# The Design Process of Red Lake Visualization

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## Learning objective

After reading the article *I called this place 'America's worst place to live.' Then I went* there by *Christopher Ingraham*. I feel like it's quite inappropriate to describe Red Lake County as the worst place based on the USDA's natural amenity index because there are many shining points of the Red Lake County, especially in the life quality of the locals.

The article provides the readers with personal experience of living in Red Lake County, and it turns out that quite enjoyable. What's more, data and studies are showing the county is pretty good in well-being, employment, and other aspects.

I believe visualization is a good way to provide the audience with a comprehensive overview of the life quality at Red Lake County. Therefore, I made 4 parts of visualizations to help the audience discard prejudice from the amenity index and generate an objective opinion towards Red Lake County.

## Part 1 – US County Amenity Index Scores

Geographic comparison is the main part of the articles' topic, so my first thought is to draw a map through which the audience can know where Red Lake County is. Besides, the chart should introduce what the amenity index is and why Red Lake looks so bad based on it. Therefore, I used the color to indicate the amenity.

There are two ways to mark the visualization. The first one is to mark the US map by state, and then provide details about MN. The second one is to directly mark all counties on the map. I chose the latter one because it provides more information comparison. The audience can compare the index scores of Red Lake County with any other county in the US. In addition, the average score of one state can't help the audience know the distribution of the score on counties' levels. They may wonder whether there is a place that is even worse than Red Lake in other states.

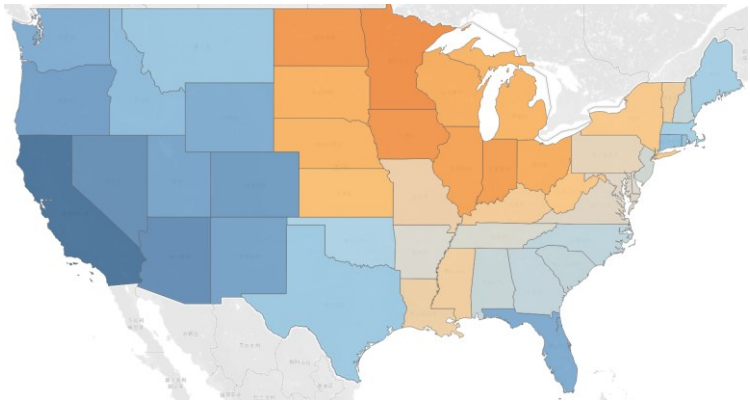

Figure 1. Marked by States

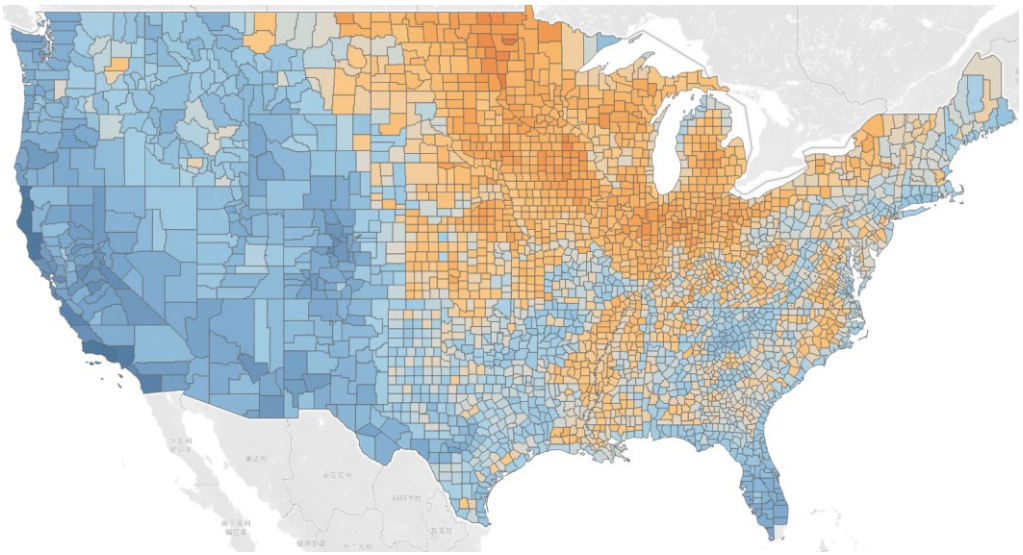

Figure 2. Marked by Counties

The color ranging from orange to blue makes the map looks like a temperature, and the hue is reversed as well. Since amenity score is an index to evaluate a place good or bad, I think black can be a better color. Black is mixed of all colors, so it implies that the county is bad in every factor. In addition, black is very eye-catching in this map as well, which can help the audience quickly find where the county is.

