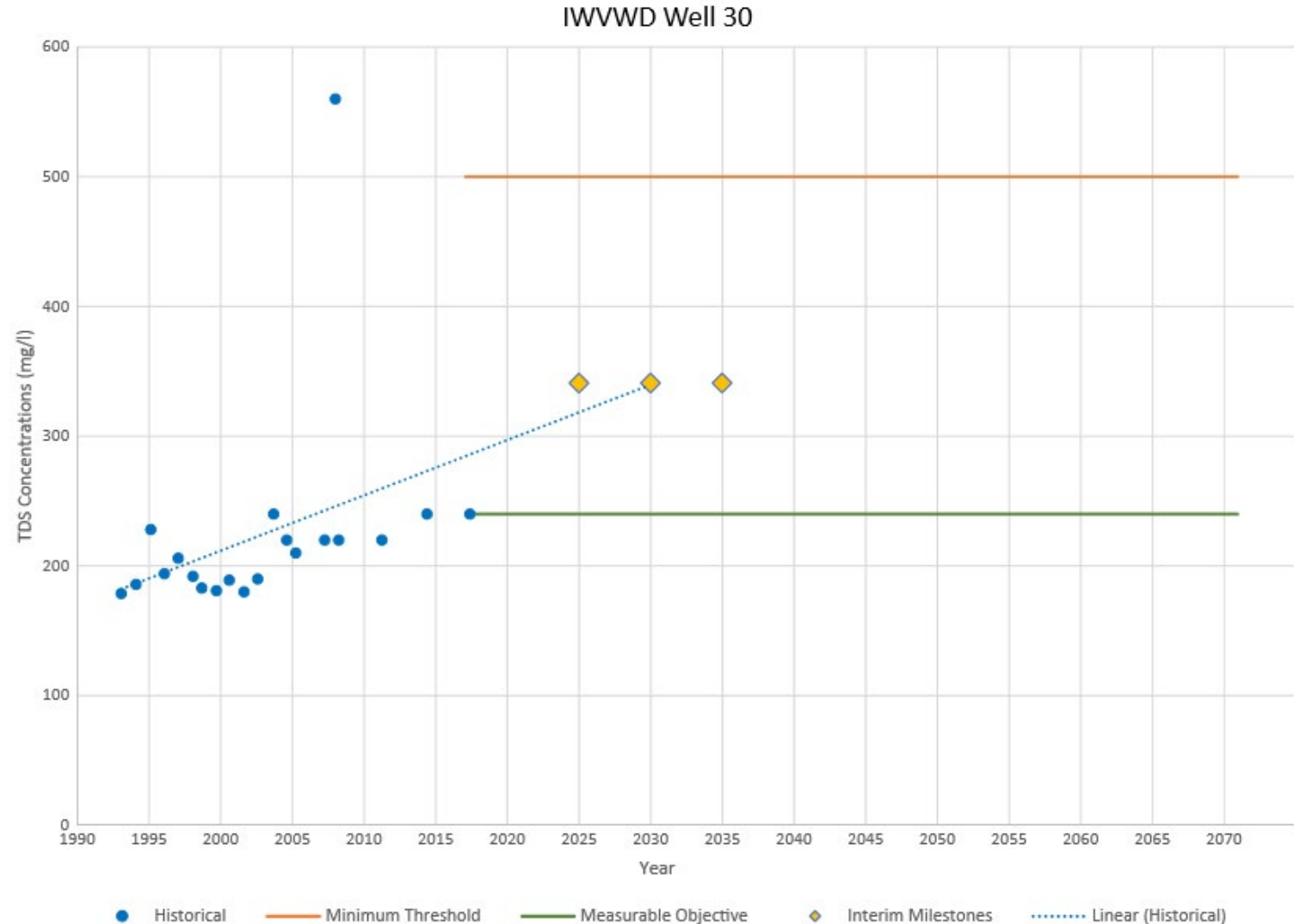
Sustainable Management Criteria

- Chronic Lowering of Groundwater Levels (example)



GSP Summary: Section 4 Sustainable Management Criteria

- Degraded Water Quality (example)



Projects and Management Actions

- The GSP proposes Project and Management Actions in order to avoid undesirable results and operate the Basin sustainably.
- These Projects and Management Actions were discussed and reviewed with the IWVGA Board, TAC, PAC, and/or Stakeholders.

