

Streamflow and Precipitation in Sonoma County

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DATA 101: Introduction to Data Science

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Abstract

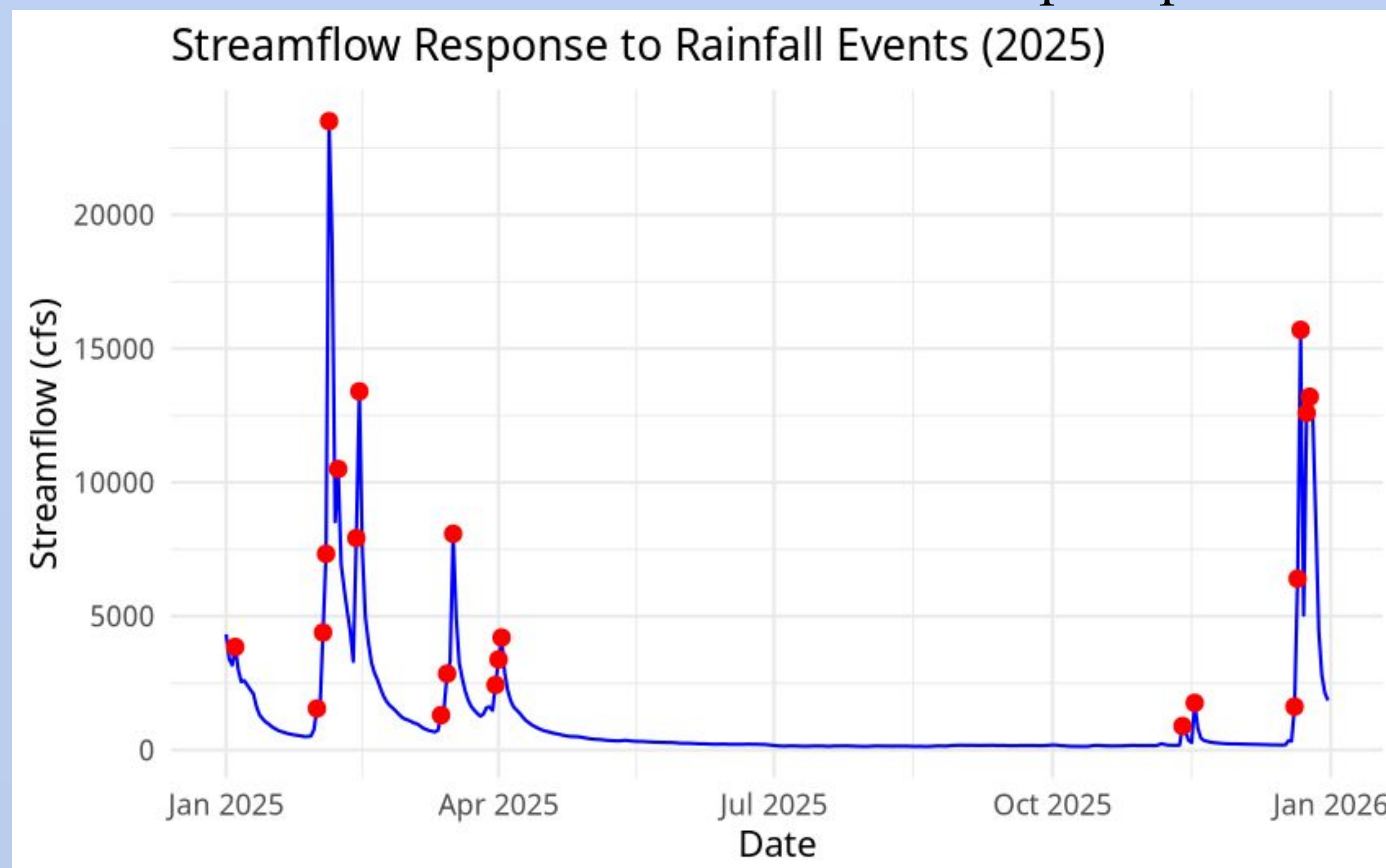
This project will investigate the streamflow patterns in Sonoma County and its affect by the rain spikes from our winter rain seasons in the year 2025 to present. There is a correlation between rainfall affecting streamflow which will be proved by the data collected by the US Geological Survey. We used a time series approach to visualise streamflow trends and we detected rapid discharge increases. These were interpreted as responses to precipitation events. Sudden spikes in streamflow show how rainfall contributes to river behavior anomalies and stochasism. Seasonal patterns were also observed in the wetter periods with higher flows and lower ones in the drier periods. Results demonstrate a clear relationship between precipitation and streamflow in the water cycle.

