

1. Description of the DATA you used (either given to you or where you found it, what unique characteristics of the data, what quantitative and qualitative information is in the data set, etc.)

The dataset I used for this project is the summary statistics of drought, which is about what proportion of an area is in what level of dryness or drought. The U.S. Drought Monitor (USDM) provide this data which can be categorized as being in one of six levels of drought; none, abnormally dry (D0), moderate (D1), severe (D2), extreme (D3), and exceptional (D4). I downloaded data about percent area of drought categorized by State from Jan.4th.2000 through June.4th.2024 for about 24 years of duration.

As defined by USDM, I calculated the drought severity and coverage index (DSCI) from D0 to D4, which is a weighted sum of the proportion of each area in each level of drought to get the summary statistics. The DSCI ranges from 0 (no drought) to 500 (all of the area in the worst category of drought). The purpose of this project is to show the time change in severity of drought by State, I created a summary table by averaging DSCI values for State and Year.

2. Description of the AUDIENCE you are aiming for (including more detail than simply saying “a biochemist”).

I’m targeting this presentation to all people who’re interested in the drought in the US, so I tried to make visualizations understandable for general people and published it as a Shiny app.

3. Description of the TYPE of graph (e.g. Bar chart, Sankey Dendogram, etc).

First, I grouped the data by ‘Year’ and ‘State’ and displayed the average DSCI for each State in a specific year on a map. I applied four color blocks, the darker purple indicates lower DSCI, the lower percent area of drought, which is good. In contrast, as it becomes more and more bright in color, like yellow, it means higher in DSCI, so higher percent area of drought, which is bad. The map shows the average DSCI.

Next, I presented the line graph for a specific State and then if one chooses the Year want to look at it, it will give us the line graph for the State during the Year. There is a summary table showing the top five records of mean DSCI with Year and Month.

4. Representation Description: What are you trying to show?

I was curious about the drought in the US continent, especially in the West, from the news article, 'The West's historic drought' (Aug.19.2022, CNN Weather, <https://www.cnn.com/2022/08/19/weather/gallery/western-united-states-drought/index.html>)

This article said much of the Western US has been experience a historic and unrelenting drought. A study published in Nature Climate Change found the period from 2000 to 2021 was the driest in 1,200 years. The drought severity during this period was exceptional, and the extreme conditions would continue through 2022.

Referring to this, I would like to check the drought severity overtime in the US by State.

5. How to read it & what to look for: How should a newbie to this graph approach interpreting it? What are the major highlights of the graph type?

There is one thing to remember; as the DSCI increases, the drought worsens. In the map, you can see as the DSCI increases, the map will be colored with brighter color, close to yellow.

6. Visual Presentation: address how you are using annotation, color, and general composition (e.g. how are things arranged, scale, etc.)

On sidebar, there is a dropdown box to choose the Year to reflect the data on a map. The default Year is 2000, but you can change the year from 2000 to 2024. For the first trend plot, the line graph with dense brown color indicates the newest trend. It will be also meaningful to compare to the National average DSCI trend as well as the State specific average DSCI trend.

7. How I created it (i.e. your "Methods section"); additionally, include a bit about the process. Please include an early draft of your visualization (it might be a completely different), and why you changed it/what you tweaked to get to your final visualization.

With the data table, I calculated DSCI value, and then recalculate the mean DSCI grouped by State and Year. With this summary statistics, I plotted a US map colored by average DSCI. I used 'Highcharter' package which provides an interface to Highcharts, an interactive plot similar to Plotly.

By choosing a specific Year, the map will display the average DSCI in a specific year for State with color variation.

The following line graphs let us take a look more closely for each State and Year by displaying a year trend. The national time trend or State specific time trend would be useful references to get a sense.

Lastly, I attached the summary table with top five drought records for the State.

The early draft version included only one line graph with a summary table to show the time trend in a selected State. But I decided to reflect the data on a US map because it would be more informative to show the difference in drought by State rather than focusing on a State at a time. I also wanted to show the time change in a map, so the draft version was the animated map. However, I couldn't find the way to publish the animated map through Shiny app. Thus, I got into this kind of map coded by highchart.