

# WANGRY : ARE WE ANGRY FOR WATER



# Agenda

1. Team & Project Structure
2. Project Scope & Definitions
3. Problem Statement & Research Questions
4. Methods
5. Findings
6. Implications of Our Research Method
7. Conclusions
8. Resources



# Project Team

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# Project Scope

Our group explored how climate change impacts the global freshwater supply, and if low freshwater areas experience more conflict. We then assessed the United States water status to see if there are any trends.



# Definition Check



**Drinking water, also known as potable water, is water that is safe to drink or to use for food preparation.**



**Freshwater is any naturally occurring water except seawater and brackish water. Fresh water includes water in ice sheets, ice caps, glaciers, icebergs, bogs, ponds, lakes, rivers, streams, and even underground water called groundwater.**



**Water conflict is a term describing a conflict between countries, states, or groups over an access to water resources.**

# Problem Statement & Research Questions

How does (fresh)water access correlate with conflict?



How does climate  
change impact  
freshwater access?



Do areas with low  
freshwater access have  
higher instances of  
conflict?



What areas in the  
United States have less  
access to water?



Do these areas with low  
water access have  
higher instances of  
conflict?

# Breakdown of Tasks

- Each WANGRY team member was assigned an individual breakdown question
- The breakdown questions were separated to the global and US situations
- Team members worked closely with their partner to ensure that input to downstream activity would be met
- The full team then worked together in the Team Checkpoint, Code, and Presentation assembly.