Introduction

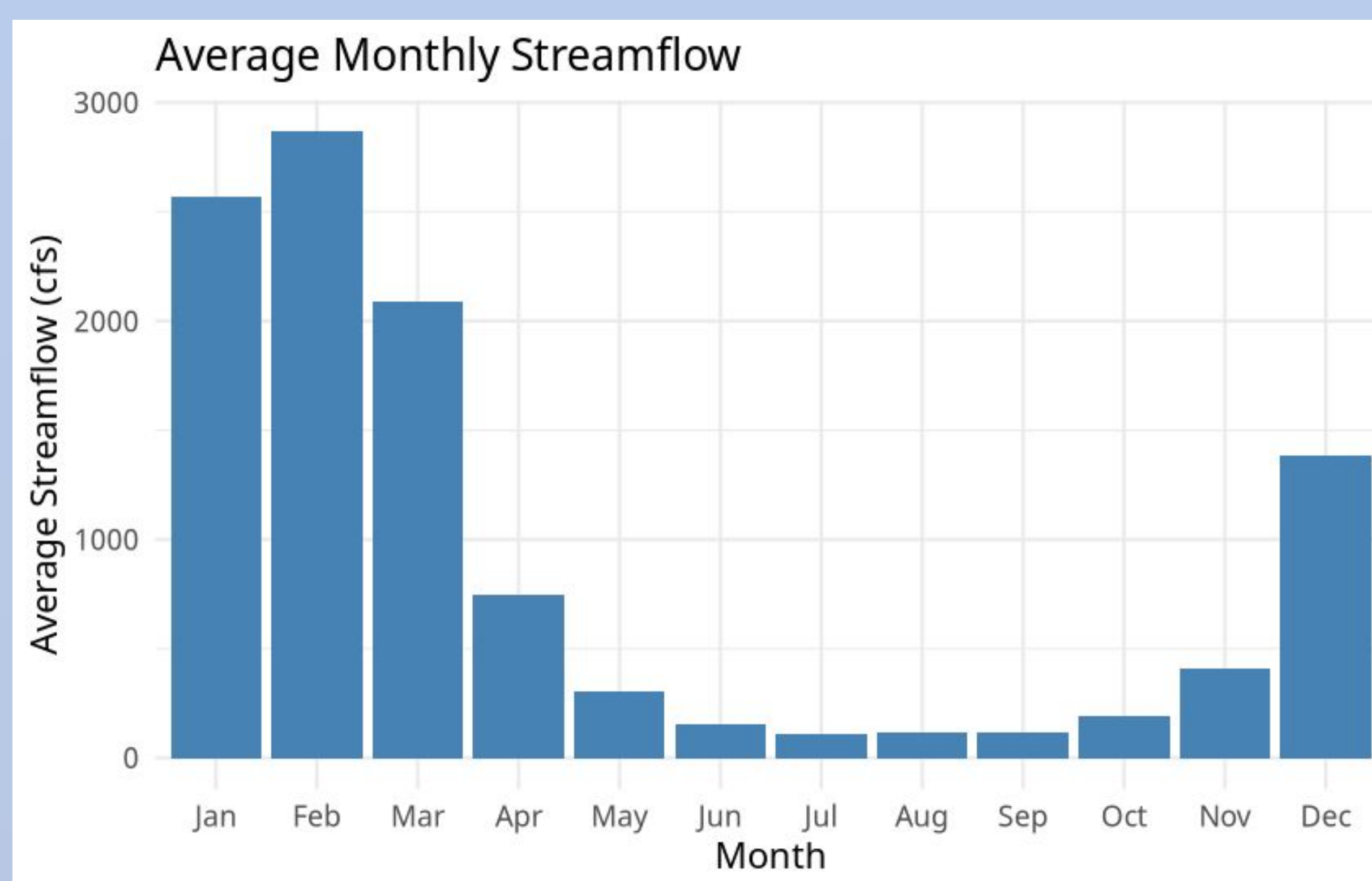
Understanding how water moves in the environment is important to studying the water cycle. This is especially important in regions like Sonoma County that experience strong changes in precipitation over the seasons. Streamflow in rivers reflect those changes and give insight on how rainfall affects water systems on the surface. This project will focus on the analysis of sreamflow data from our Russian River in Sonoma County so we can explore the changes in river discharge over time. The topic was chosen to provide a clear and observable way to see the relationship between precipitation and surface water.

