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

World Bank Climate Change API

UCDP API

FBI API

CDC DATA

USGS Water Services

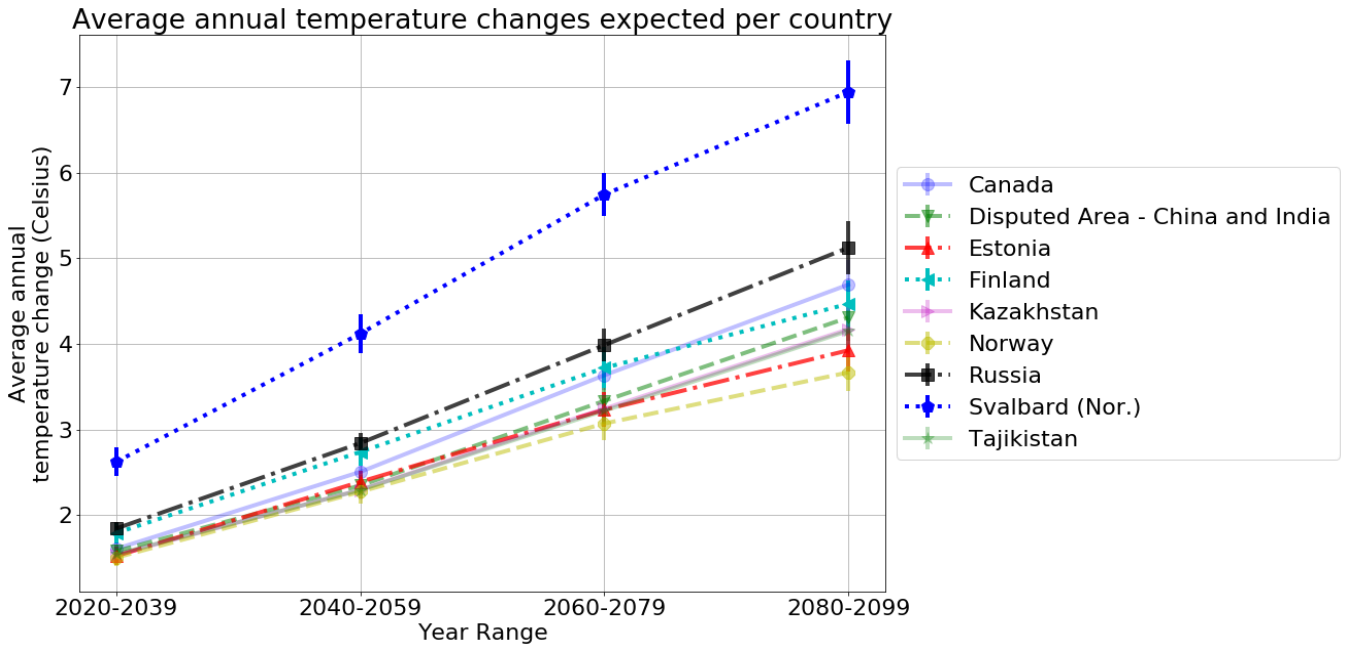
US Census Data

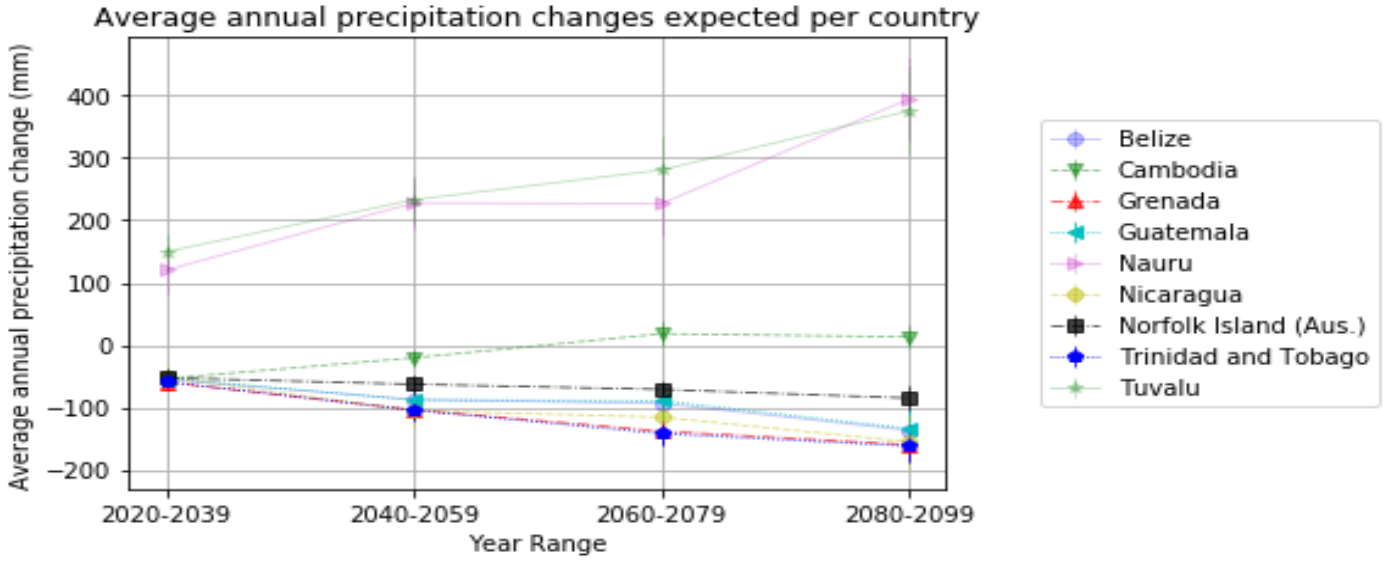
Pandas Data Frame manipulations using merge

