

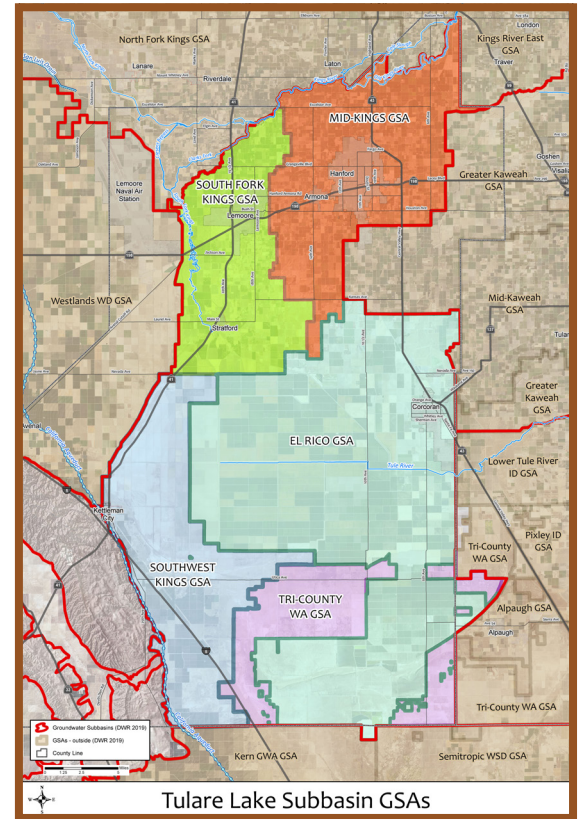
WESTERN WATER SUPPLY RESILIENCY AQUIFER STORAGE AND RECOVERY

ISSUE: Funding is needed for further evaluation and expansion of innovative Aquifer Storage and Recovery projects to improve local groundwater storage and recovery in areas where soil is not suitable for conventional groundwater recharge methods.

OVERVIEW: Managed aquifer recharge (MAR) is identified in nearly every Groundwater Sustainability Plan (GSP) as an action to achieve sustainability under SGMA. Aquifer Storage and Recovery (ASR) is a form of MAR in which excess surface/flood water is stored in an aquifer. The South Fork Kings GSA has conducted a successful ASR pilot test in an existing agricultural supply well, and is seeking to further evaluate the methodology for scaling an ASR program across a GSA or groundwater basin. Implementing ASR using agricultural wells is an innovative method that helps manage current and future groundwater use to achieve sustainability and support drought resiliency in California's Central Valley.

HOW IT WORKS: Available surface/flood water is injected into the aquifer using a well as opposed to conventional MAR using infiltration basins. The injected water remains in the vicinity of the injection well and creates a "bubble" of recharge that can be pumped out later during dry periods when water demand is high. A key advantage of ASR is that it can be used in areas where surface soils are poor or in areas where depletion of deeper aquifers has occurred.

ASR has been applied in many locations for municipal water supply systems, but has not been widely used for agricultural purposes, making it an innovative approach to increase water management flexibility in ag settings.

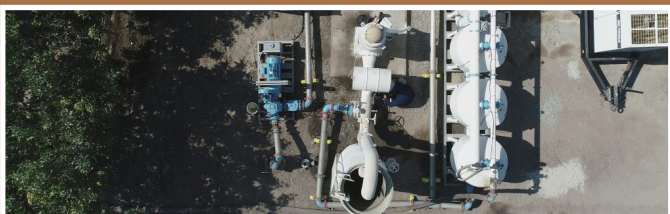


PILOT STUDY

The South Fork Kings GSA completed an ASR pilot test to evaluate the technology. The test successfully characterized the range of operational issues that need to be considered to implement ASR in more wells across a larger area.

Video: www.southforkkings.org/ASR

Pilot study details on back page.



ASR KEY BENEFITS

- Mitigates drought impacts in Central Valley areas lacking suitable soil for traditional groundwater recharge methods.
- Water injection targets specific aquifer zones ideal for storage and recovery. Maximizes every drop of water.
- Increases flood water capture for groundwater recharge, offsetting groundwater use and replenishing supplies, a priority under CA's SGMA law.
- Localizes water storage in the aquifer for individual agricultural users to efficiently manage groundwater with limited to no impacted on surrounding users.

FUNDING NEEDS & REGIONAL SCALE

COST TO CONDUCT FURTHER TESTING OF PILOT SITE: \$100,000 - \$300,000

LOCAL GSA* WELL TESTING AND PROGRAMMATIC CEQA: \$1M - \$5M

*Groundwater Sustainability Agency

The South Fork Kings GSA conducted a successful pilot test, but additional testing and research in other ASR settings is needed to design a full-scale ASR program that could be scaled across the GSA and throughout the Tulare Lake Subbasin. Research needs include further analysis of geochemical interactions and well performance changes, assessment of different agricultural well designs, and assessment of different aquifer zones in the regional aquifer system.

Based on the SFKGSA pilot test, follow up testing at the pilot site is recommended, followed by testing of additional wells in different settings, and a programmatic CEQA analysis to evaluate environmental impacts and ASR program implementation issues. Regionally, other GSAs lacking suitable soils for surface recharge can use this research to consider ASR as a groundwater sustainability strategy in their GSAs.

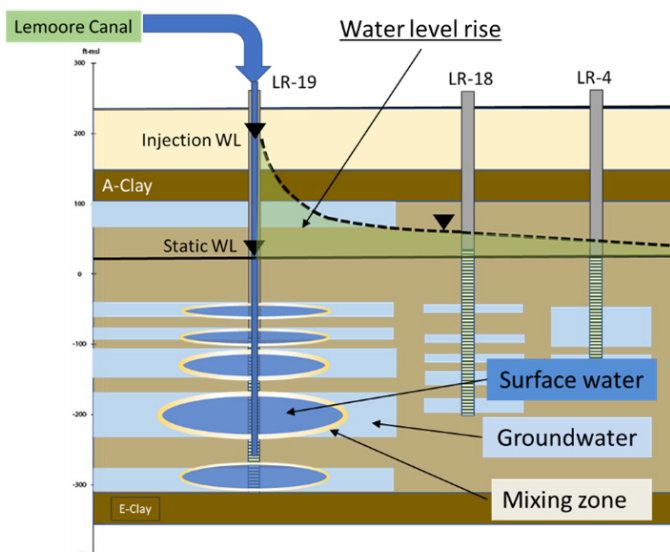
SOUTH FORK KINGS GSA PILOT TEST

As part of GSA implementation, the SFKGSA recently completed an ASR pilot test at an active agricultural production well near Lemoore, CA. Approximately 20 million gallons of water was injected into the aquifer, stored for 45 days, and then recovered and used for irrigation.

A State Board permit was obtained. Extensive monitoring of water levels and water quality occurred throughout the test. The test successfully characterized a range of operational issues that need to be considered to implement ASR in more wells across a larger area.



Check out a video showing the pilot test process here: www.southforkkings.org/ASR



The pilot test evaluated:

- The design of injection facilities to deliver surface water to an injection well and minimize air entrainment during injection
- Operating procedures to maintain injection efficiency
- Geochemical reactions that occur as surface water mixes with native groundwater during injection and storage
- Water quality of recovered ASR injection water
- Well performance changes that can occur during and after ASR operations