Results

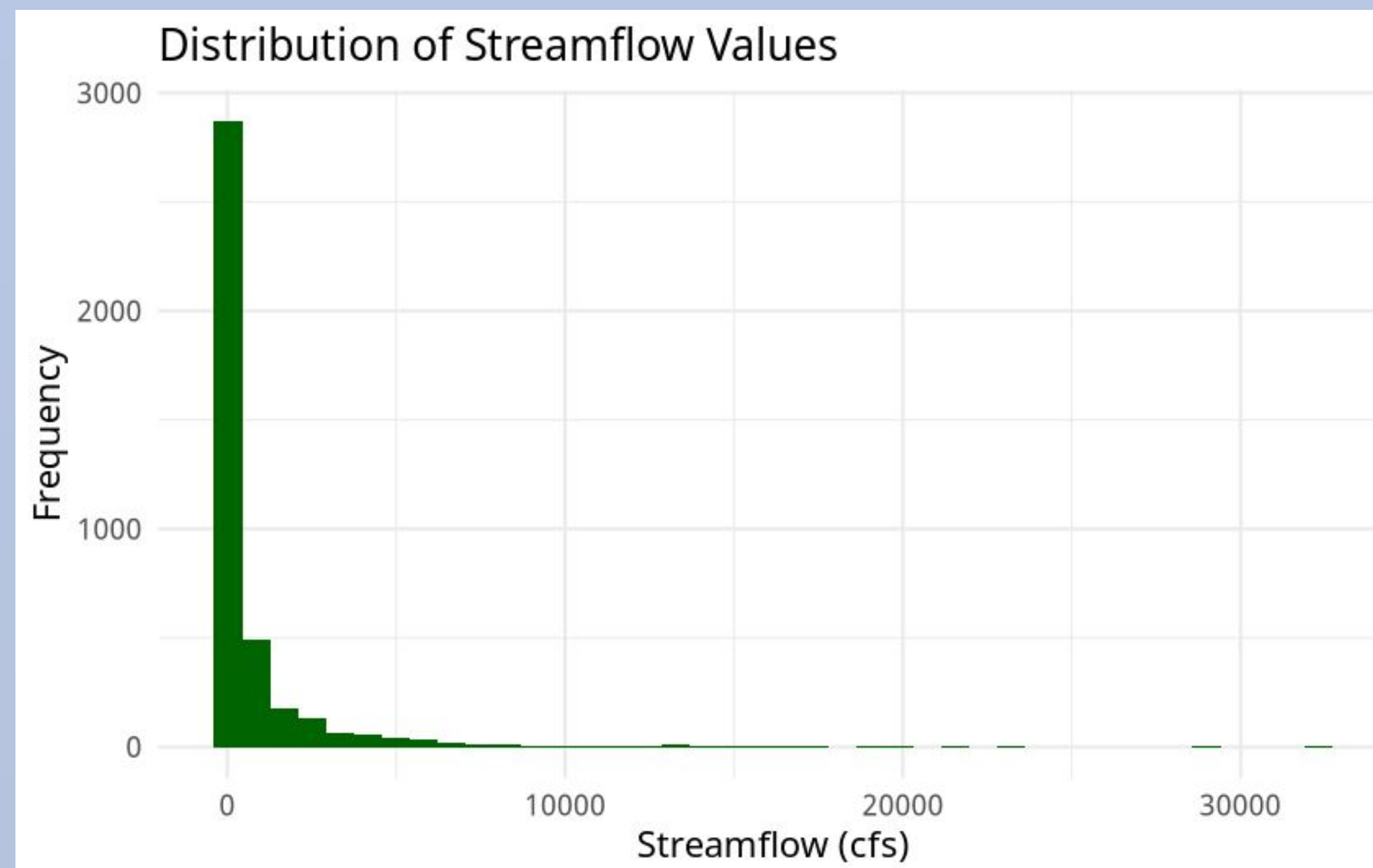
Russian River Streamflow. Red dots indicate precipitation events.



Monthly average streamflow indicating seasonal change in winter and summer.



Histogram showing the distribution of streamflow in the Russian River. Shows a left skew.



Discussion

The results of this analysis show the strong influence of precipitation on the flow of the Russian River here in Sonoma County. At a local level, understanding how rivers and rainfall interact is important for managing water and preparing for any possible flooding events. At a state level, thes patterns are relevant to the entirety of California, where water availability varies a lot throughout the year.

Moreover, this study shows key processes in the water cycle by showing how precipitation directly impacts our surface water systems like rivers. These findings can help bring a better understanding of how natural systems react to environmental changes. It is important in the context of climate variability and extreme weather events.