# Methods



Population API



UCDP API

World Bank  
Climate Change  
API

FBI API



CDC DATA

USGS Water  
Services



US Census Data



Pandas Data Frame  
manipulations using  
merge



Plotting in Python using  
matplotlib



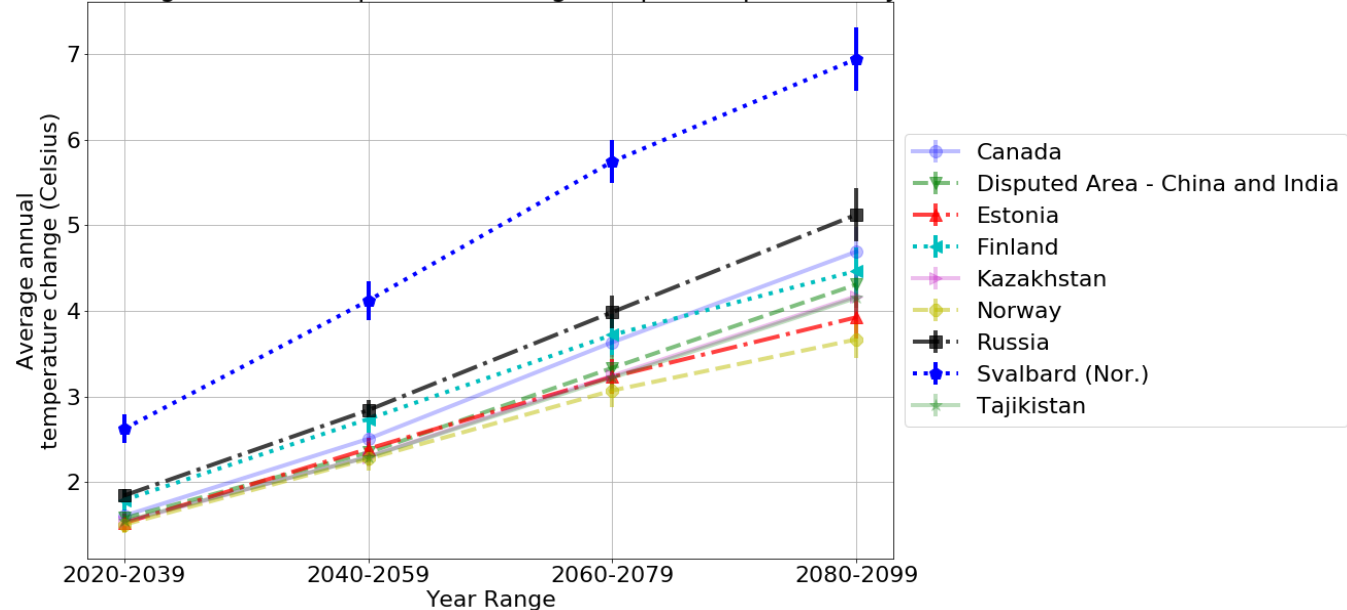
# Findings



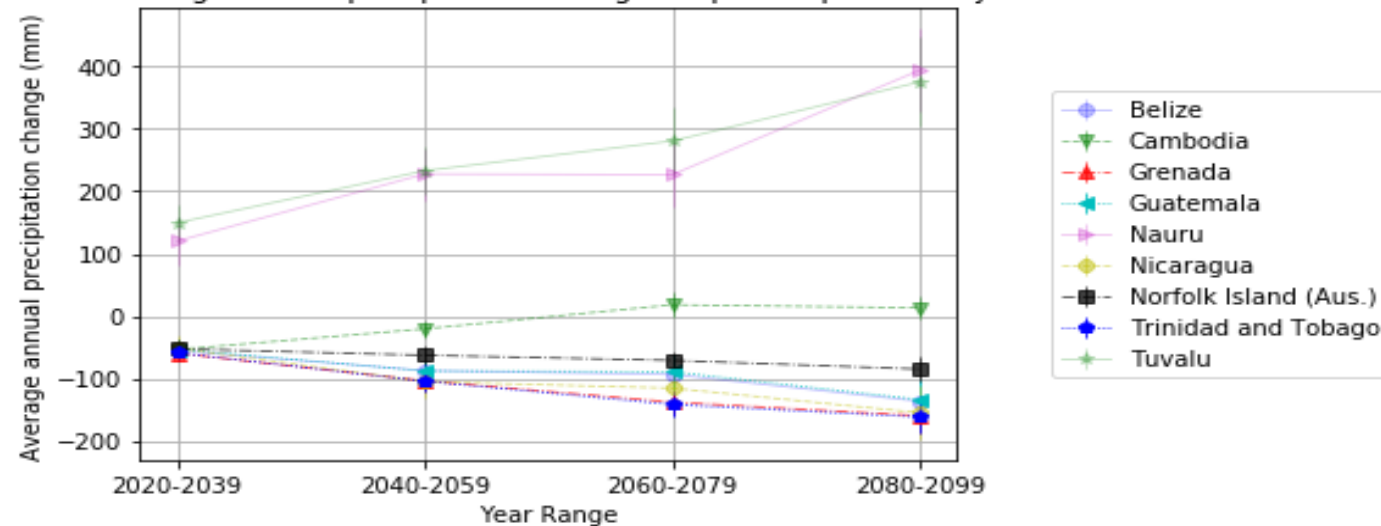
How does  
climate change  
impact  
freshwater  
access?



