

Groundwater in Sonoma County

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DATA 101: Introduction to Data Science

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Abstract

This project models aspects of the water cycle in Sonoma County, California. The aspects of the water cycles that this project focused on are on ground water, streamflow, and precipitation. Through understanding these components of the water cycle in Sonoma County we can understand the cycle as a whole. This project also has a focus on the sustainability issue of groundwater usage in Sonoma County.

Introduction

Water is essential for all living things, everyone needs water to survive. In Sonoma County the majority of the water we use is either from the Russian River or from groundwater. Half of the county's portable water comes from groundwater. The winter and early spring is when we get most of our rain. During the summer and fall, we get little to no rain. Having aquifers that store most of the groundwater we use is super important. During dry seasons, stored water is used. Water that we collect from the Russian River is a collection of direct rainfall we get during the winter, and multiple tributaries. It is fascinating to think about how our water is stored underground and is available for us to use during dry weather conditions!



Results

Image 1: This scatterplot shows precipitation in inches for Sonoma County from 2018-2026.

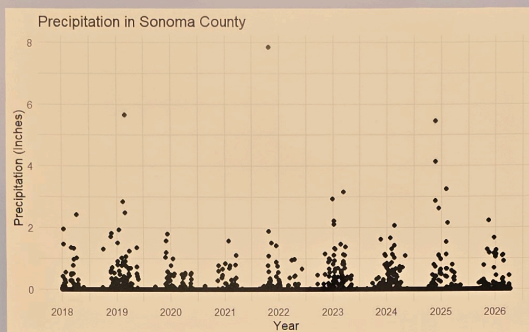


Image 2: This scatterplot shows streamflow in ft³ per second for the Russian River from 2013 to 2024.

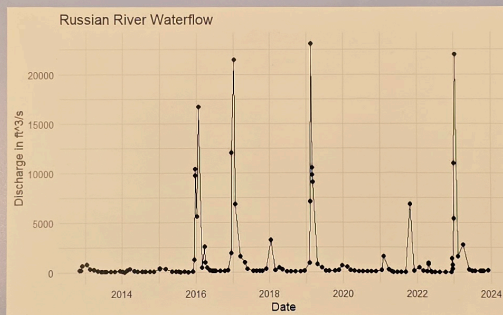
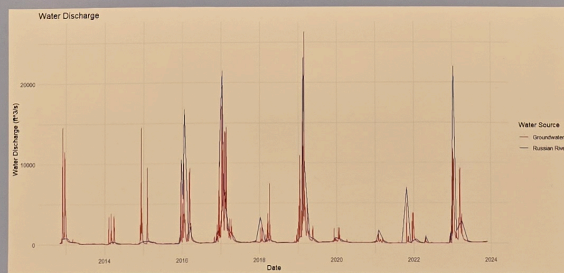


Image 3: Overlapping plots of the Russian River watershed groundwater discharge in ft³ per second and streamflow ft³ per second for the Russian river from 2013-2024.



Discussion

Groundwater is extremely important to residents of Sonoma County because it is a primary provider of water to a large portion of the population and many of the industries in the county. Due to uncertainties in the future reliability of water supplies here in Sonoma County. We have organizations and partners like Sonoma Water and City of Sonoma working together to create a long term solution for managing surface water and groundwater.

In some cases, over-pumping can even cause land subsidence, where the ground slowly sinks. This can damage infrastructure like roads, pipelines, and buildings. Additionally, groundwater depletion can affect nearby rivers and wetlands. Climate change is making these effects more noticeable because we experience more frequent droughts. Which is why managing our water resources is so important! Overall, groundwater and surface water is incredibly important and a valuable resource.

We must protect our water resources.