Plotting in Python using matplotlib

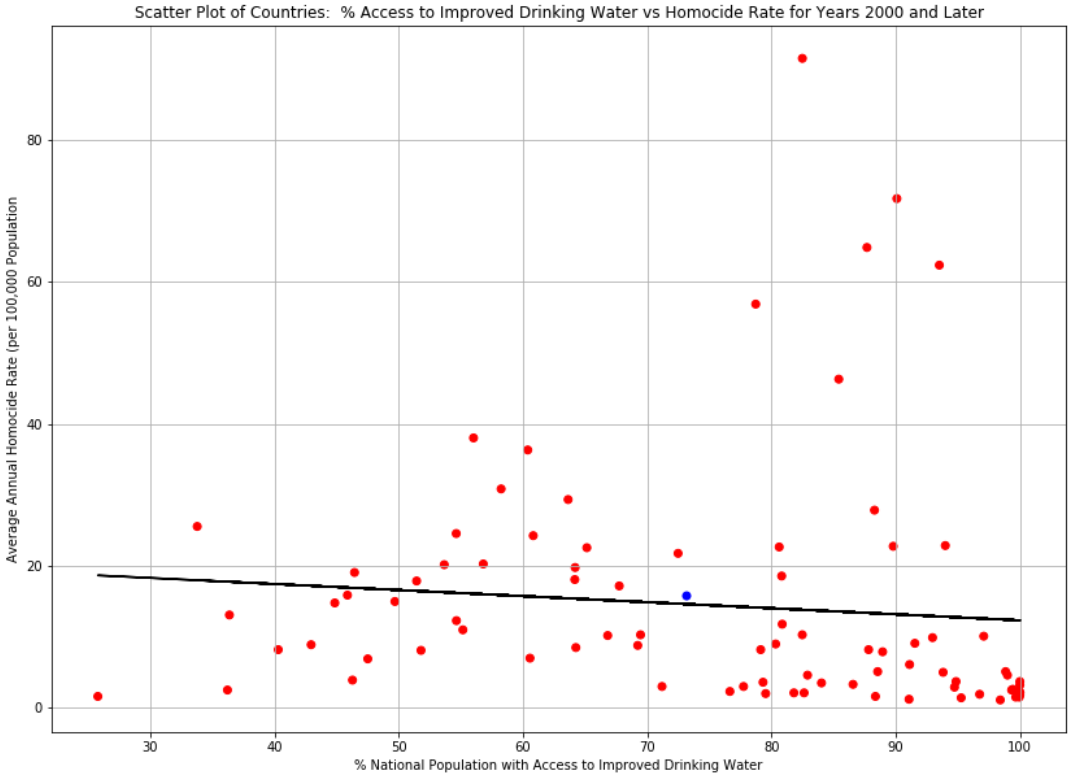
Findings

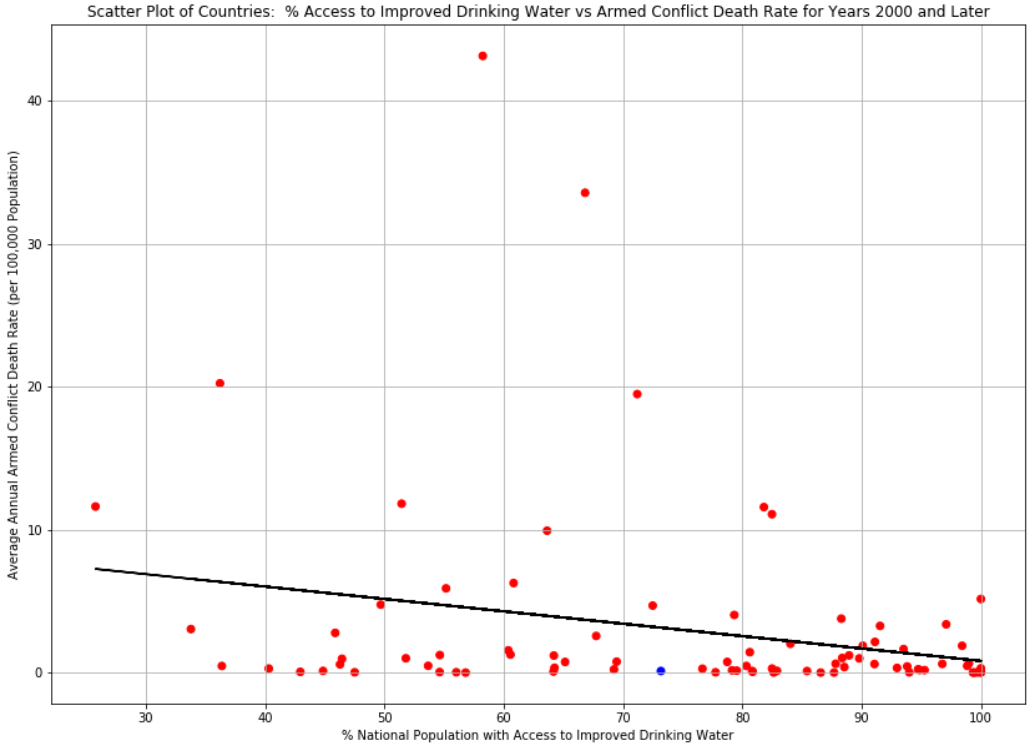
How does climate change impact freshwater access?