Average annual temperature changes expected per country

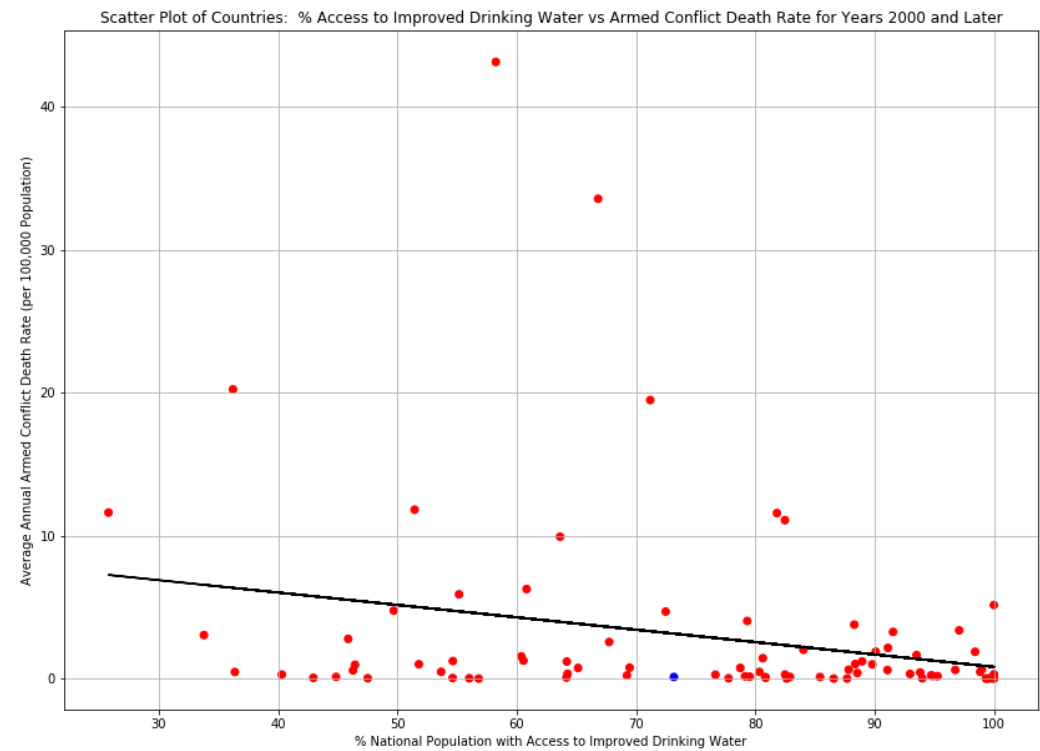
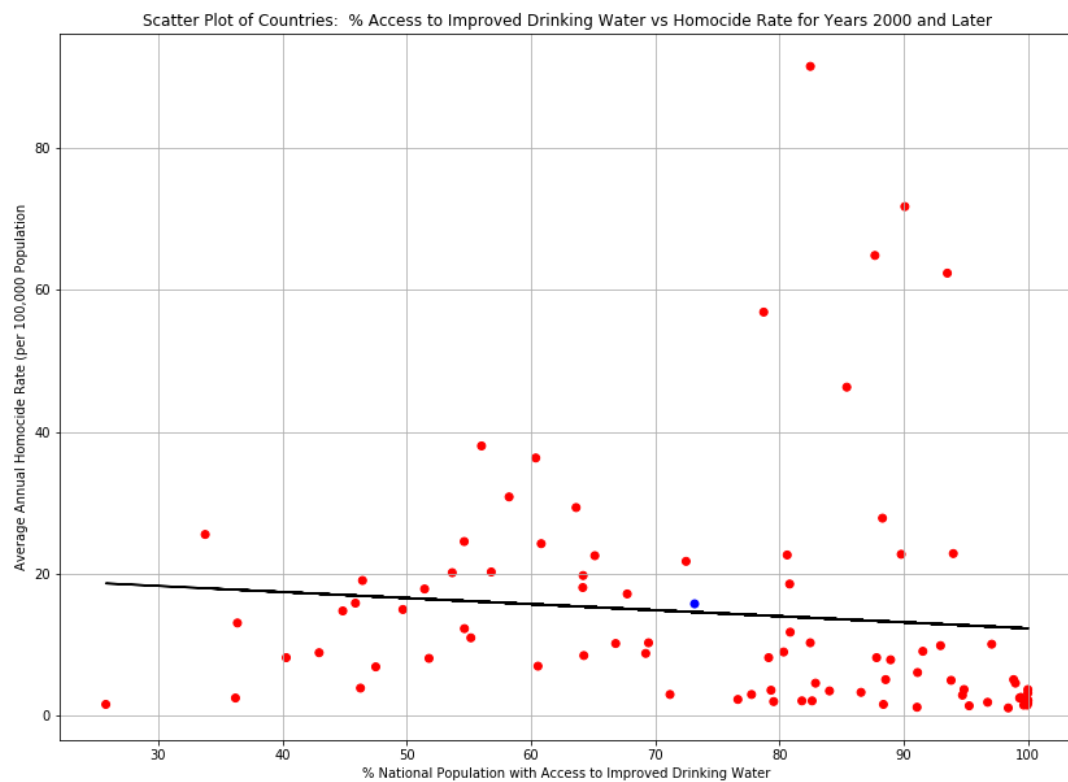


