

# Flood Warning Analysis

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## About me!

**Ornie**

she/her

Major: Bioengineering  
Minors: Applied Mathematics & Chemistry

# Internship



**EarthLab**



**Climate Impacts Group**

# Project Timeline



## Week 1-2

Pick a specific gauge location and flow thresholds for testing the methodology using observed flows



## Week 3-4

For each water year and each flow threshold, count the number of times flows exceed that threshold



## Week 5-6

Investigate relationship between instantaneous and daily avg flows with the model data

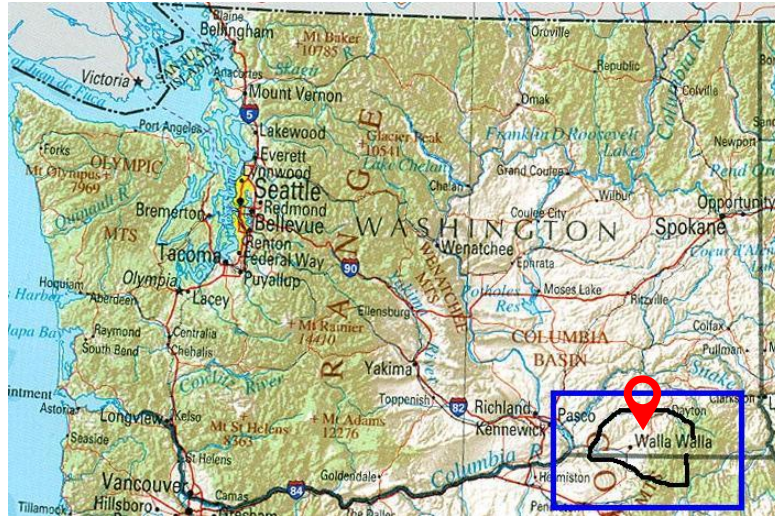


## Week 7-9

Flood Warning Calculation:  
1950-2100  
Pick historical and future time periods  
Calculate change as future vs historical

# Walla Walla Flood

Location Map:



- February 2020 flood caused severe damage to Walla Walla's infrastructure.
- The community faced significant threats from rising water levels.
- My work improves future flood prediction accuracy, helping protect such region.



**"In my career, which is going about 27 years now, this is the worst since 1996, I would say,"  
National Weather Service meteorologist Mary Wister.**

# Methodology

## Data Acquisition:

Processed daily streamflow data from NOAA and USGS and CIG datasets.

01

02

## Threshold Analysis:

Calculated flow threshold exceedances per water year in MATLAB.

## Temporal Projection:

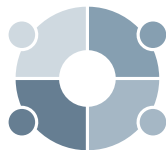
Assessed flood warning changes from 1991-2099 for historical and future time periods.

04

03

## Regression Modeling:

Analyzed relationships between instantaneous and daily average flows.



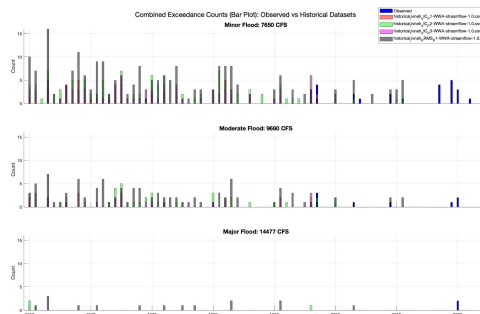


# Plots

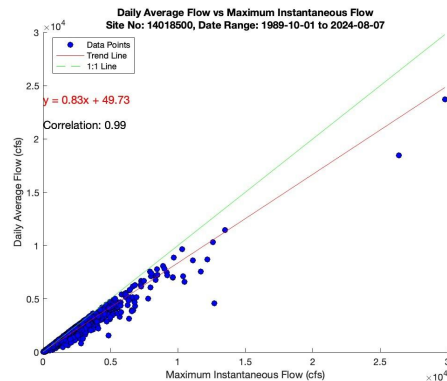
## 01 Data Acquisition:

Data Acquisition									
Data Source		Range	Start Date	End Date	Frequency	Units	Location	Notes	Comments
1. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
2. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
3. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
4. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
5. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
6. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
7. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
8. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
9. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
10. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
11. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
12. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
13. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
14. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
15. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
16. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
17. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
18. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
19. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500
20. Data Source		1989-10-01	2024-08-07	2024-08-07	1.00	cfs	14018500	14018500	14018500