Projects and Management Actions

- Management Action #1: Annual Pumping Allocation Plan, Transient Pool and Fallowing Program
 - Annual Pumping Allocation
 - Used for the purpose of assigning pumping fees
 - All groundwater pumpers continue to possess the right to produce groundwater provided they pay the applicable fees
 - The Annual Pumping Allocation program will assign each qualified groundwater pumper an Annual Pumping Allocation of the safe yield, if any, after consideration of:
 - Federal Reserve Water Rights (FRWR) of NAWS China Lake;
 - California water rights;
 - Beneficial use priorities under California Law;
 - Historical groundwater production; and,
 - Municipal requirements for health and safety.

Projects and Management Actions

- Management Action #1: Annual Pumping Allocation Plan, Transient Pool and Following Program
 - Transient Pool
 - All groundwater pumpers who were producing groundwater during the Base Period (2010 to 2014) and who are not given an Annual Pumping Allocation will be eligible
 - Consists of limited non-transferable one-time allocations of water to be used prior to 2040
 - Created to facilitate coordinated production reductions and to allow groundwater users to plan and coordinate their individual groundwater pumping termination

Projects and Management Actions

- Management Action #1: Annual Pumping Allocation Plan, Transient Pool and Fallowing Program
 - Fallowing Program
 - Voluntary program available to those assigned a Transient Pool Allocation
 - Groundwater pumper may elect to sell their Transient Pool Allocation back to the IWVGA in exchange for a price equal to the fair market value of the overlying lands associated with their shares of the Transient Pool
 - Management Action Benefits: Anticipated to reduce pumping in the first year of implementation to approximately 12,000 AFY plus Transient Pool pumping

Projects and Management Actions

- Project #1: Develop Imported Water Supply
 - Option 1: Direct Use Project with Antelope Valley East Kern Water Agency (AVEK)
 - Purchase of State Water Project Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with Kern County Water Agency.
 - Purchased water supply will be wheeled through existing AVEK facilities and an extension of a pipeline from California City to the IWV.
 - Treated water would be used directly to meet water demands that exceed the long-term natural recharge to the Basin.

Projects and Management Actions

- **Project #1: Develop Imported Water Supply**
 - **Option 2: Groundwater Recharge Project with Los Angeles Department of Water and Power (LADWP)**
 - Purchase of State Water Project Table A Entitlement or potentially a combination of other short and long-term water supplies in coordination with Kern County Water Agency.
 - Purchased water supply will be delivered to Metropolitan Water District and subsequently provided to LADWP for use in LADWP's service area.
 - In exchange, LADWP would provide Owens Valley water from the LA Aqueduct to the Basin for use in a groundwater recharge project in new spreading grounds near the Inyokern Airport to replace any groundwater pumping that exceeds the long-term natural recharge to the Basin.
 - **Project Benefits: Replaces groundwater pumped above the long-term sustainable yield of the Basin with imported water to balance the amount of water pumped with the amount of water recharged into the Basin**

Projects and Management Actions

- Project #2: Optimize Use of Recycled Water
 - Ridgecrest is currently planning to upgrade, expand, and potentially relocate the existing City Waste Water Treatment Facility (independent of the IWVGA)
 - Coordination with Ridgecrest to optimize recycled water use
 - Recycled Water Subproject 1 – Landscape Irrigation in the City and the NAWS China Lake
 - Recycled Water Subproject 1a – Landscape Irrigation at Cerro Coso Community College
 - Recycled Water Subproject 2 - Groundwater Recharge
 - Requires additional treatment
 - Project Benefits: Replaces groundwater pumped above the long-term sustainable yield of the Basin with recycled water to balance the amount of water pumped with the amount of water recharged into the Basin

Projects and Management Actions

- **Project #3: Basin-wide Conservation Efforts**
 - Water Conservation Pilot Project (possible expansion to other parts of the IWV)
 - SDAC Rebate Program
 - SDAC Water Audit, Leak Detection, and Repair Program
 - Historical and current conservation measures will be used as a guide to establish new voluntary and/or mandatory conservation measures on a basin-wide level.
 - Coordination with Searles Valley Minerals to investigate the potential for industrial conservation and determine if recycled water and/or brackish water could be used in their mineral recovery process
 - Project Benefits: Reduces demand for groundwater which reduces the required supply of imported water and recycled water