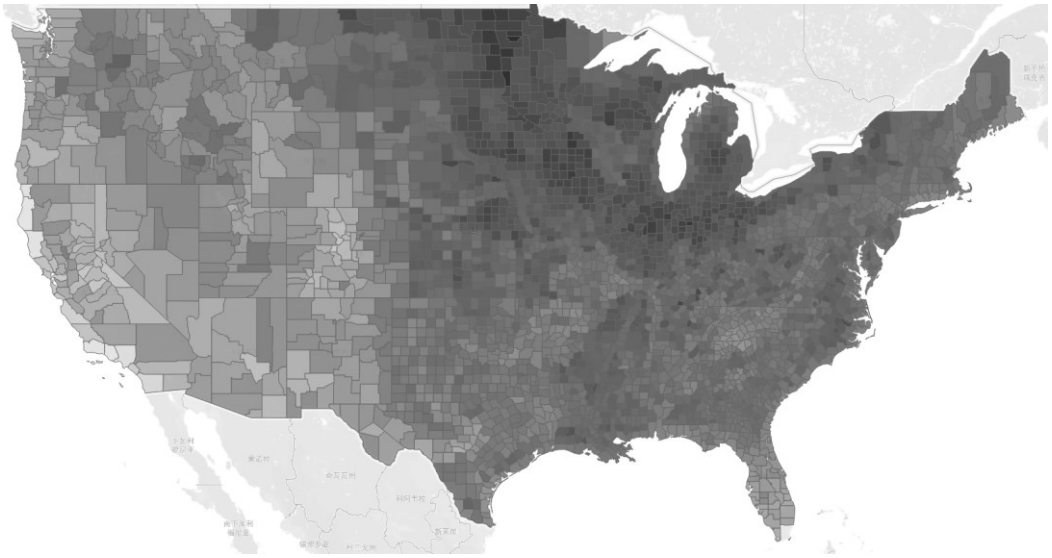

Figure 3. Map with black and white style

However, the hue is too dark, too many gray blocks may cause distraction, so I set the red for counties with a high amenity index. It makes more sense because typically the temperature is high at places with high scores. Then I completed it after adding the title and annotating the Red Lake County.

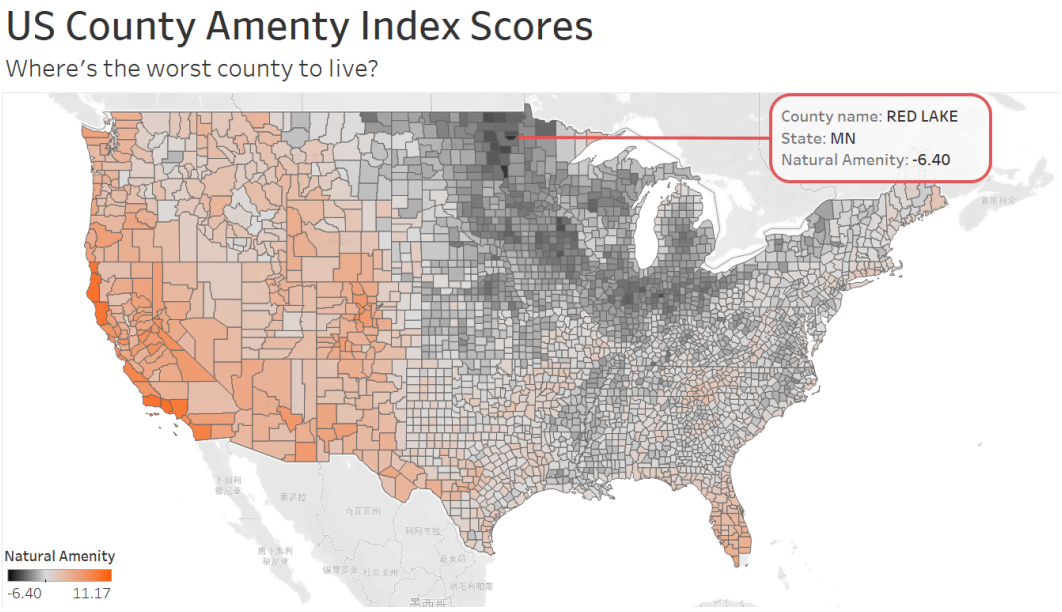


Figure 4. Final delivery for amenity index

Two more visualizations were made for this part, aiming at providing more information about the index, but they were discarded because they don't conform to the learning object. One is about ranking the counties based on the amenity index and the standardized water area. The ranking is redundant because readers already know it from the title of the article. The blue color is used to encode the standardized water area, but it delivers a more confusing result. The visualization looks like to defend other counties with more water area but less index score while and claim that Red Lake deserves the criticism due to its low water area.