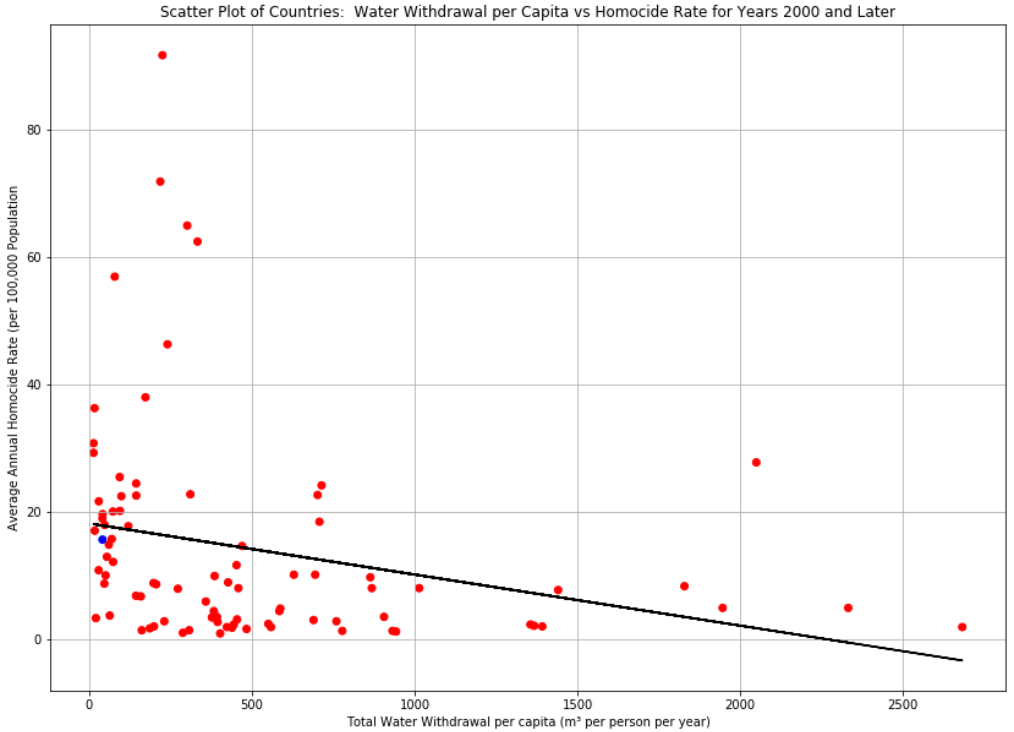


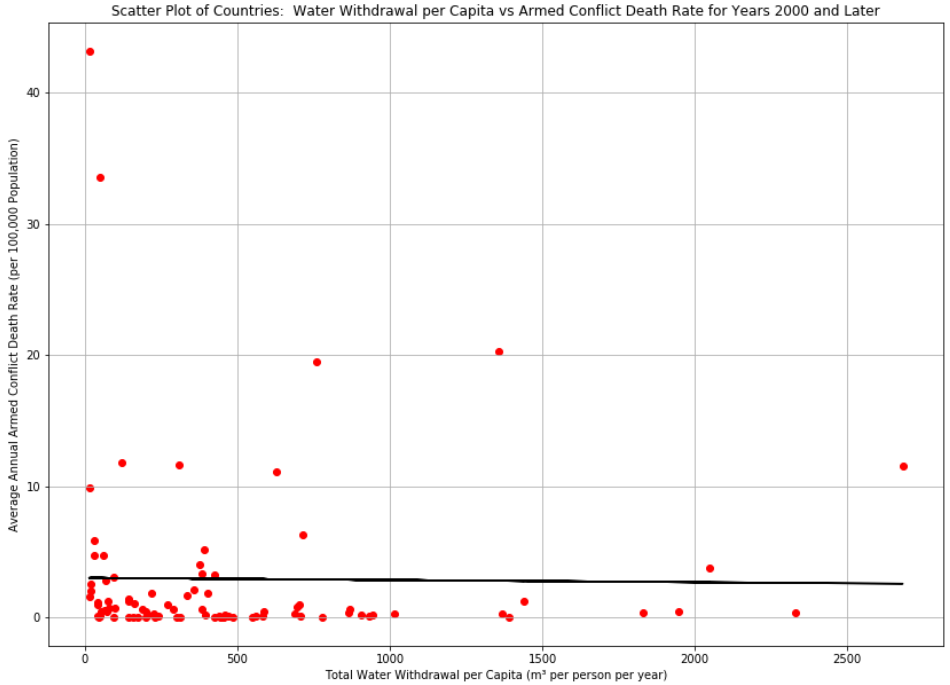


Do these countries with low water have higher instances of conflict?