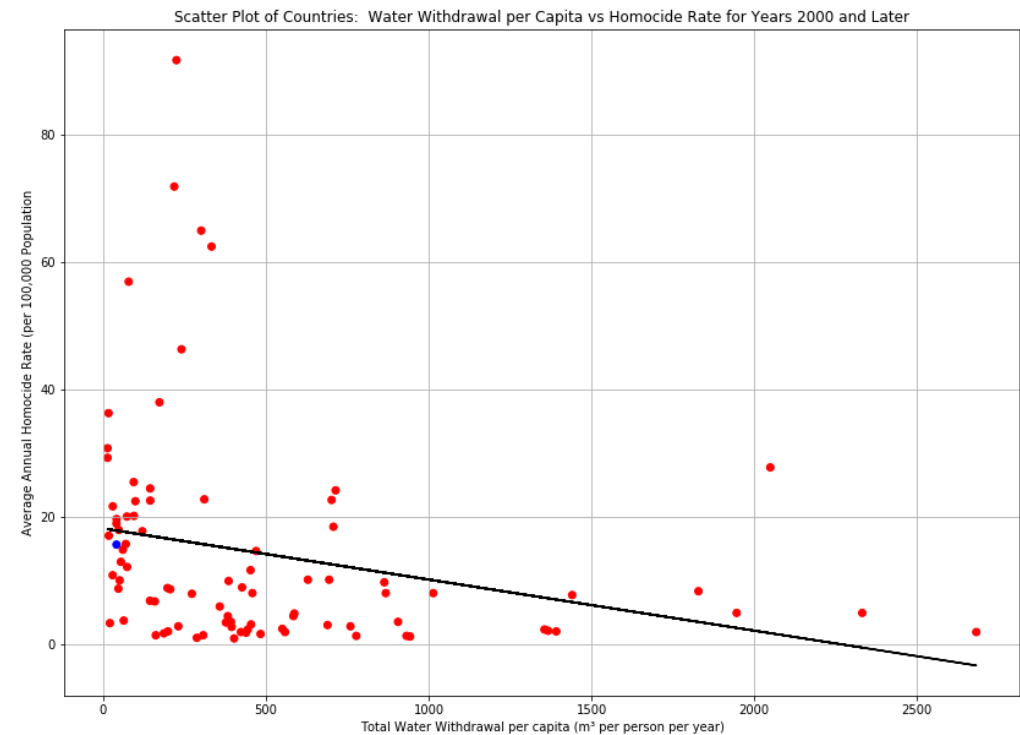
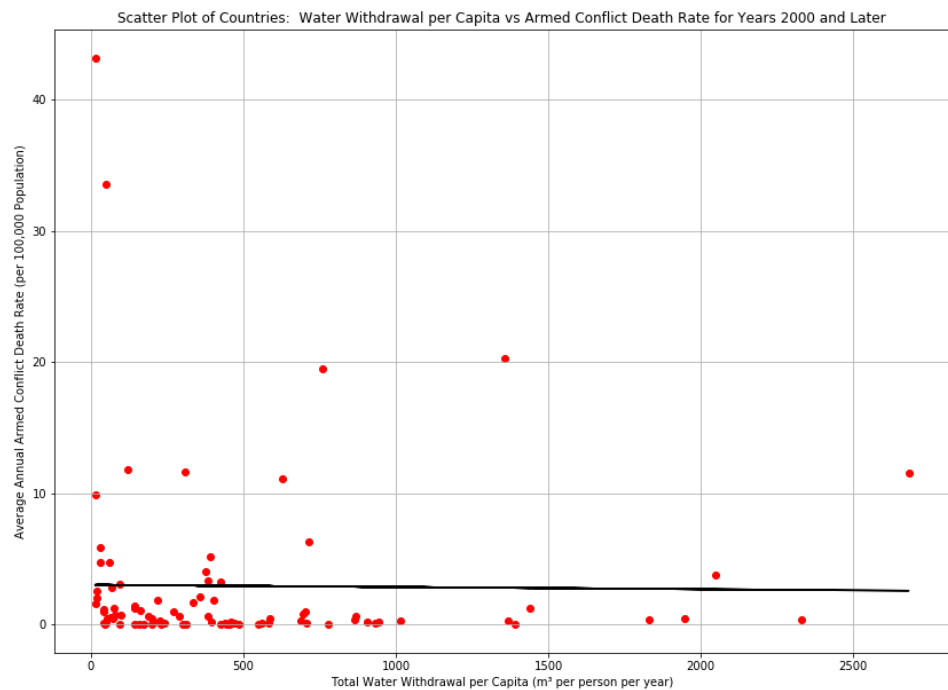
Average annual precipitation changes expected per country



Do these  
countries with  
low water have  
higher instances  
of conflict?