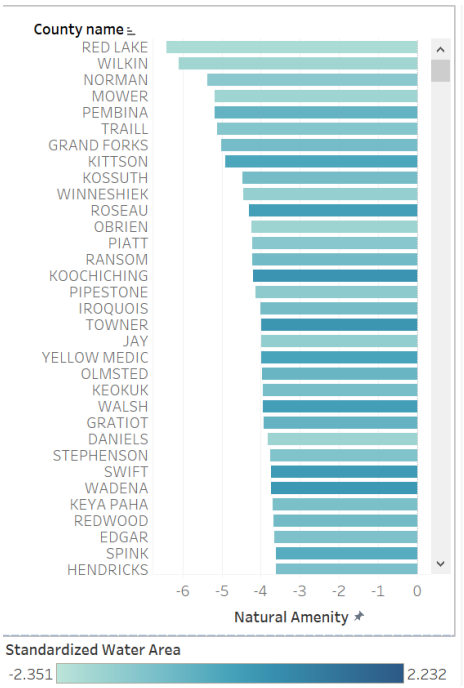


Figure 5. Natural amenity rank and a standardized water area

The other is a scatter plot showing the temperature in January and July for the counties with a nature amenity index lower than -2. This visualization is still providing redundant information about how Red Lake is based on the temperature. Besides, the size encoding is very weird, because the larger the size, the lower the score is.

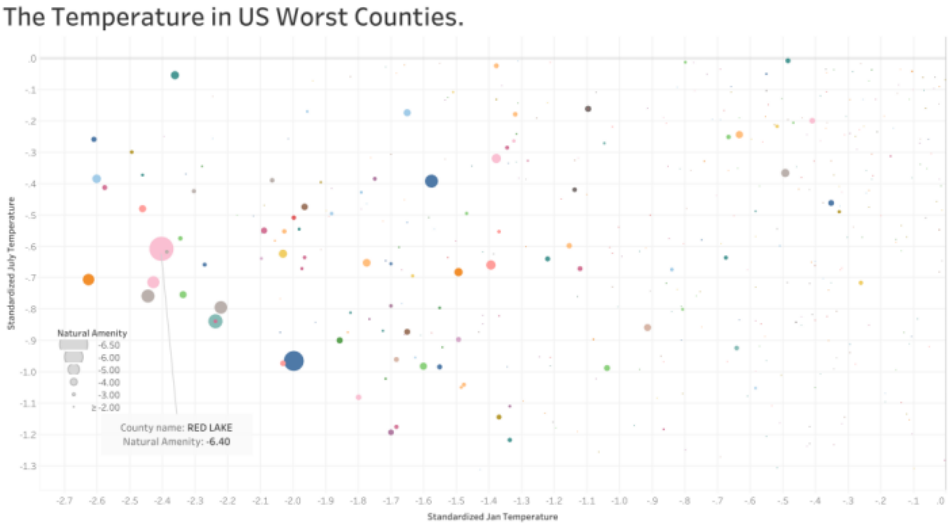


Figure 6. The temperature in US worst counties

## Part 2 – US Average Life Expectancy

I keep the idea of a map in this part because it's still about geography comparison. However, I think the state-level comparison is enough here because Red Lake is not so extreme in this life expectancy. I use blue color to encode the life expectancy because it makes the audience feel mild.