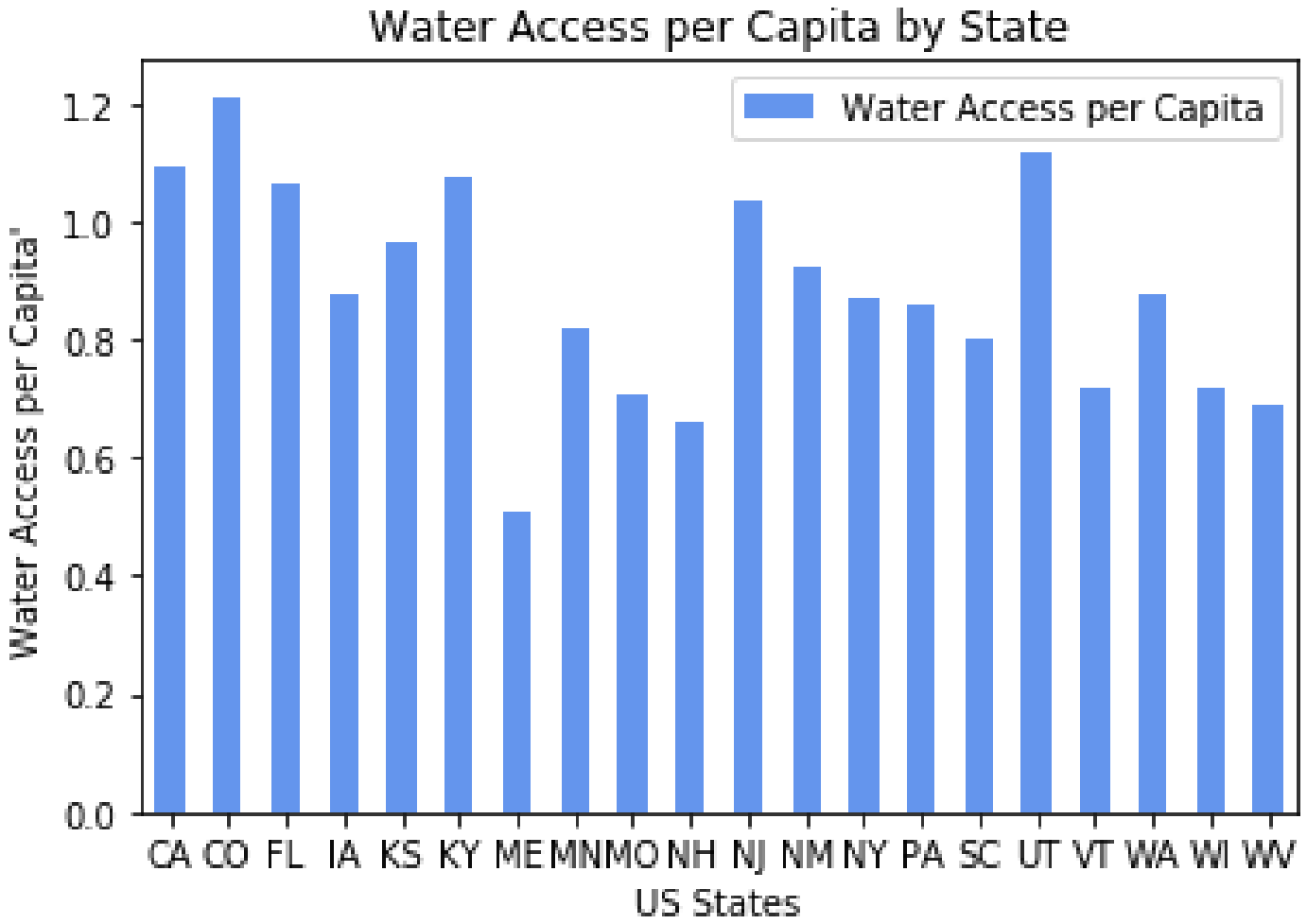

Scatter Plot of Countries: % Access to Improved Drinking Water vs Homocide Rate for Years 2000 and Later
Average Annual Homocide Rate (per 100,000 Population
% National Population with Access to Improved Drinking Water
0
20
40
60
80
30
40
50
60
70
80
90
100


Scatter Plot of Countries: % Access to Improved Drinking Water vs Armed Conflict Death Rate for Years 2000 and Later
Average Annual Armed Conflict Death Rate (per 100,000 Population)
% National Population with Access to Improved Drinking Water
0
10
20
30
40
30
40
50
60
70
80
90
100


Scatter Plot of Countries: Water Withdrawal per Capita vs Homocide Rate for Years 2000 and Later
Average Annual Homocide Rate (per 100,000 Population
Total Water Withdrawal per capita (m³ per person per year)
0
20
40
60
80
0
500
1000
1500
2000
2500

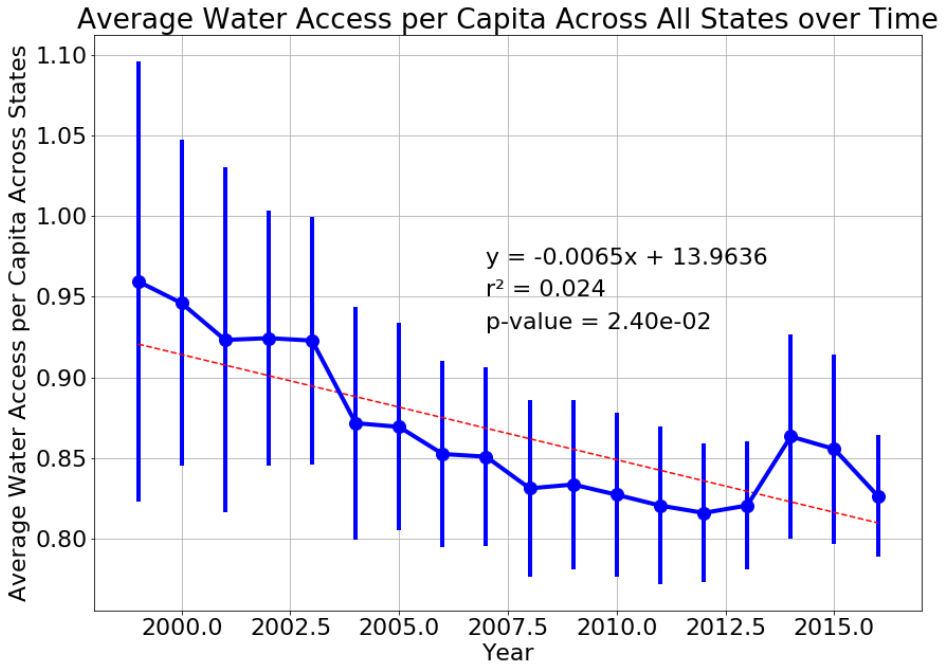

Scatter Plot of Countries: Water Withdrawal per Capita vs Armed Conflict Death Rate for Years 2000 and Later
Average Annual Armed Conflict Death Rate (per 100,000 Population)
Total Water Withdrawal per Capita (m³ per person per year)
0
10
20
30
40
0
500
1000
1500
2000
2500