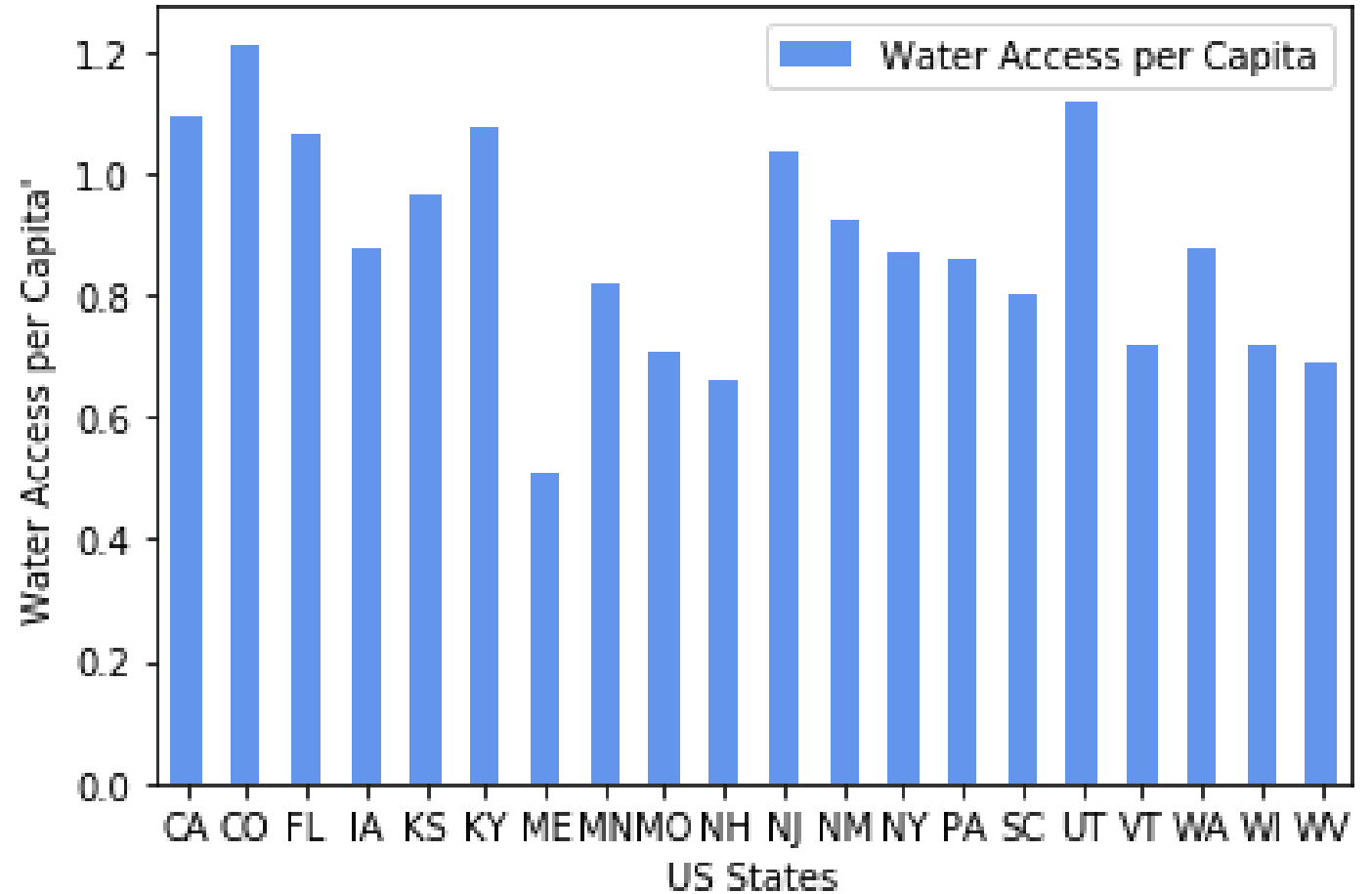




What areas in the United States have less access to water?

