Regional Scale Pumping in Central Valley Wells During Drought Increases Nitrate Concentrations in Groundwater

Intensive pumping of aquifers during drought can speed up deterioration of groundwater quality, according to a new study by the U.S. Geological Survey (USGS). Previous groundwater research has been focused on the risk of wells being overdrawn and running dry during drought; this study provides a major advancement to understanding the related consequences to water quality caused by over-pumping.

Researchers examined 30 years of data from Central Valley public water system wells to find nitrate concentrations increased on a regional scale where water levels dropped rapidly during drought. Nitrate, and other co-occurring contaminants, are present in shallow groundwater throughout the Central Valley due in large part to decades of agricultural land use. USGS scientists found that increased pumping from wells during drought can pull shallow, contaminated groundwater down to depths commonly tapped for public drinking-water supply.

This study is part of a cooperative effort between the USGS and the State Water Resources Control Board Groundwater Ambient Monitoring and Assessment Program (GAMA). Many more GAMA Program articles and publications can be found on the program publications website, including studies that monitor Central Valley arsenic concentrations and assess groundwater quality trends.

U.S. Geological Survey GAMA website: https://ca.water.usgs.gov/projects/gama/
State Water Board GAMA website: https://www.waterboards.ca.gov/gama/