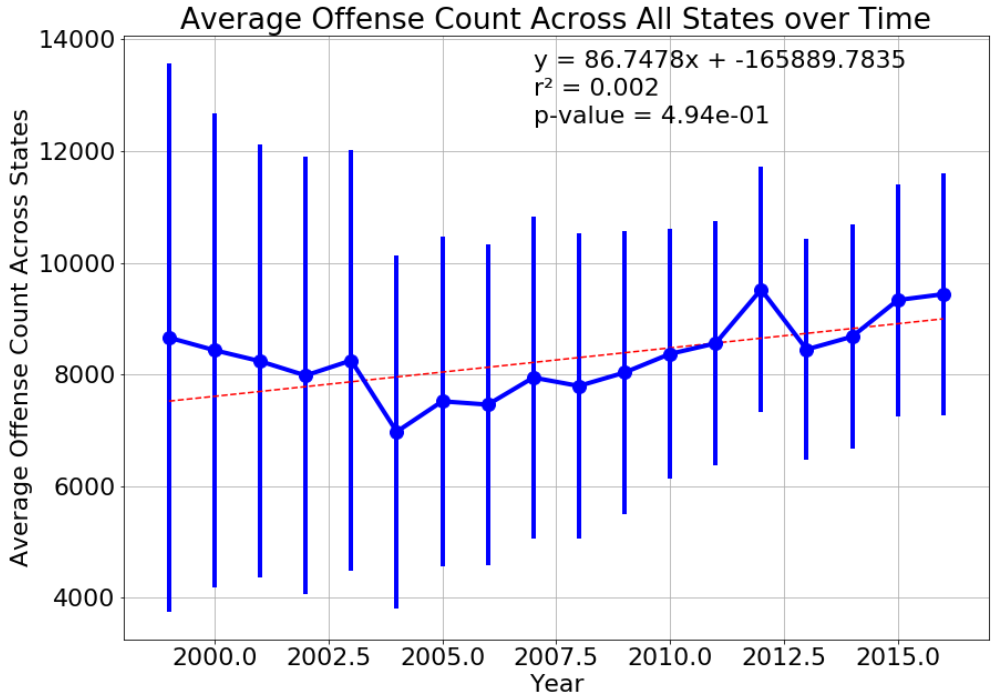
What areas in the United States have less access to water?