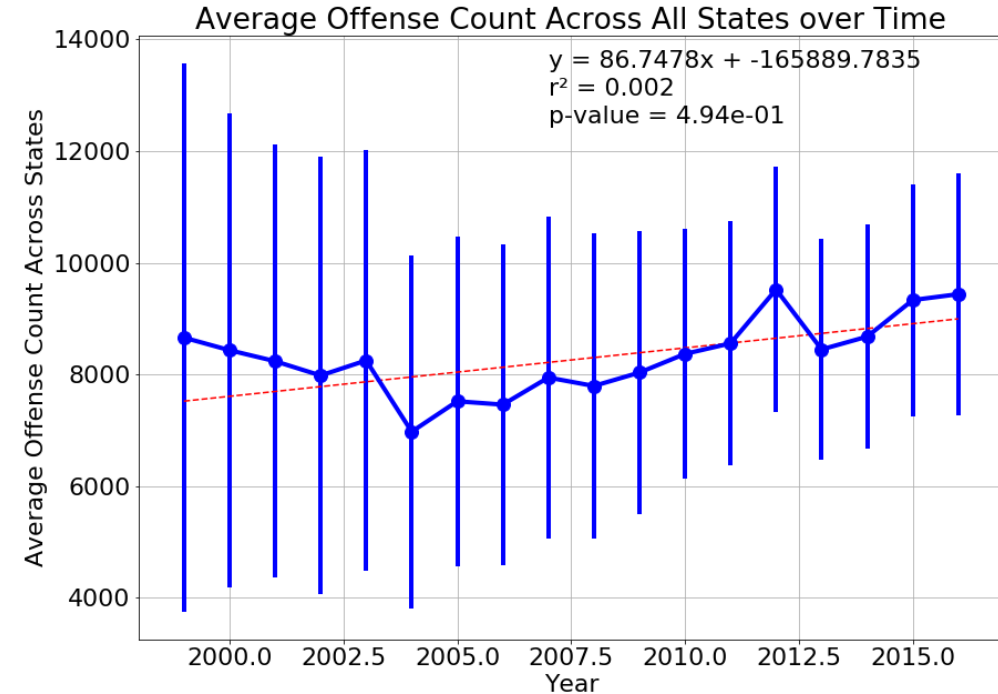
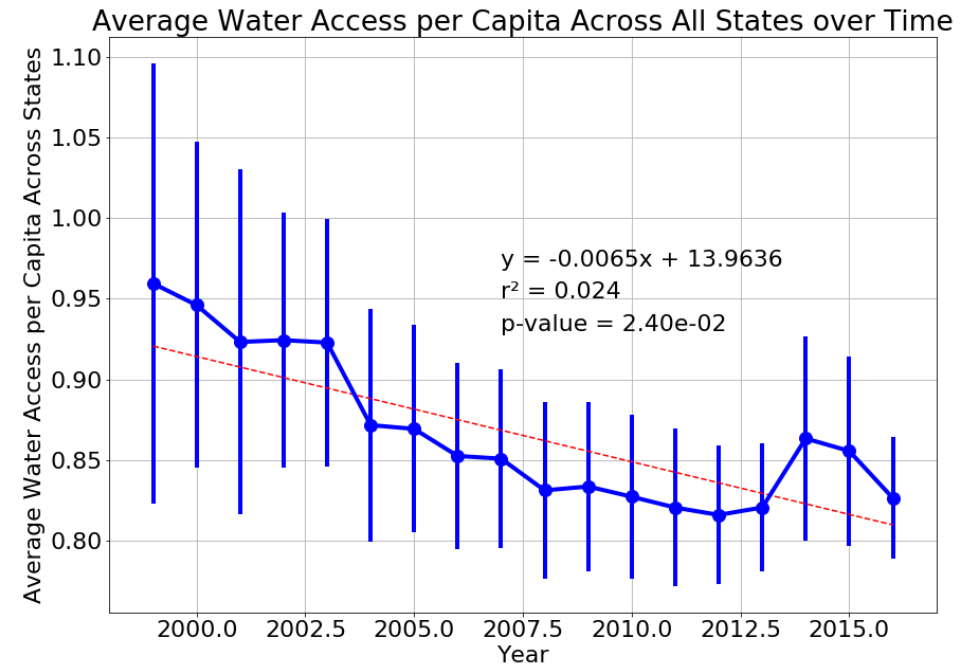