Projects and Management Actions

- Project #4: Shallow Well Mitigation Program
 - Shallow Well Mitigation Plan
 - Address the approximately 872 shallow wells in the IWVGB that are vulnerable due to lowering of groundwater levels and degraded water quality
 - Develop criteria to characterize the level of impacts
 - Develop well evaluation process
 - Shallow wells impacted after February 1, 2020 are eligible for mitigation, pending the evaluation of the impacts.
 - Project Benefits: Mitigates the impact of the decreasing groundwater levels and degraded water quality that occur before the Basin becomes sustainable.

Projects and Management Actions

- **Project #5: Dust Control Mitigation Program**
 - Implementation of Management Action #1 will result in a potential increase in windblown dust and sand, due to the climate of the IWV
 - Dust Control Mitigation Plan
 - Investigate best management practices
 - Identify location and magnitude of the potential need for dust control
 - Critical areas will be identified and prioritized for mitigation
 - Project Benefits: Mitigates potential impacts caused by reduced use of groundwater for agriculture

Projects and Management Actions

- **Project #6: Pumping Optimization Project**
 - Relocation of some of the Water District and/or Searles groundwater pumping to the northwest portion of the basin
 - Includes the construction of two new wells in the northwest portion of the basin along Brown Road and approximately nine miles of pipeline to connect the wells to the Water District's water system.
 - Project Benefits: Stabilizes groundwater levels near major groundwater pumpers

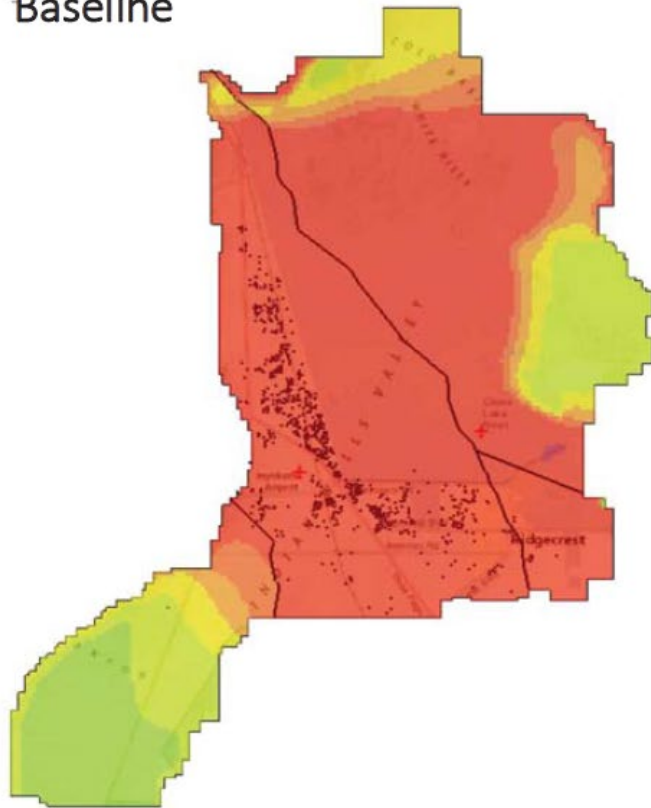
Projects and Management Actions

- Additional Projects
 - Brackish Water Groundwater Project
 - Direct Potable Reuse of Recycled Water