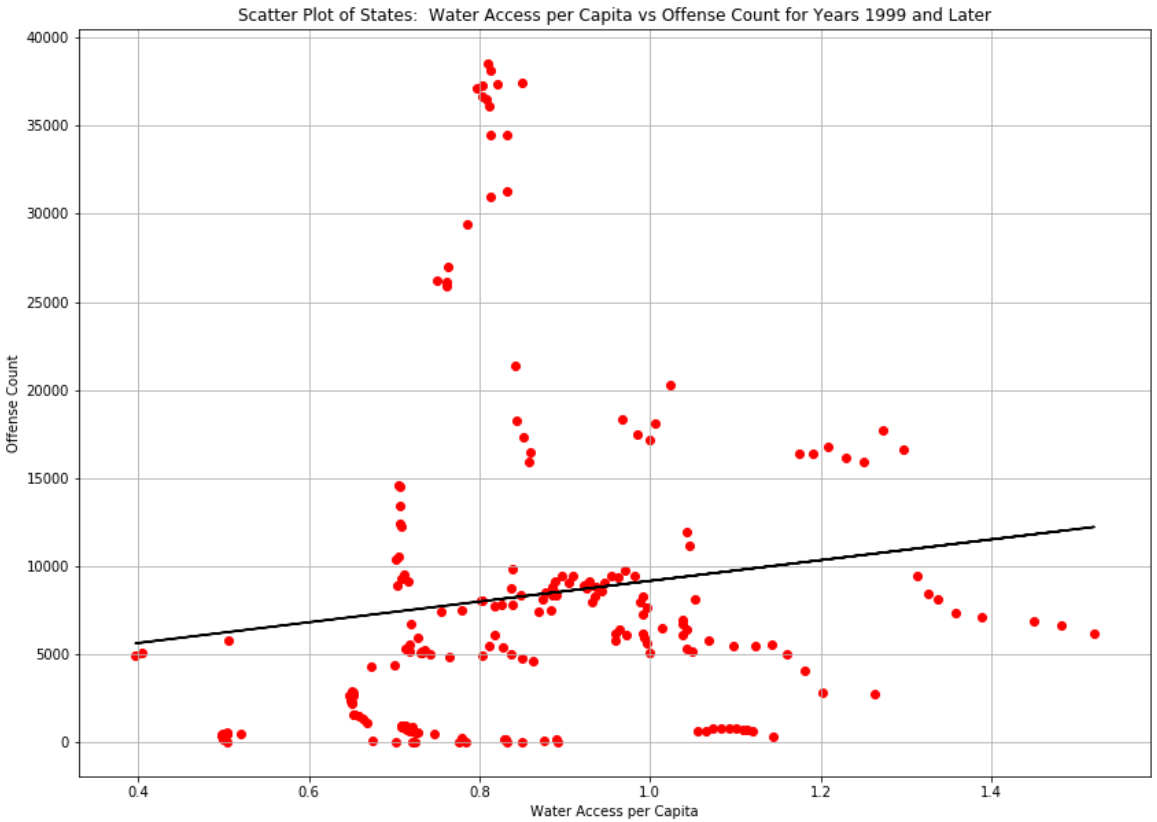


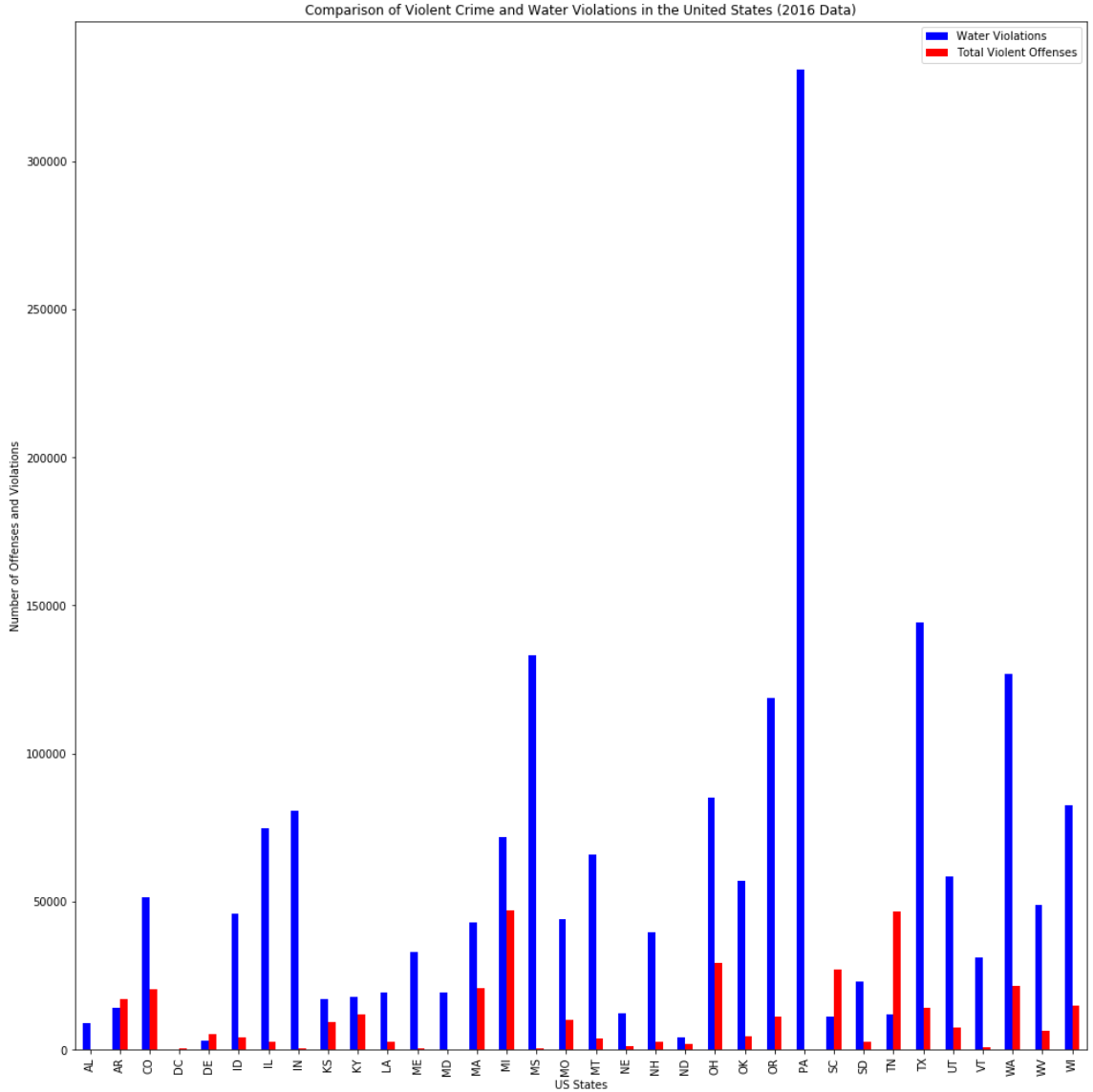
*Population and water data are from different sources

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
Offense Count
Water Access per Capita
40000
35000
30000
25000
20000
15000
10000
5000
0
0.4
0.6
0.8
1.0
1.2
1.4