Water Access per Capita by State





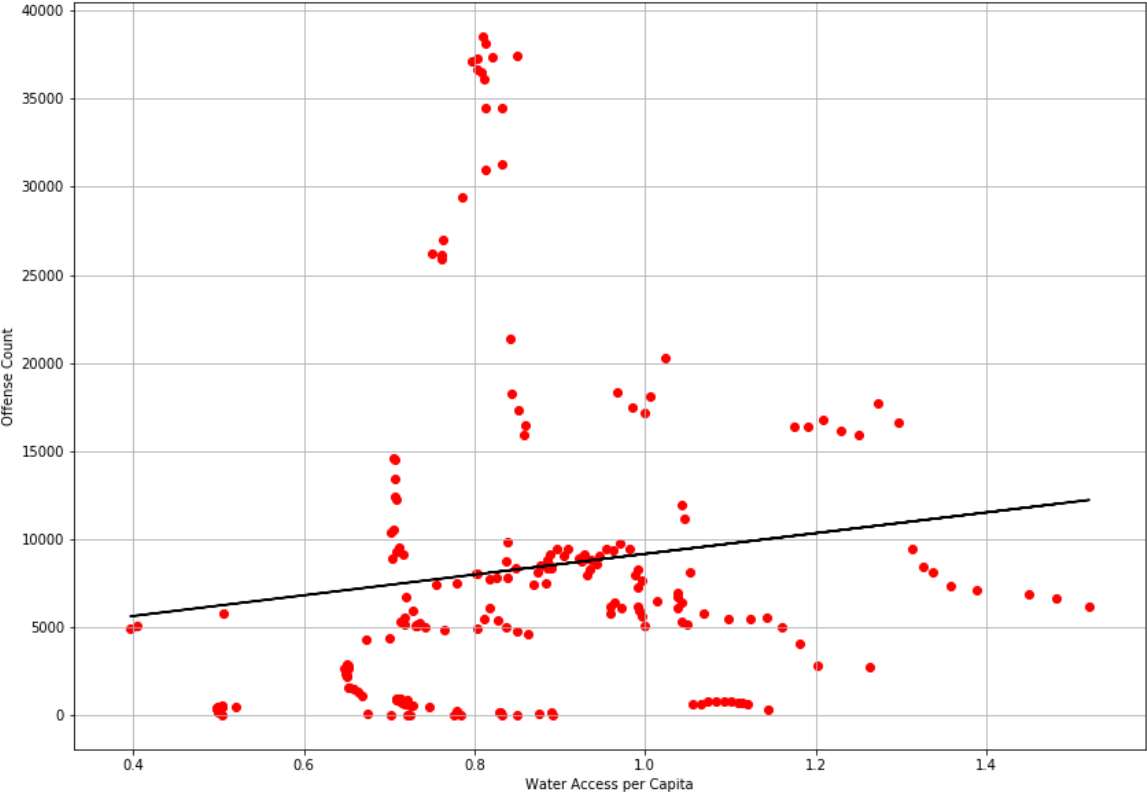
Do these areas  
with lower water  
access in US have  
higher instances  
of conflict?



