GEOG:3540 Brief Report **May 8, 2024**

Sydney Benton and Rachel Walenceus

Introduction

Overarching Goal

The first goal for this project was to explore varying reservoir levels along the Colorado River Basin (CRB). Data was obtained from the USGS Colorado River Basin Actionable and Strategic Integrated Science and Technology Initiative analysis webpage. The data was presented in three categories: pre-drought (1991-2001), drought (2002-2022), and 2023 daily average. While this data was convenient for us to download, it was not intuitive how it was presented. So, the second goal was to take this data and present it in a way that was comprehendible. Aside from the webpage by the USGS, there aren't many interactive interfaces online.

Objectives

The question we must consider when creating our interface is: what specific objectives can be achieved with each visualization method used in the project? Using what we had learned in class, we knew we wanted to create an interactive map. This would stimulate curiosity in the audience, and hopefully, more knowledge would be gained from the experience. The user having the ability to switch between the different map categories will facilitate the interactive element.

Target Audience

The target audience for this project is somewhat broad, which can make designing the map difficult. However, this map will be most important to those interested in the water supply in the CRB. This could be individuals with an academic approach, where studying how climate change affects water access. Those living in the CRB will also likely view this map; anyone from those directly impacted by the lowering levels of the reservoirs to those that impact those levels will be among the audience.

We want this map to be accessible to the general public. Our goal is to have the data tell the story with the map interface that we create. The interface needs to be simple enough that the message presented by the data is clear, while simultaneously facilitating new avenues of interest. Initially, we were wondering how all ages could interpret the map, specifically young audience members; however, children will likely be able to comprehend the idea of a bigger circle compared to a smaller circle, which would foster the appropriate observations for our map (Slocum et al, 2023).

Team-based Methodology

The two of us used our strengths to complete this project. While we both used the provided class time and time outside of class to collaborate on the project, we individually completed sections, as well. Rachel prepped the excel/csv file to be put into Observable. Sydney focused on the Observable Notebook coding to thread the data together. Once the Observable Notebooks were

completed, Rachel created the index.html file to put the Notebooks into an interactive format. Both members of the group put the index.html file into their GitHub repositories. The report was completed independently, yet an outline of the required sections was made clear prior to writing the final draft. Both members of the group reviewed and edited the draft before submission.

Discussions

Learning Outcomes and Lessons Learned

The project successfully displays four periods of reservoir conditions. Throughout this project, we were able to draw from various sources to best present the reservoir fluctuations in a meaningful and new way. Proportional symbols allowed us to map the raw counts to showcase relative size with peak storage capacity visually.

Limitations of Visualizations and Data

Despite our map showing the CRB outline and a select few reservoirs, these are not all of the reservoirs in the CRB. Reservoir data and the basin outline were obtained conventionally online. Two data sets had to be combined to formulate this project, so some data was lost on both sets due to non-joining values. Having water level data and GPS points for all the reservoirs in the CRB would provide a more comprehensive presentation.

For the base map, the CRB shape file was used, rather than the basin outline with a map of the southwest United States. Not having the states as part of the base map may confuse some readers; however, we cautioned the audiences that the base map is the watershed outline.

The legend was created with the idea that higher values will be higher up on the scale, thus at the top of the legend. This may be backwards for some viewers that feel larger values are "heavier" and should be placed at the bottom of the legend (Slocum et al, 2023).

Using an html as an interactive interface allows for the user to flip between the four different variables. However, it may be confusing that this interface is not presented as one map with a toggle. A toggle seems more user friendly, but the website approach is not unfamiliar to the audience either.

Future Work

The data originated from a study, presented by the USGS, to monitor the reservoir levels across the CRB, specifically to see how the water supply was depleting. Analyzing data on a more granular scale would provide a more comprehensible understanding for the audience. Often when the data is too blown out, it can create more questions than it answers. For example, data could be presented on a year's worth of daily, weekly, or monthly averages. This will allow for a better understanding of how the seasons affect the water levels; if the presentation of the data is over a few years, it would be evident exactly when these levels began to significantly decrease.

This type of data could even be presented before our presentation, to give the audience a more granular analysis that flows into to a big-picture analysis.

This data will likely be compared to any future data, if mitigation efforts are put in place. Therefore, it's important to consider how this data will be compared to future data sets. It's imperative we ask ourselves, "how do we set up the data now so that when new data comes in it's easy to see the differences?" This is probably done more easily with the full, and more granular, data set.

I. Conclusion

Through completing this project, we went through trial and error to present the data to the best of our ability. We ended with a webpage method of presentation that acts as an interactive interface for the audience to see where changes occur. The way we visualized the data will hopefully inspire scientists of all ages for future investigative work.

II. References

Slocum, T. A., McMaster, R. B., Kessler, F. C., & Howard, H. H. (2023). *Thematic Cartography and Geovisualization* (Fourth). CRC Press.