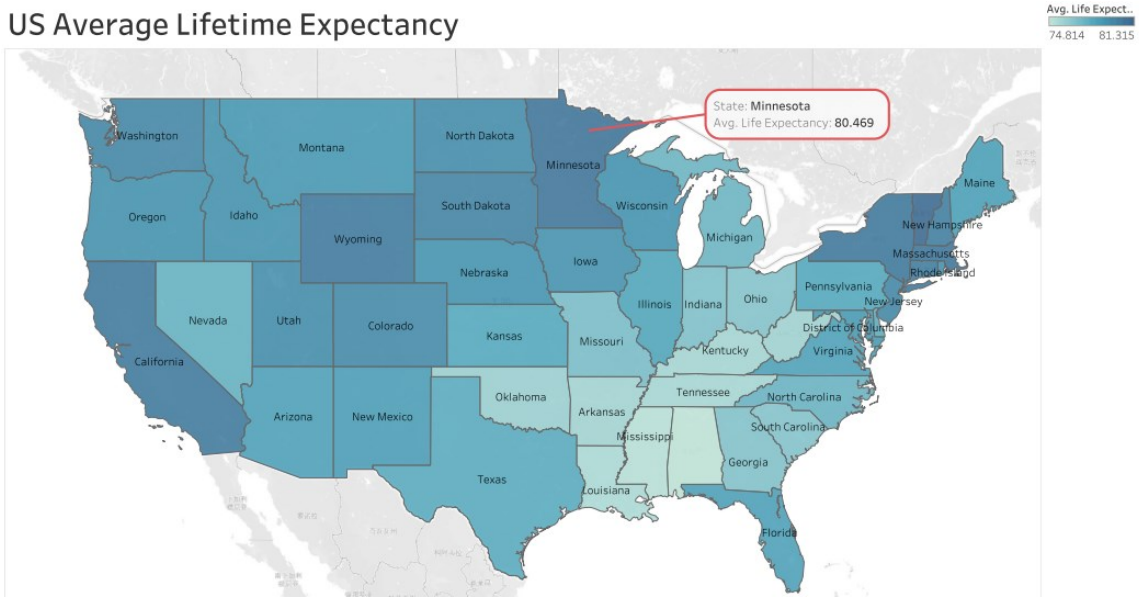


Figure 7. US Average Lifetime Expectancy

Typically, the lifetime expectancy doesn't vary much in one county, but I still made another visualization for details. It also shows the Red Lake's rank based on the lifetime expectancy. Since there are too many counties to rank and we don't care about the specific rank, I put the counties into different bins whose range is 10 based on the lifetime expectancy.

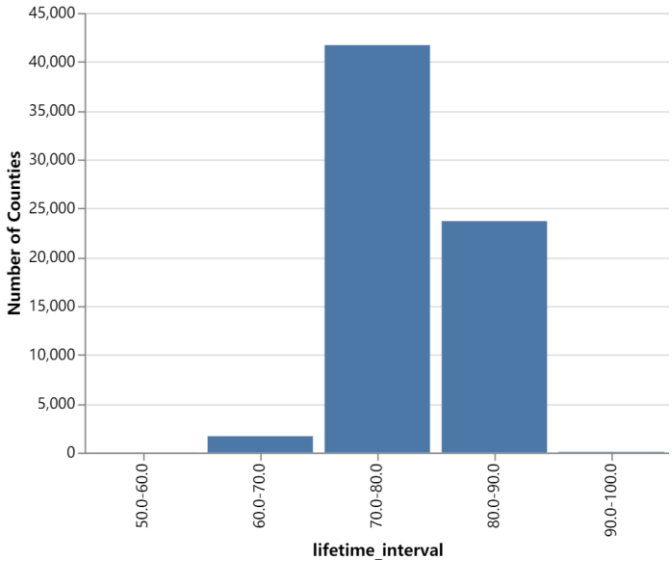


Figure 8. US lifetime interval with ranges 10

However, I think there are too few bars in this chart so that the comparison is not so meaningful. Besides, we still don't know where Red Lake is. Therefore, I split the bars and add the annotation to where the county is.

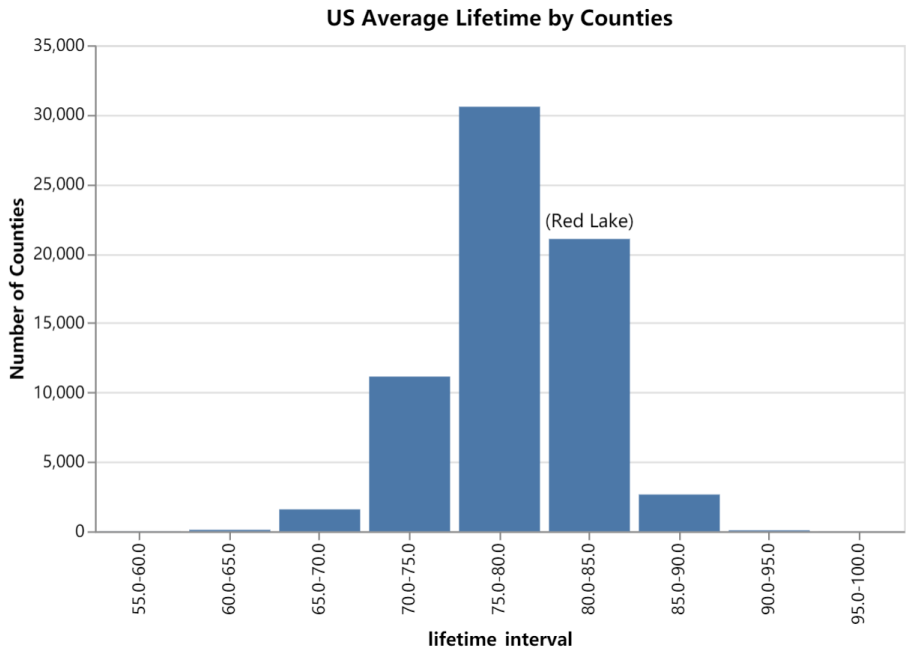


Figure 9. US Average Lifetime with range 5

To make the visualization clearer, I polished it by adding a highlight on the bin containing Red Lake and added text of each bin's size so that the audience can have a rough idea about Red Lake's ranking in the country.