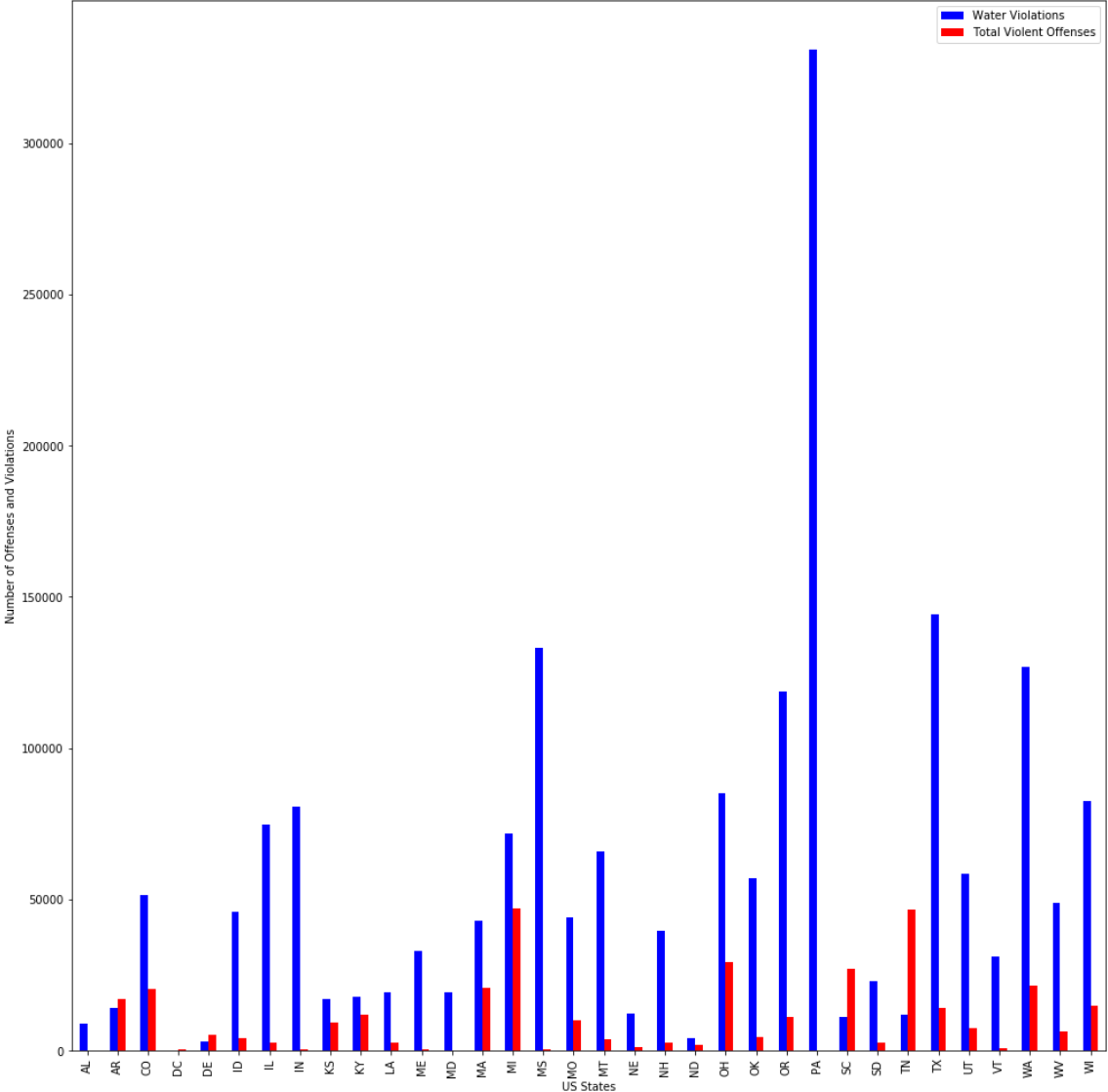




Scatter Plot of States: Water Access per Capita vs Offense Count for Years 1999 and Later



Comparison of Violent Crime and Water Violations in the United States (2016 Data)



# Implications of our Research Method

- Climate data identified several countries for further research, but some those countries did not have violent crime data
- Databases lacking data governance structures
  - We originally wanted to work on Canadian water access, but the Canadian Government API didn't give us the information we needed
  - Some states and nations had a lot of data, others had less
- No universal baselines in data
  - IE: USGS population sizes were different than FBI agency population sizes, which were both different than US Census data
- Multiple definitions around conflict, water quality, etc.



So...are we WANGRY?!



# Conclusions

1. As climate changes continue, precipitation volume changes over time – some countries more and others less. This impacts natural freshwater reserves
2. Nations with less freshwater access show a slight trend toward more conflict
3. Almost all of the United States have adequate water available to their populations
4. No direct correlation between water access and total conflict at the State level or the national level

....Although the data isn't strong...  
We should definitely stay hydrated!





# Resources

- [World Bank Climate Change API](#)
- [USGS Water Services API](#)
- [FBI API](#)
- [UPCD - UPPSALA Conflict Data Program API](#)
- [United Nations Data](#)
- [Renewable Freshwater Resources](#)
- [Net Freshwater Supplied by Water Industry](#)
- [Water Quality Data](#)
- [Armed Conflict Locations and Events Data](#)
- [Global Health Organization Data Repositories](#)

Scatter Plot of Conflict Locations from UCDP API for 2000 and Later