Comparison of Violent Crime and Water Violations in the United States (2016 Data)
Water Violations
Total Violent Offenses
Number of Offenses and Violations
US States
300000
250000
200000
150000
100000
50000
0
AL
AR
CO
DC
DE
ID
IL
IN
KS
KY
LA
ME
MD
MA
MI
MS
MO
MT
NE
NH
ND
OH
OK
OR
PA
SC
SD
TN
TX
UT
VT
WA
WV
WI

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

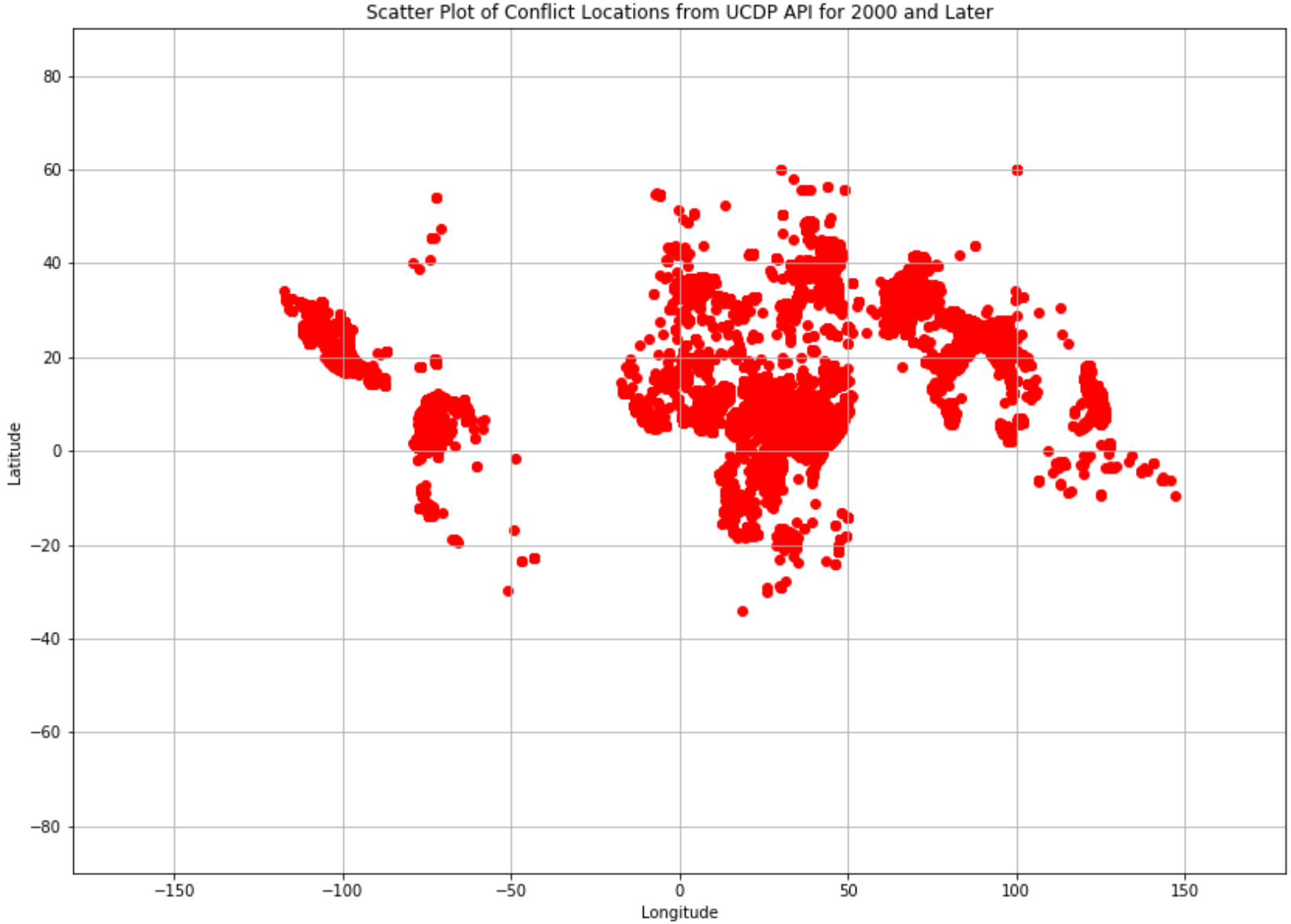
1. As climate changes continue, precipitation volume changes over time – some countries more and others less. This impacts natural freshwater reserves
2. Nations with less freshwater access show a slight trend toward more conflict
3. Almost all of the United States have adequate water available to their 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
Latitude
Longitude
80
60
40
20
0
−20
−40
−60
−80
−150
−100
−50
0
50
100
150