Insert title of project here

Web address for GitHub repository

Name

1 Rationale and Research Questions

While many of the rivers we've examined over the course of the semester are in North Carolina and have discharge levels driven primarily by precipitation, many rivers in the western U.S. are heavily influenced by runoff from snowpack and their discharges are more seasonal. The relationship between snowpack, measured as snow-water equivalent (SWE), and discharge is less direct than precipitation and discharge, and often influenced by a number of other factors. My project explores two questions:

- What is the relationship between peak SWE and peak discharge in terms of magnitude and timing?
- How has the lag time between peak snowpack and peak runoff change over time?

2 Dataset Information

3 Methodology

Look at cal year bc max SWE occurs in April and max discharge occurs in summer.

4 Exploratory Analysis

Discharge on the Animas River is very seasonal, typically characterized by peaks in the months of May and June due to runoff from snowmelt (Figure 1). A Mann-Kendall test shows that discharge on the Animas has been decreasing significantly since 1987 ($p < 0.05$).

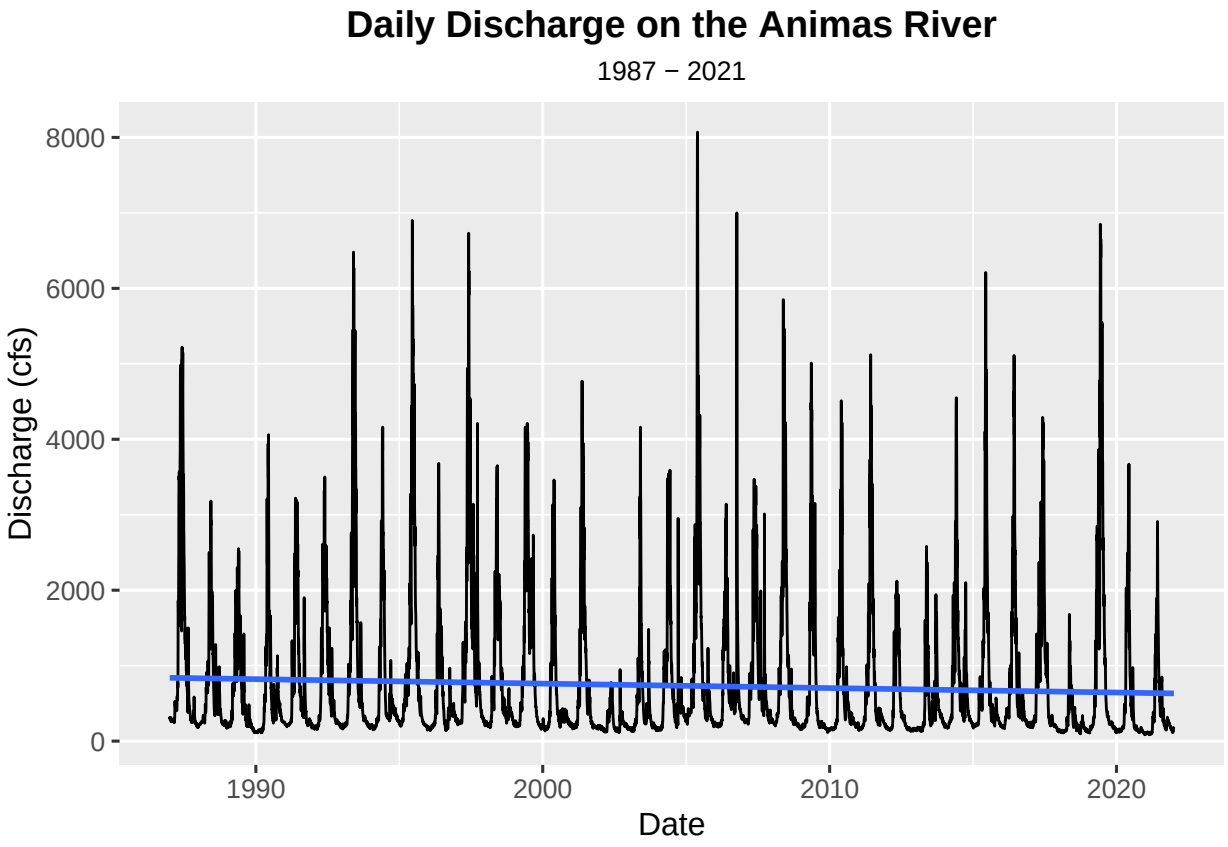

Figure 1: Daily discharge measured in cubic feet per second on the Animas River at Durango, Colorado

The seasonality of SWE in the mountains above Durango generally mirrors that of discharge in the Animas River (Figure 2), although peak SWE occurs 54 days prior to peak discharge on average. a Mann-Kendall test reveals that SWE has also been decreasing during the same period. It is unsurprising that both levels of discharge and SWE have decreased from 1987-2021: a new study reveals that "2000-2021 was the driest 22-yr period since at least 800" [WILLIAMS2022232].