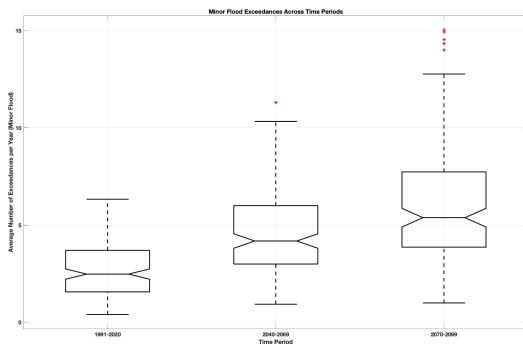
## 02 Threshold Analysis:



## 03 Regression Modeling:

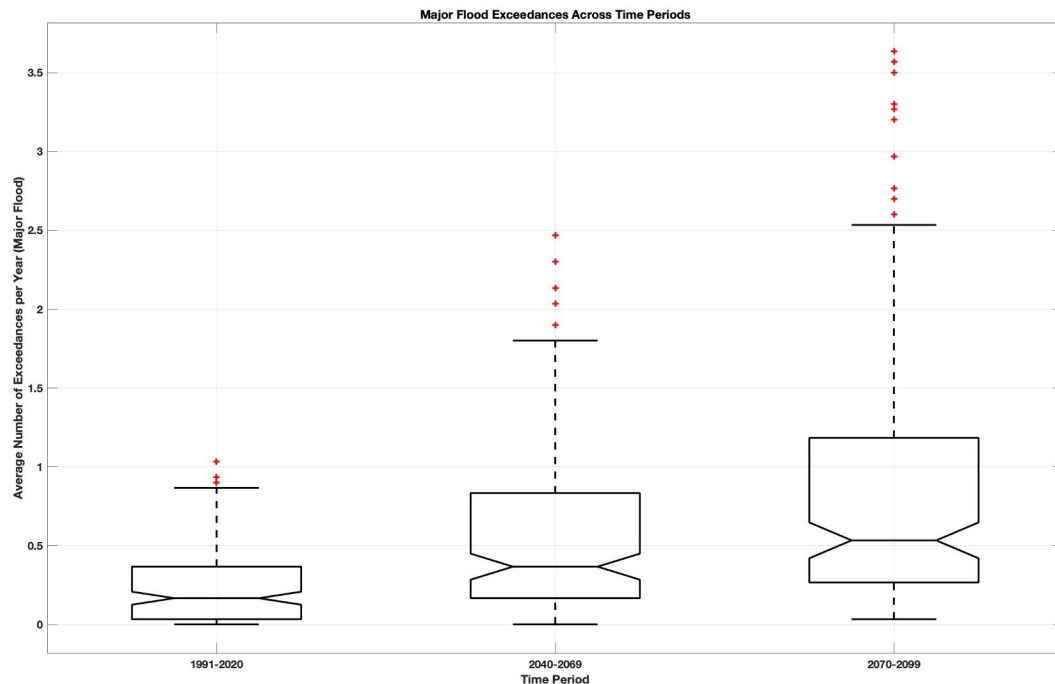


## 04 Temporal Projection:





# Results



## Rising Flood Risk

More major floods are expected in future periods compared to the past.

## Greater Variability

Flood frequency becomes more unpredictable over time.

## Extreme Events

Some future years could see a spike in major floods.

# Reflection



## Skill Development

Enhanced public speaking and scientific communication skills, gained experience in control systems, and applied data analysis to real-world flood predictions.



## Leadership Growth

Advocating for myself, set boundaries, and practiced active listening, integrating social justice principles.



## Challenges and Solutions

Prioritizing tasks effectively, sought feedback, and navigated technical challenges with adaptive strategies.



## Impact and Future Applications

Keep expanding flood prediction accuracy for the PNW, ensuring community preparedness by analyzing threshold exceedances using CIG datasets.



# **Acknowledgement**

**Guillaume Mauger**

**Lissan Tibebe**

**EarthLab Cohort and Team**

**Climate Impacts Group Team**

**Anastasia Ramey**

**Ben Packard**

The slide features a white background with several teal-colored abstract shapes. In the corners, there are dark teal and light teal organic shapes. Along the bottom, there are light blue wavy lines and small teal circles, resembling water or a splash. A single dark teal oval shape is positioned in the lower center.

# Thank You!

Questions?