

Visualizing Utilization on the SRER

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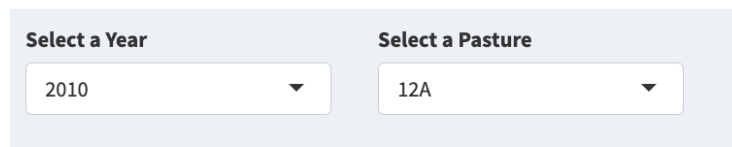
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1 Project Objective

The goal of this project is to create a data visualization tool to examine and observe the history of utilization occurring within a pasture over the pasture's history. Utilization is the the amount of plant material that has been removed by animals during the grazing period. This included the plant material consumed or lost through trampling. Examining utilization is important to understand the impact of grazing on the forage base. Effects of grazing on a single year may not affect the long term sustainability of a forage base so multiple years need to be examined to inform the need for a change to grazing management. Holechek (1998) recommends adjustments to grazing management following two consecutive years of utilization exceeding 30% of the pasture or allotment. This recommendation is valuable in starting a conversation, but ignores the larger risk associated with sustained high levels of use (overgrazing) over a longer time frame. To identify areas of sustained overgrazing between and within pastures, we propose the creation of a tool.

2 Input Variable

In this program, we have two input boxes. One to enter the year we want to select and one for the specific pasture we want to select. The range of input years we currently support is between 2010 to 2023. And the supported pastures include 12A, 12B, 12C, 12D, 12E, 15, 2N, 2S, 3, 5M, 5N, 5S, 6A, 6B, 6D, 6E.



Select a Year	Select a Pasture
2010	12A

Figure 1: Select a Year and Pasture

3 Average Pasture Use

The program is designed to analyze and visualize pasture utilization patterns over time. At its core, it allows the user to examine changes in ranch utilization based on a selected time window. The time windows range from one year to a maximum of ten years or more. By selecting a specific window, the user can use scroll bars to filter historical data on pasture utilization over time.

The visualization dynamically adjusts based on the "Select Year" variable to show how pasture utilization has changed from year to year. The graph on the left shows pasture utilization in 2010, while the graph on the right averages pasture utilization over the three-year period from 2008 to 2010. The color scale indicates the intensity of use, with different shades representing different levels of use, ranging from low (0-5%) to high (60-100%).

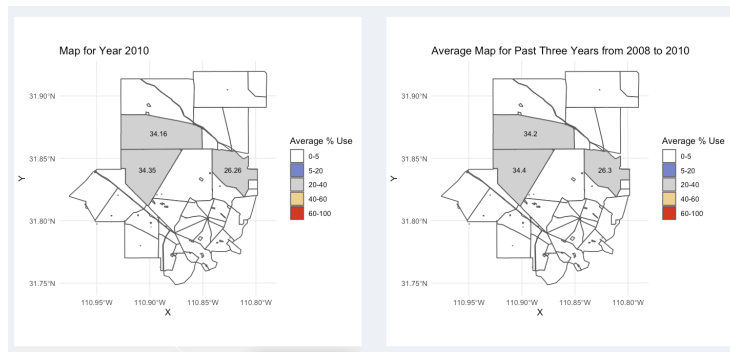


Figure 2: Example of 2010

Assuming that use is consistent across the range, the average use metrics can help us understand the typical level of activity in a given area. However, in order to better understand the risk of overgrazing, which is a key factor in rangeland management, the program could provide a more granular analysis of individual sites within the rangeland. In this way, it would be possible to identify which specific sites may be at higher risk of overgrazing and require more targeted management interventions.

4 Within Pasture Site Utilization

Within a user-defined time window, the program highlights highly utilized rangelands and provides detailed interpolated utilization maps for these areas. This enhanced data resolution allows the user to pinpoint specific locations in the pasture where overutilization may be present.

As shown, different areas of the pasture are color-coded to represent different levels of use from low to high. Users can adjust the time window after selecting a pasture to examine these areas in a more targeted manner. The map shows

the percentage use values for specific locations within pasture 12A, allowing the user to identify areas that may need attention due to higher usage.

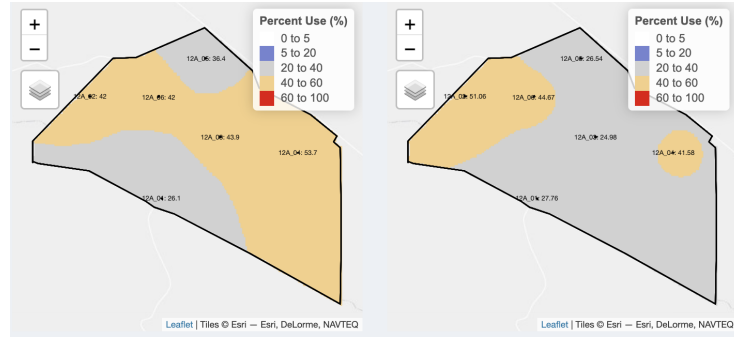


Figure 3: Example of 12A 2020

Combined with the additional description:

“In this section, the interactive visualization tool reflects the use of Ranch 12A over a selected time period. When years prior to 2012 were selected, the tool was unable to display a three-year average map, indicating that available data or program features limited the analysis to years after 2012. As a result of this limitation, the time window for examining average usage must be set within the range of available data. As a result, users wishing to understand usage patterns prior to 2012 will need to rely on annual data rather than multi-year average metrics.”