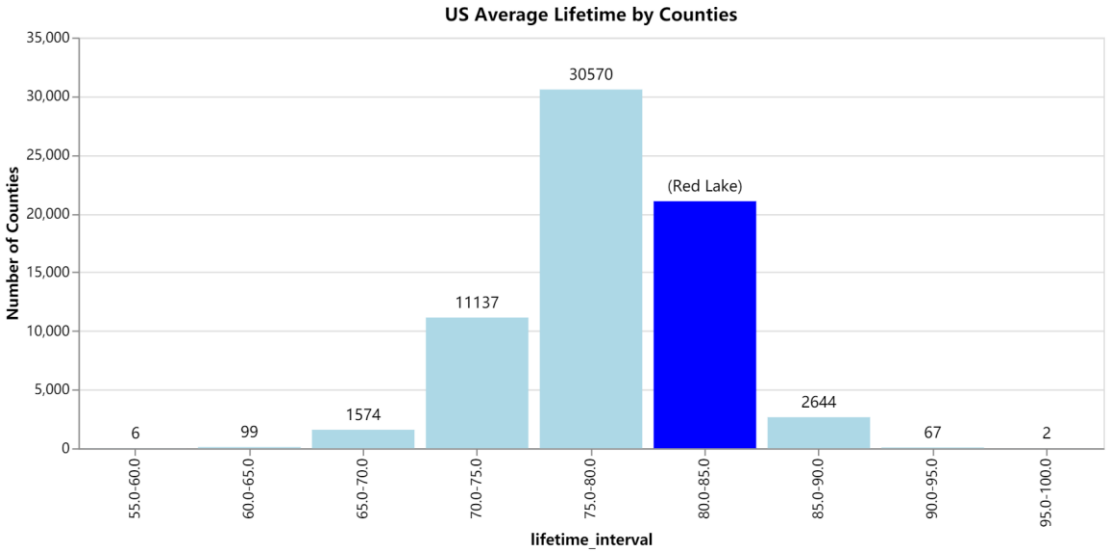


Figure 10. Final delivery of US average lifetime

# Part 3 – US County Child Income and Gini Index

To show the well-being at Red Lake from more aspects, I visualized more information about the economy. There is no doubt that the child income at this county can indicate what the future looks like there, while Gini Index is used to show the income equality in a certain area. The lower the index, the more equally wealth is distributed in the place.

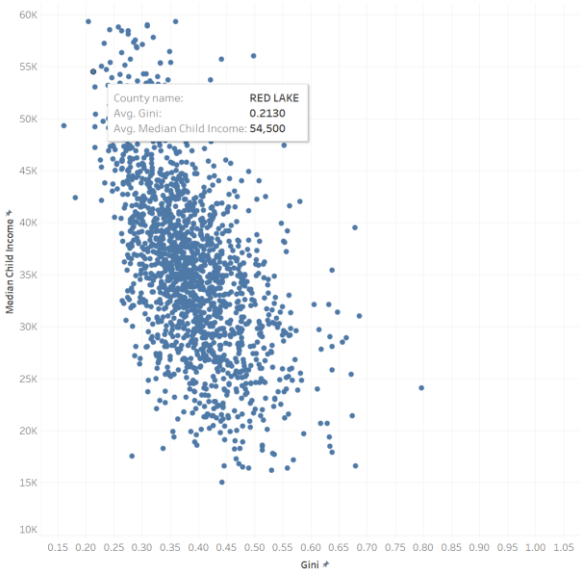


Figure 11. Median Child Income and Gini

The visualization does show that Red Lake County is doing well in the economy, but it's hard for the audience to find its mark even though there's an annotation. What's more, the chart is not symmetric because the dots are crowded to the left. To make further improvement, I change the scale of the X-axis, so that the chart looks better. I also encode the shape by the states and size by the amenity scores so it'll easier to find the Red Lake.


Figure 12. The economy chart with natural amenity

The modification to the axis works and the dots are scattering more evenly. The blue color is also very helpful for the audience to identify the county in MN. However, it's still counterintuitive to make the dot with a lower index score bigger. Therefore, I decided to put the size encoding away, and use the amenity to encode the color. The amenity index can help the audience to identify Red Lake due to its low score. Color encoding can also show the relationship between the amenity index and economy.