Predicted Future Conditions after GSP is Implemented

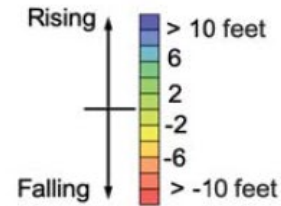
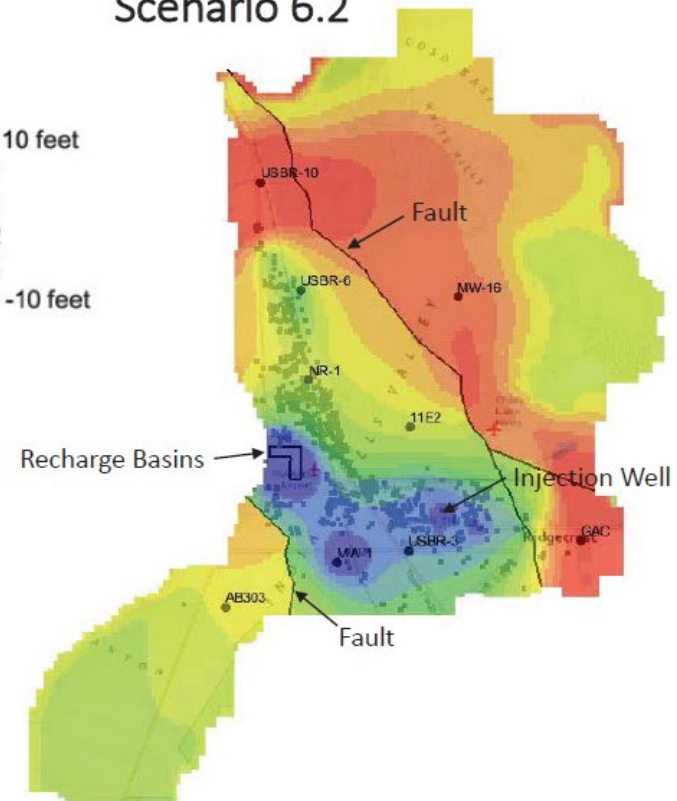
Groundwater Level Changes 2020 - 2070

Baseline



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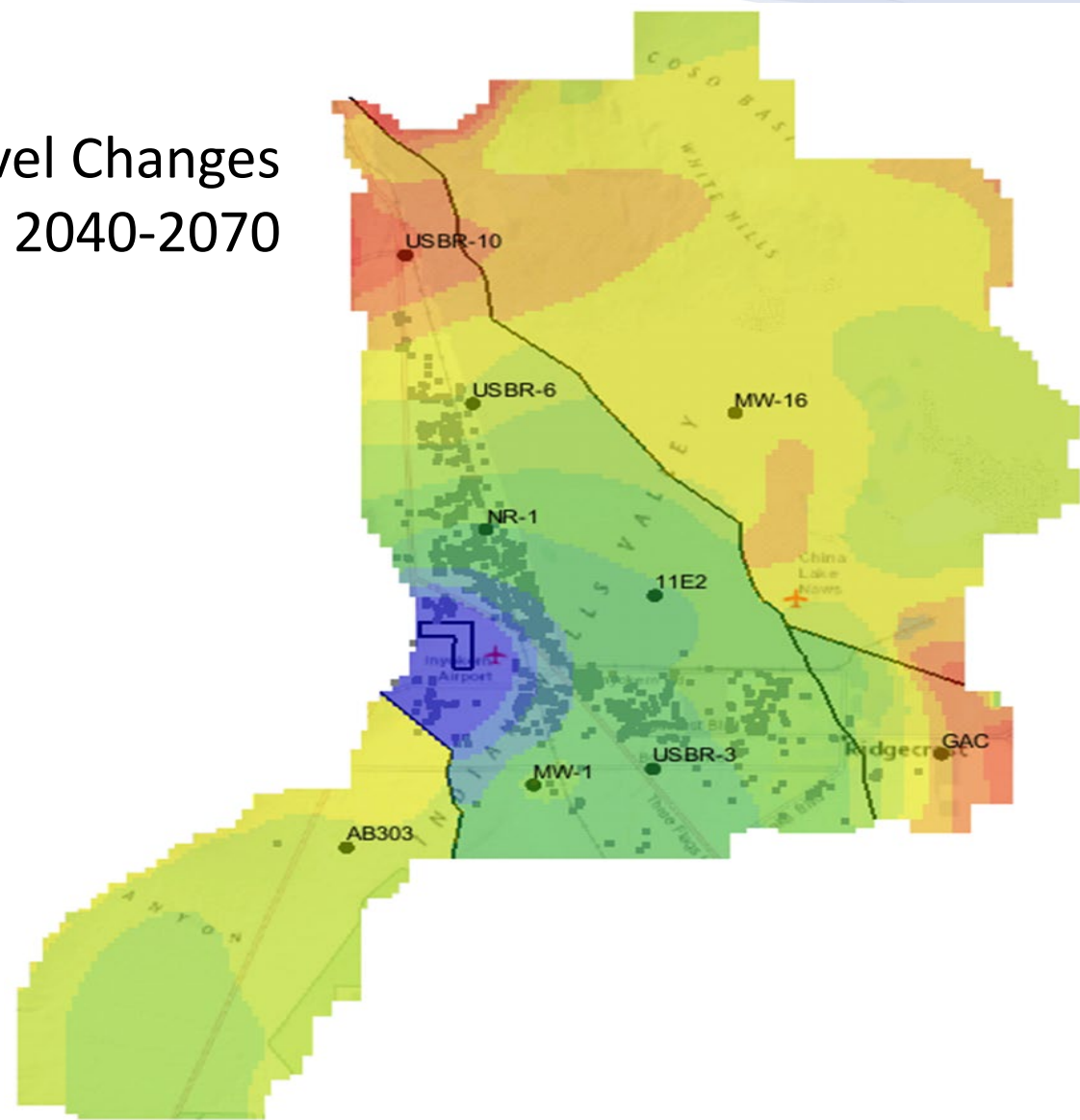
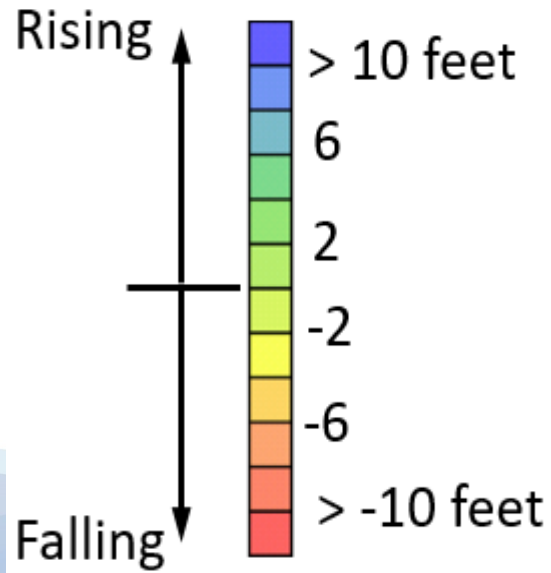
Scenario 6.2



