Assessment of Water Resources for Southern California –What's the Prospects for Communities?

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Abstract

California is facing extreme water deficits because of the prevailing drought conditions in the region. The purpose of the current project is to assess the water resources quality and quantity in the southern California region, develop partnerships across the inland empire water districts such as San Bernardino (SB) water district and CSU water resource professionals and student trainees. Per the SB community indicators 2020, the average consumption of water in the county is higher than the state average in July 2020. It is anticipated that water shortages and drought prevail as consumption will increase. Therefore, the current work helps to collect and assess water resources data and regional climatic variables at community and secondary sources to seek answers to the prevailing conditions in the region. The student-centered research and community partnerships are crucial in this research to improve southern California water resources, resource conservation practices, and positive student educational outcomes.
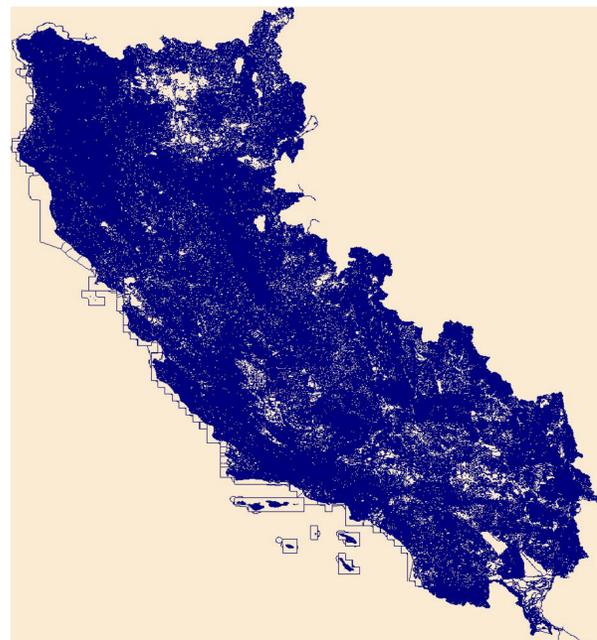
USGS National Hydrographic Dataset for CA, helps in developing water budget calculations

The Problem

In the first phase, the project attempts to estimate the residential water usage for Southern California by exploring the data from California Water boards, the State Water Resources Control Board and evaluate the future trends and needs for the region.
1. Where do Southern California Stand to the rest of the State?
2. Is there a significant risk of long-term drought?
3. What factors play a role for the water insecurity in the region?
4. What is the future of water for regional population that is in constant growth?

The Approaches

1. Explore the available data resources at State, National and local to study the water resources information.
2. Review the water resource literature to study the resource problems.
3. Develop a collective framework to collaborate, evaluate and solve the water resource problems for Southern California.
4. Engage the College of Natural Sciences students in summer research to further improve understanding of southern California water resources, three (3) students recruited through the office of student research.

Gallons Per Capita Per Day (July 2020)
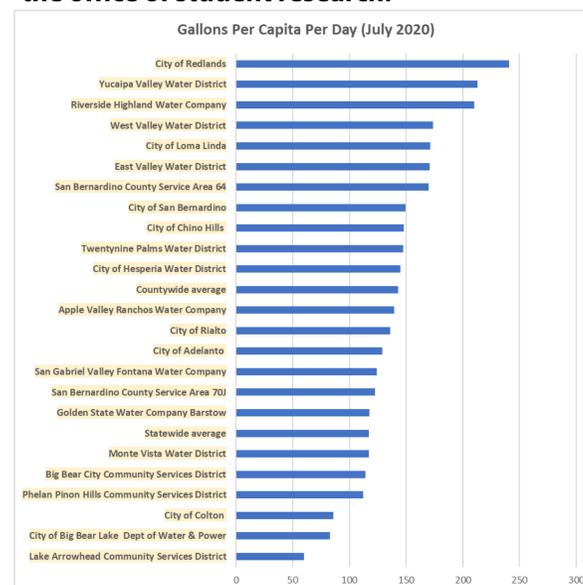
Data resources