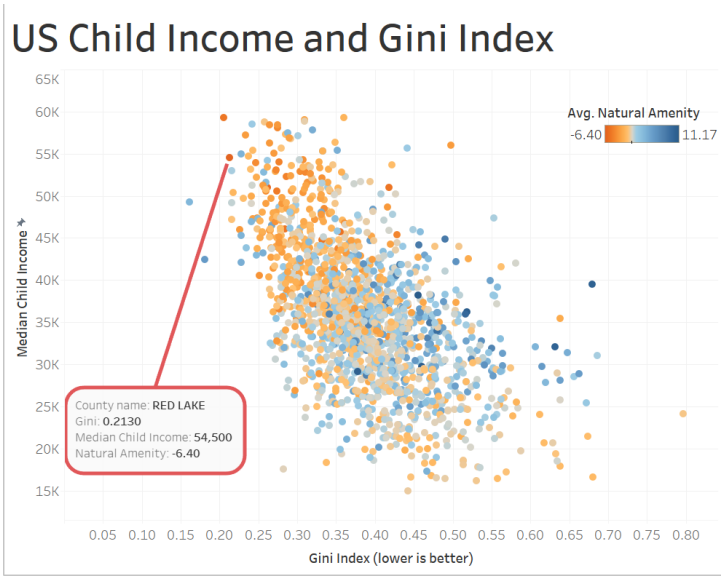


Figure 13. Final delivery of child income and Gini index

# Part 4 – US County Child Income and Gini Index

The last part is about unemployment and poverty. I can't get 2015 all county's unemployment rate, so I think of my first idea in part 1, where I want to plot a map on the state level and provide mode details about MN.