DRAFT – Subject to change

Predicted Future Conditions after GSP is Implemented

Groundwater Level Changes
2040-2070



GSP Implementation

- Anticipated year when Projects/Management Actions will be implemented:

Project/Management Action	Implementation Year
Annual Pumping Allocation Plan, Transient Pool and Fallowing Program	2020
Develop Imported Water Supply	2035
Optimize Use of Recycled Water	2025
Basin-wide Conservation Efforts	2020
Shallow Well Mitigation Program	2021
Dust Control Mitigation Program	2021
Pumping Optimization Project	2025

GSP Implementation

Task	Development/ Engineering Costs	Implementation/ Capital Costs	Total Annual Costs
Projects and Management Actions			
Management Action No. 1: Implement Annual Pumping Allocation Plan, Transient Pool and Fallowing Program	\$340,000	\$9,000,000	\$40,000
Project No. 1: Develop Imported Water Supply			
Option 1:	\$28,875,000	\$197,490,000	\$8,140,000
Option 2:	\$8,613,000	\$94,823,000	\$4,440,000
Project No. 2: Optimize Use of Recycled Water			
Option 1:	\$7,005,700	\$35,751,500	\$395,500
Option 1a:	\$1,737,300	\$8,445,900	\$129,300
Option 2:	\$4,936,200	\$17,861,800	\$480,300
Project No. 3: Basin-wide Conservation Efforts	--	Unknown	\$20,000
Project No. 4: Shallow Well Mitigation Program	\$70,000	\$1,650,000	\$20,000
Project No. 5: Dust Control Mitigation Program	\$70,000	\$19,000,000	\$100,000
Project No. 6: Pumping Optimization Project	\$3,230,000	\$20,170,000	\$150,000
GSP Monitoring	--	--	\$60,000
Data Gap Projects ¹	--	\$270,000	--
Annual GSP Reporting	--	--	\$30,000
GSP 5-Year Updates ²	\$360,000	--	--
Data Management System	--	--	\$20,000
ESTIMATED TOTALS ³	\$26,362,200 - \$46,624,200	\$206,972,200 - \$309,634,200	\$5,884,800 - \$9,584,800

Notes

¹ Costs for data gap projects are currently funded under Prop 1 grant funding. Additional data gaps will be evaluated periodically to determine if additional projects are required. Estimated costs will be updated as necessary.