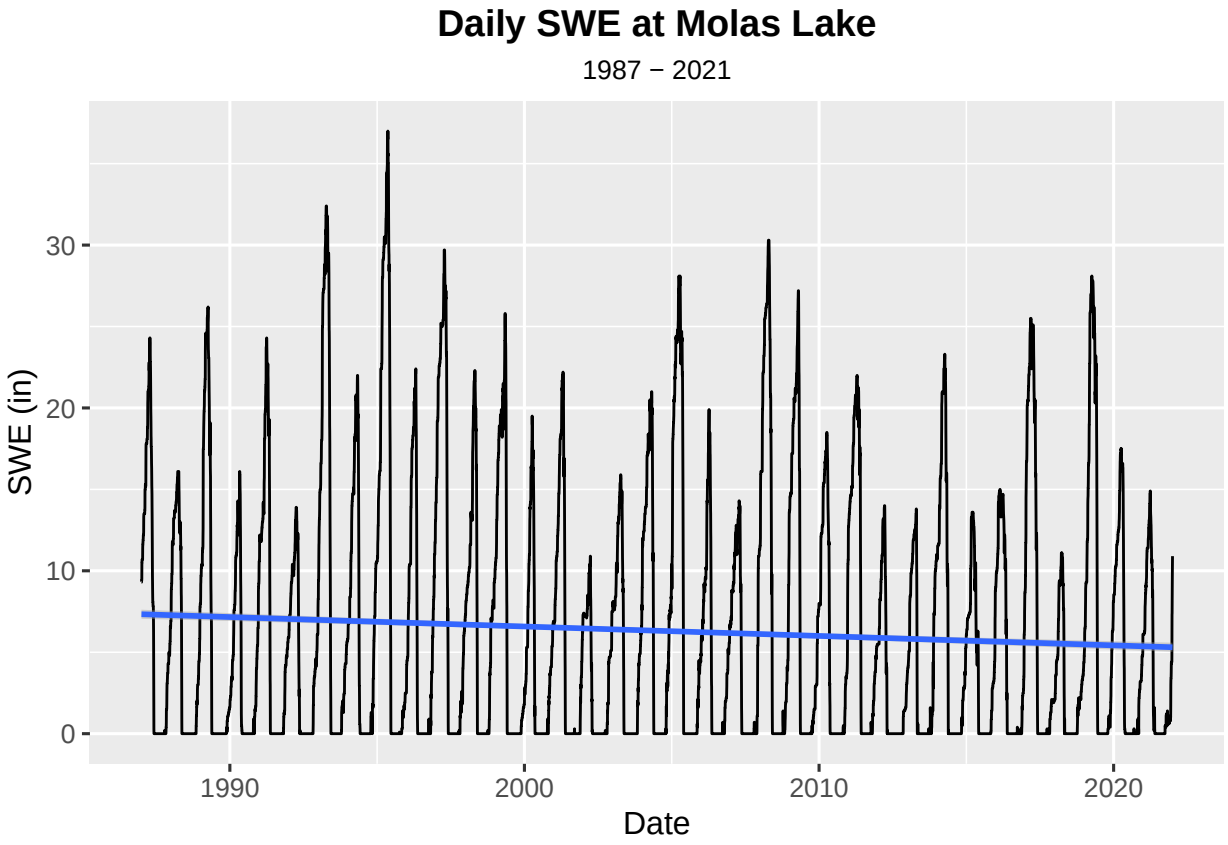

Figure 2: Snow water equivalent at Molas Lake, upstream of the Animas River USGS gage in Durango

5 Analysis

5.1 Question 1: What is the relationship between peak SWE and peak discharge in terms of magnitude and timing?

5.2 Question 2: How has the lag time between peak snowpack and peak runoff change over time?

6 Summary and Conclusions

7 References

<add references here if relevant, otherwise delete this section>

A. Park Williams, J. E. S., Benjamin I. Cook. (2022). Rapid intensification of the emerging southwestern north american megadrought in 2020–2021. *Nature Climate Change*, *12*, 232–234. https://doi.org/https://doi.org/10.1016/j.landurbplan.2013.12.008