File: Stocking\_Rate\_History.xls

Stocking\_Rate\_History.xls reports the record of cattle use since 1908 across the Santa Rita Experimental Range (SRER) located south of Tucson, AZ.

The excel file includes 36 separate worksheets, 34 of those are for individual pastures, and the other 2 are summary reports for cattle use across the entire SRER and the change in the size of pastures throughout the length of the record.

Common Terms

Animal Unit (AU) is the equivalent of 1 mature cow. A bull is considered 1.5 AU. Steers are considered to be 1 AU.

Animal Unit Month (AUM) is the presence of one animal unit (AU) in a pasture for one month.

Animal Unit Year (AUY) is the presence of one animal unit (AU) present in a pasture for 12 months, which is also equivalent to 12 animal unit months (AUM).

Individual Pasture Worksheets (n=34 pasture worksheets)

Monthly values for Animal Units in Each Month from 1908-2006 (September) were transcribed from historic paper records. Values since 2006 (October) were recorded as daily values and we converted to monthly values by summing the daily values and dividing by the number of days in a month. Be aware that data is missing for some pastures and months between 1977 and 1982 and in 1988, and those missing values appear as blank cells in contrast to cells with entries of 0.0 which indicates that records exist and no grazing occurred.

Animal Units per Year (AUY) was calculated as the sum of Animal Unit Months in the year and then divided by 12 months (formulas are found in the cells).

Pasture size (hectares) changed when large pastures were split to create smaller pastures. Values for pasture size (hectares) come from Worksheet “Percent Area”, which reports the timing of size changes.

Stocking rate as ha/AUY (hectares per Animal Unit Year) or AUY/ha (Animal Unit Year per hectare) are the quotient of those variables (formulas are found in the cells).

Pasture locations and boundaries are available in the Spatial Coverage section of the Santa Rita Digital Archive (http://cals.arizona.edu/srer/data.html).

Total AUY per ha Worksheet (n=1)

This worksheet reports the stocking rate history of Animal Units per Year per hectare (AUY per ha) for all years and all pastures. The values in each cell are repeated (linked) from the AUY/ha column and year row in each worksheet for the separate pastures. These pasture values are summed in the Total AUY column and stocking rates of AUY/ha and AUY/100 acres are calculated (formulas in the cells) based on the area of the pastures included in the record. Finally a graph “Santa Rita Experimental Range AUY per 100 Acres Since 1919” reports the stocking rate AUY/100 acres beginning in 1919 when most pastures were being stocked with cattle and records were being collected. Recall, that most pastures had no livestock from 1903 through 1915 during the initial efforts to estimate forage production.

Be aware that data is missing for some pastures and months between 1977 and 1982 and in 1988, and those missing values appear as blank cells in contrast to cells with entries of 0.0 which indicates that records exist but no grazing occurred during the specified time.

Percent Area Worksheet (n=1)

This worksheet reports pasture sizes for each year of the record and thus provides a history of pastures being split into smaller pastures. Pasture locations and boundaries are available in the Spatial Coverage section of the Santa Rita Digital Archive (http://cals.arizona.edu/srer/data.html).

The history of pasture size changes is:

Pasture 1 no change;

Pasture 2 split to 2N and 2SW in 1958, and Pasture 2SW split to 2SW and pastures 21 and 22 in 1972. Pastures 2SW was split again and reconfigured with Pastures 21 and 22 to create the UA Cell (9 pastures) in 1990 (specifically, pastures 2S, UA-A, UA-B, UA-C, and UA-H, were created by splitting pasture 2SW; pasture UA-D and UA-E by splitting pasture 21; and pastures UA-F and UA-G by splitting pasture 22). Individual stocking records were not kept for each of the 9 pastures in UA Cell until 2006, and therefore stocking is reported for the entire UA Cell from 1990-2005.

Pasture 3 no change;

Pasture 4 no change;

Pasture 5 split to 5N and 5S in 1957, and pasture 5N split to create Pasture 5Mid in 2008;

Pasture 6 split to create Pastures 6A, 6B, and 6C in 1937, Pasture 6A split to create 6E in 1987, pasture 6B split to create Pasture 6D and Huerfano Trap in 1986;

Pasture 8 no change;

Pasture 9 no change;

Pasture 10 no change;

Pasture 11 acquired in 1922, split to 11A and 11B in 1942, and Pasture 11B split to create Pasture 11C in 1996;

Pasture 12 acquired from 1925-1927, split to 12A and 12B in 1937, Pasture 12A split to create Pasture 12C in 1983, Pasture 12B split to create Pasture 12D in 1987, Pasture 12B split to create Pasture 12E in 2015;

Pasture 15 acquired in 1929 and no change; and

Pasture 140 created in 1941.

Column "HA" is the sum of hectares in those pastures where records confirm the use or no use of cattle. The column titled "Total HA" is the total number of hectares of the entire Santa Rita Experimental Range (SRER), including the area for pastures listed in the spreadsheet as well as the area for additional pastures not listed (such as Huerfano Trap, Madera Trap, and Pasture 16). The numbers in these two columns both increase over time as land was acquired. The column titled "Percent of HA" divides the "HA" column by the "Total HA" column (formula in the cells) to report the percent of total SRER land area that was accounted for in this record.

Sources and Contributors:

Records for 1908-1973 were compiled by S.C. Martin and stored in large-format binders in the Santa Rita paper archive at the Campus Agricultural Center. Records for 1973-2006 are annual grazing plans found in the archive. Records since 2006 are from monthly reports submitted by cooperating rancher A. McGibbon. These numbers were transcribed and organized into the digital files by Ashley Shepherd, Amber Dalke, Kelsey Hawkes, and Mitch McClaran.

Pasture splitting history and pasture sizes) were revised in 2023 by making a few corrections to the original data and the Stocking\_Rate\_History.xls file as well as the present file were updated accordingly.

18 July 2023

Stocking\_Rate\_History\_Notes.txt