² Assumes four 5-year updates through 2040.

³ Estimate total costs show a range of potential estimated costs. The low end of the range assumes Project No. 1 Option 1 will be implemented and the high end of the range assumes Project No. 1 Option 2 will be implemented.

GSP Implementation

- Potential Funding Sources:
 - Federal Sources
 - Water Infrastructure Financing and Integration Act (WIFIA)
 - Reclamation Integration Financing and Integration Act (RIFIA)
 - Bureau of Reclamation – WaterSMART Program
 - Department of Defense – Defense Communities Infrastructure Program
 - Department of Defense – Readiness and Environmental Protection Integration Act (REPI)
 - Water Resources Development Act (WRDA)
 - U.S. Department of Agriculture
 - Community Facilities program
 - Regional Conservation Program
 - State Sources
 - State Water Resources Control Board Loans and Grants
 - Clean Water State Revolving Fund (CWSRF)
 - Drinking Water State Revolving Fund (DWSRF)
 - Small Community Grant Fund
 - Groundwater Grant Fund (Chapter 10, Prop 1)
 - Parks and Water Bond (Chapter 11, Prop 68)
 - Legislative Appropriations

Potential GSP Impacts to Stakeholders

- De Minimis/Mutuals
 - Subject to Pumping Fees (De minimis users potentially limited to administrative fees)
 - Potential Conservation (voluntary or mandatory)
 - Benefited by overall basin management (i.e. water supply preservation, water levels stabilization, water quality preservation, shallow well protection)

Potential GSP Impacts to Stakeholders

- NAWS China Lake
 - Navy may cooperatively and voluntarily contribute to basin management
 - Benefited by overall basin management (i.e. water supply preservation, water level stabilization, water quality preservation, land subsidence reduction)

Potential GSP Impacts to Stakeholders

- Small and Large Agriculture
 - Subject to Pumping Fees
 - Temporary relief from certain fees could be provided through Transient Pool Allocation
 - Could elect to participate in Voluntary Fallowing Program
 - Coordination on ag business decision
 - Conservation (voluntary or mandatory)
 - Potentially Benefited by overall basin management (i.e. water supply preservation, water level stabilization, water quality preservation)

Potential GSP Impacts to Stakeholders

- Industrial
 - Subject to Pumping Fees
 - Conservation (voluntary or mandatory)
 - Possible Pumping Relocation and Coordination (Pumping Optimization)
 - Possible Recycled Water Conversions
 - Benefited by overall basin management (i.e. water supply preservation, water level stabilization, water quality preservation)

Potential GSP Impacts to Stakeholders

- Municipal
 - Subject to Pumping Fees/Rate Increases
 - Conservation (voluntary or mandatory)
 - Possible Pumping Relocation/Coordination (Pumping Optimization)
 - Recycled Water Conversions
 - Benefited by overall basin management (i.e. water supply preservation, water level stabilization, water quality preservation)

Potential GSP Impacts to Stakeholders

- City/County
 - Subject to Pumping Fees
 - Conservation (voluntary or mandatory)
 - Benefited by overall basin management (i.e. water supply preservation, water level stabilization, and water quality preservation)

Stakeholder Involvement

- Stakeholders and the public are invited and encouraged to participate in the decision making process for all basin management strategies
- Some ways to participate:
 - Review and provide comments on the Public Review draft GSP
 - Join interested parties list to receive notices and updates on GSP Implementation documents
 - Attend IWVGA meetings
 - Review and provide comment on planning documents to be prepared for the projects and management actions (post GSP adoption)

GSP Public Review Draft

- Public Review Draft finalized on December 10th and distributed on December 11th
- Incorporates comments from TAC and PAC committee members
- Requesting additional written comments by January 8th
- Public Hearing is scheduled for January 16th