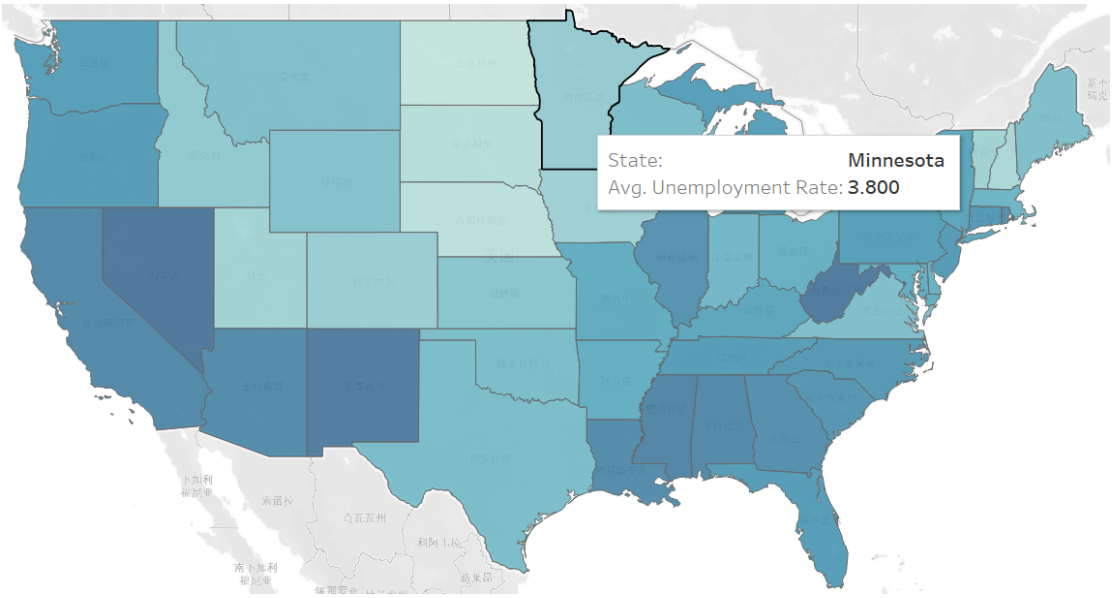


Figure 14. US unemployment rate by state

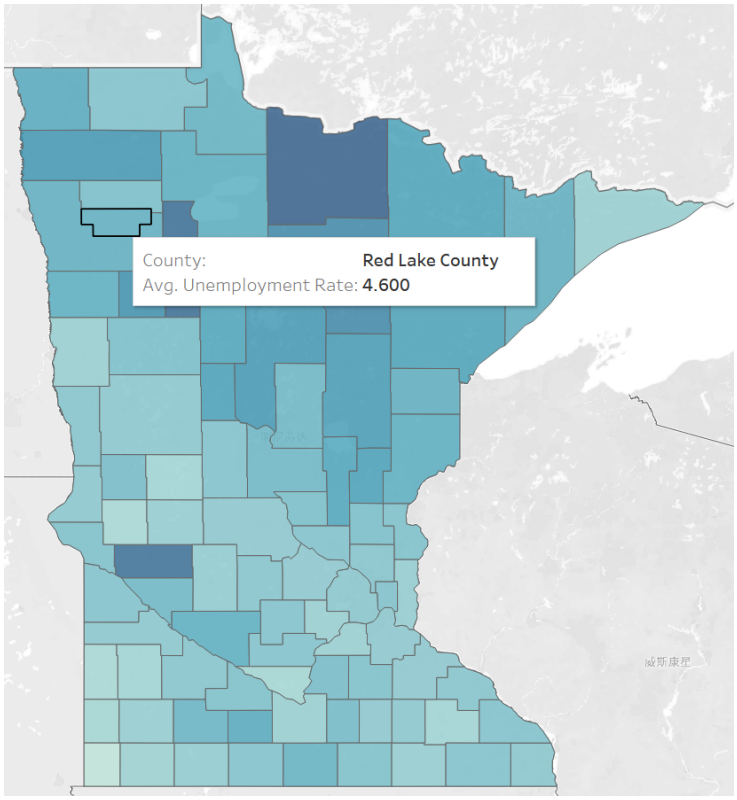


Figure 15. MN unemployment rate by county

However, it looks very crowded when there are many maps on one page and it repeats the style from the previous part. To make the visualizations cleaner, I replace the US map with the ranking of the employment rate of each state. I only choose the top 20 states because they're enough to show MN's status.

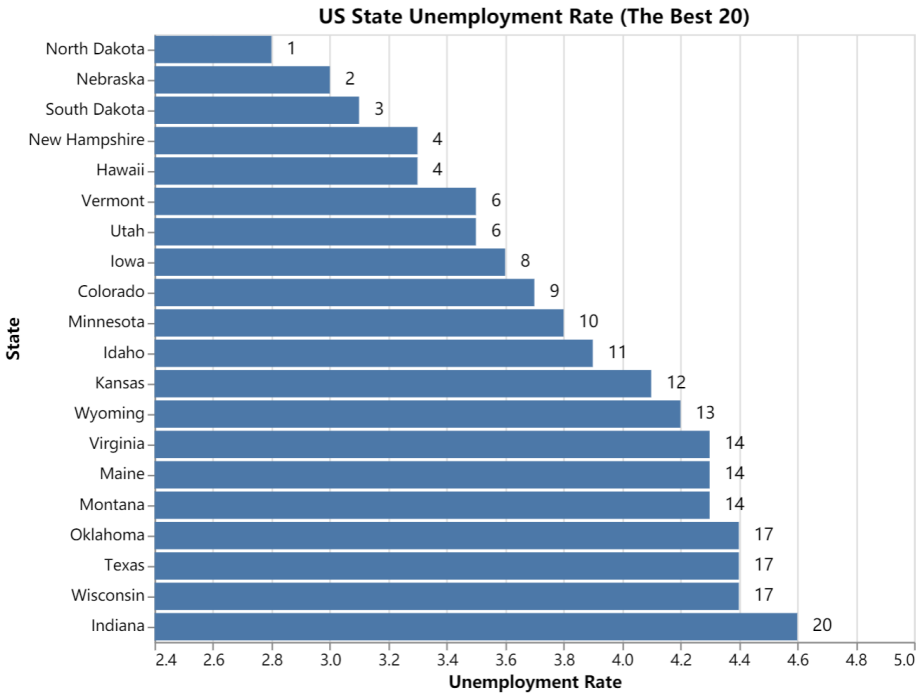


Figure 16. US employment rate ranks by state

For further improvement, it would be better to change the text from rank to the value of rate because it's easy to get the rank from the chart. What's more, highlighting the MN state by color made the visualization more reader-friendly. I also adjusted the color style of the two charts so they look more coordinated.