### Statewide water production by the hydrologic region
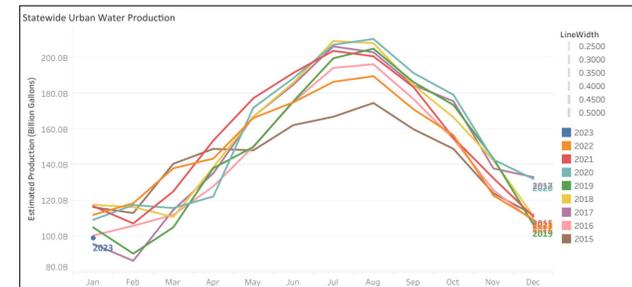

Statewide water usage by the hydrologic region

Average monthly residential gallons per capita daily (R-GPCD)

Region	2015	2016	2017	2018	2019	2020	2021	2022	2023
Central Coast	68	65	68	69	66	73	73	70	50
Colorado Riv...	145	151	163	166	159	175	173	177	125
North Coast	64	65	65	66	68	73	66	61	51
North Lahon...	84	87	91	91	87	94	92	87	60
Sacramento ..	110	114	122	119	112	129	119	116	64
San Francisc...	65	63	68	68	67	72	65	61	44
San Joaquin ..	101	100	107	111	108	117	113	108	67
South Coast	83	81	85	85	80	87	86	82	58
South Lahon..	108	109	111	113	105	113	114	105	67
Tulare Lake	119	125	133	134	131	133	133	125	69
Statewide	85	85	90	90	85	93	91	86	58

Water production for 10 southern California counties
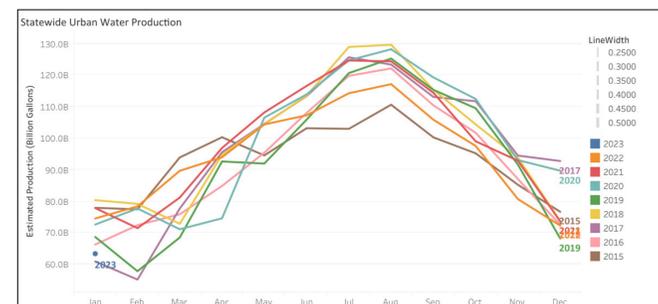
Water production for all California Counties
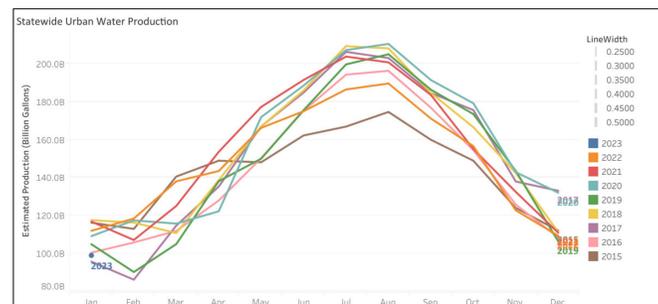
Observations & Results

1. The residential water usage and production peaks during the summer months and declines during the winter season.

2. The demand and production has peaked in recent years.

3. Relevant data is being analyzed from the California Water Science Center to assess and quantify the water quality from surface waters.

References

1. The California Water Boards, https://www.waterboards.ca.gov/water_issues/ programs/conservation_portal/conservation_re porting.html
2. San Bernardino County indicators environment profile, https://indicators.sbcounty.gov/environment/
3. California Water Science Center, https://www.usgs.gov/centers/california-water-science-center/data

Future Work

1. Explore the National Hydrographic Datasets in ArcGIS.

2. Apply statistical and Geospatial methods to analyze and assess the water and public health data.

3. Apply GIS and remote sensing data and techniques to develop water inventory.

4. Partner with local water districts and engage communities for effective water management for informed decisions on the water and public health.

Acknowledgements