

# Gage Guesser

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## Intro:

The goal of this project is to estimate river discharge levels based on the several climatic factors occurring in the hydrosheds. We will look at different gages downstream of glaciers and collect shapefiles around their watersheds boundaries. We will retrieve climate data for each area and display influences of different climate metrics on discharge levels. Finally, we will train a machine learning model to predict discharge at specific gages.

## Research Question:

1. Based on several climate factors can we train a model to estimate discharge in a specific hyrdobasin?
2. To what extent does a glacier influence river discharge levels?
3. At what point in the season does diurnal melt control daily discharge readings?

## Datasets:

USGS Gage Data -- [program to retrieve data](#)

USGS Weather Data -- [Rainier Weather](#)

[discharge/precip/temp](#)

Site numbers - 12092000, 12082500, 14226500

NOAA Climate data

ERA Climate data

## Tools and Packages:

python 3.8

matplotlib

numpy  
pandas  
geopandas  
jupyter  
shapely  
rioxarray  
scikit-learn  
dataretrieval  
folium?

### **Planned Methodology and approach:**

- We will choose a gage location
  - draw shapefile around the hydroshed leading to the gage
  - clip climate data for ROI
  - test for correlation to discharge
  - visualize results
- Repeat these steps over multiple gage locations
- create a machine learning model based off of climate factors that predicts discharge over a specific region
- How will we account for landscape change and extreme weather events.... previous season rainfall/snowfall... Anomalies.....

### **Expected Outcomes**

We anticipate discharge to be particularly correlated with climatic factors such as precipitation and temperature. Additionally, we expect that glacial influence on discharge will be heightened during warmer, drier months as main snow melt has already occurred.