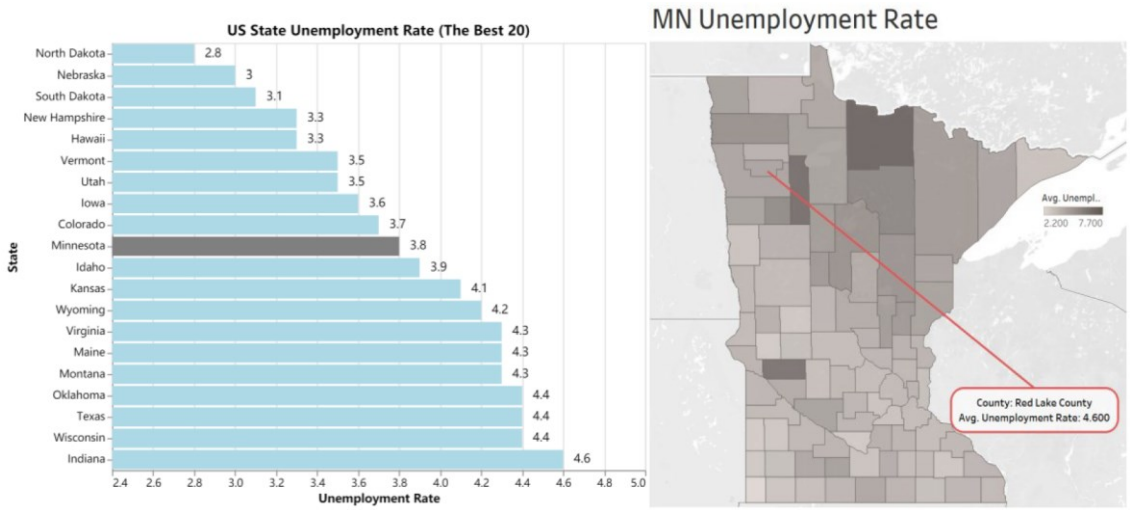


Figure 17. Unemployment Rate

To provide more details, I draw another two pictures to compare the unemployment rate and poverty between Red Lake and the average value of MN as well as the US. The two bar charts are sharing the same Y-axis. Although the two bar charts are very simple, I think they provide a solid support for Red Lake's unemployment.

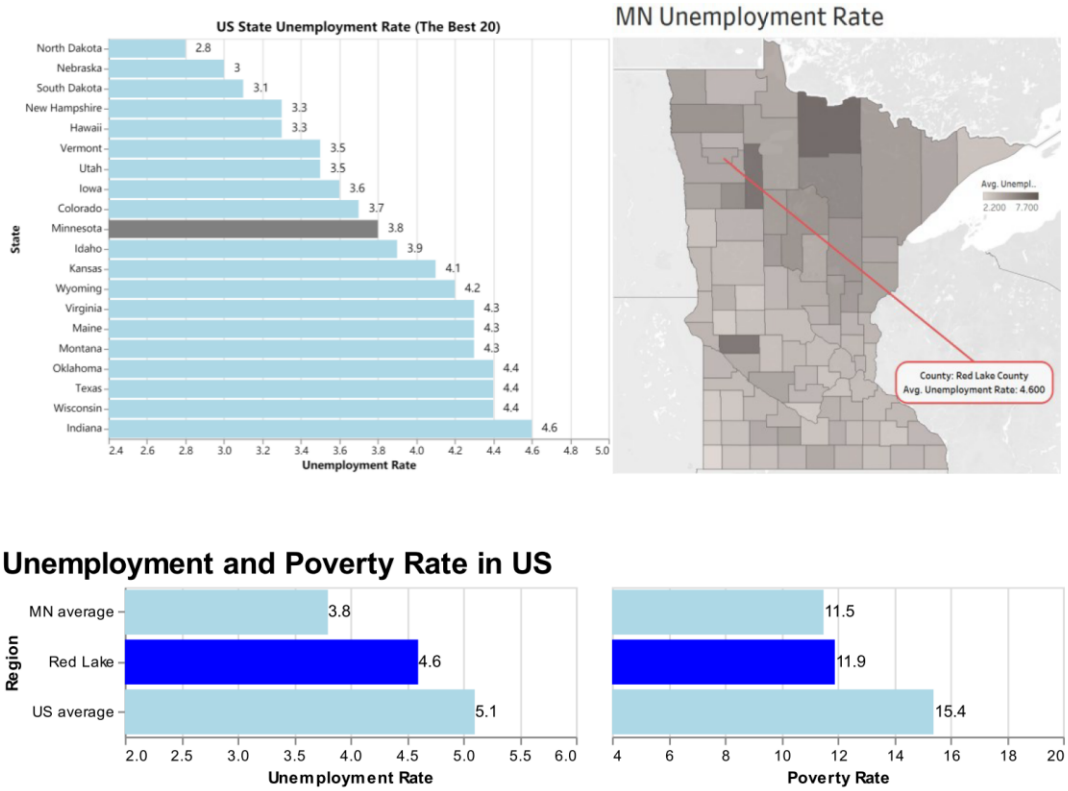


Figure 18. US unemployment rate

## Conclusion and Reflection

Generally speaking, these visualizations play an effective role in providing the audience with an overall understanding of Red Lake County as well as essential details. The learning objective is very important, because if we ignore it, we may create too much irrelevant visualization without any meaning, and the objective helps us get a sense of the big picture. Usually, the audience will only scan the article in seconds, so we'd better not add counterintuitive elements to the visualizations. However, highlighting in bars and annotations in maps are very helpful for the user to identify important information.

On the other hand, I think the style of these visualizations is a bit simple. I only made maps, bar charts and a scatter plot because based on my skills, I don't know how to make more fancy design and realize it through Altair or Tableau. That's where I need to do pay more effort and make further improvements.