File: exclosure\_basaldiameter.xls

Exclosure\_basaldiameter.xls refers to long-term basal diameter measurements of perennial grasses on transects corresponding to selected existing livestock exclosures on the Santa Rita Experimental Range. This file includes all measures of basal diameter made on these transects since they were established in 2011 through 2023; measurements were recorded every three years. Grass mass is estimated using an allometric equation developed on the Santa Rita Experimental Range, and the value represents the mass produced at the end of the most recent summer growing season.

Measurements were made in permanent 1x100-ft. belt transects corresponding to 22 livestock exclosures. Ecological site mapping within each fenced exclosure area determined the location for the transects. For each ecological site represented within an exclosure, four transects were established: two within the exclosure and two just outside of the exclosure on the same ecological site. Only one exclosure (1A) contained more than one ecological site distinction, for a total of 6 transects on 3 different ecological sites.

Transects that are within the exclosures are labeled numerically and with the letter “U” to indicate that the vegetation along the transect has been “Ungrazed” by livestock since the exclosure was established. Transects located outside of the exclosure are labeled numerically and with the letter “G” to indicate that the vegetation along the transect has been “Grazed” by livestock. Transects for each exclosure are therefore labeled G1, G2, U1, and U2.

The basal diameter of perennial grasses was measured and recorded for all individual plants within that 100f^2 area. Taxa were recorded separately to the species level in most cases and sometimes to the genus level only. In this file, ARIS refers to all perennial Aristida spp. As for the species Bouteloua chondrosioides (BOCH), Bouteloua hirsuta (BOHI), and Bouteloua repens (BOFI), use caution in using the data due to the possible misidentification of those species at their vegetative stage. It may be wise to lump these species together for analysis.

The file provides a complete list of all individual plants by species code name and the associated basal diameter for each individual within a particular transect. Measurements are recorded to the nearest tenth of a centimeter. In all cases, measurements were made around the base of each plant as close to the soil surface as possible.

A Diameter-Tape was used to estimate basal diameter of individual plants that had a diameter greater than 3.5 cm. A digital caliper was used to estimate the basal diameter of individual plants that had a diameter less than 3.5 cm. Two perpendicular readings of the basal diameter were measured and recorded when using the digital caliper. The average of those two values is provided in the file as the basal diameter for those individuals less than 3.5 cm in diameter.

In some cases, the number of individual plants along a transect was too great to census in an efficient time frame. Therefore, plants were measured in an area 6 inches wide along the 100-ft. transect, making a 50 square foot area. These data were then doubled to represent the entire standard 100 square foot area. The file does not indicate at which transects this situation occurred.

The basal diameter data can be used to estimate grass density, percent basal cover, and biomass.

Biomass was estimated using the allometric equation developed on the Santa Rita Experimental Range by Nafus et al. 2009. Multispecies allometric models predict grass biomass in semidesert rangeland. Rangeland Ecology and Management 62:68-72. The mass-size relationship is an exponential function. That equation is biomass (g) = e(raised to the 1.441 power) x diameter (cm)(raised to the 1.253 power).

The file also indicates whether each individual plant was located under the canopy of mesquite (Prosopis velutina) in the column labeled “CANOPY COVER o/u”. If the individual was found to be under mesquite canopy, this is indicated with a “1”. If the individual was determined to be in the open or not under mesquite canopy, this is indicated in the file with a “0”.

Sources of vegetation data were the original field data sheets.

exclosure\_basaldiameter\_notes.txt

8 January 2024