File: ltbasaldiametermass.xls

ltbasaldiametermass.xls refers to long-term basal diameter measurements

of perennial grasses on selected transects established in USFS Studies

FSRM 1706-09, FSRM 1706-12, FSRM 1706-15, and FSRM 1706-25. This file includes all measures of basal diameter made on these transects since 2009. 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 in 11

pastures. The basal diameter of perennial grasses was measured and

recorded for all individual plants within that 100ft2 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., including A. glabrata formerly recorded as ARGL1 or ARGL. 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.

In 2021, no basal diameter measurements were made because the extremely dry conditions in summer 2020 resulted in very little growth of perennial grasses, and many plants were appeared to be dead in the winter and spring of 2021. Under these conditions, we could not be certain that basal diameter would represent biomass produced in the previous summer in the same manner as all the other years when measurements were made.

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

plants as close to the soil surface as possible.

A Diameter-Tape was used to estimate the 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 these 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”.

Mesquite treatments performed on transects during the USFS studies are

coded as follows: DEAD for transects on which mesquite (Prosopis

velutina) was killed in USFS Studies FSRM 1706-09 and FSRM 1706-12, and

LIVE for transects on which mesquite was left untreated. The 1994 burn

occurred in the first week of June 1994, and 23 transects were burned at

that time. The occurrence of the fire is noted in the spreadsheet column

"1994 Burn".

Grazing records for the USFS Studies and other individual study protocols

are available in the study plans for FSRM 1706-09, FSRM 1706-12, FSRM

1706-15, and FSRM 1706-25. A grazing plan summary for subsequent years is

available on the front page of the Santa Rita web site and in the long-

term record section under “Livestock Grazing History”, but note the

following clarifications:

A grazing year begins on November 1 and ends on October 31 of the

following year.

Pasture 2S from Study 1706-25 was divided into two parts after the 1984-

85 grazing year. In the table, 2S refers to the western part of the

original pasture, which contains transects 1-4. The eastern part of 2S

(called 2SE and containing transects 5-10) became part of the UA Cell in

1987-88.

The UA (HRM) Cell was formed in 1987-88 from pastures 2SE, 21, and 22;

this unit has eight cells. The cattle grazing the UA Cell are rotated

through the eight cells during each grazing year.

Pasture 2S was grazed in a Santa Rita three-pasture rotation system with

pastures 4 and 12A from 1985-86 to 2006.

Pastures 6A-6B were grazed in a Santa Rita three-pasture rotation system

with pasture 6D from 1984-85 to 2006.

Sources of grazing data were SRER stocking plans for the Santa Rita Ranch

except for 1987-88 and 1989-90. No plans were available for these two

years so grazing season is based on information from Santa Rita Ranch

personnel.

Sources of vegetation data were the original field data sheets.

ltbasaldiametermassnotes.txt

13 January 2022