

## Information on Data Collection and Organization from the SGS-LTER

This data package was produced by researchers working on the Shortgrass Steppe Long Term Ecological Research (SGS-LTER) Project. This project was supported by National Science Foundation from 1982-2014. This data package includes one or more tab-delimited data tables, tab-delimited files that denote header definitions and data types for each column, and detailed metadata within an Ecological Metadata Language document (i.e. XML). Example image files of plots, digital datasheets, or schematics of the experimental design may also be included when applicable.

Background information on the SGS-LTER project is contained in related series of objects within the Digital Collections of Colorado and the Colorado State University archives. Together data packages and other background information, and items such as images, proposals, and reports contribute to a comprehensive SGS-LTER collection.

The data tables and associated EML documents represent components of the data package and SGS-LTER collection, which may be discovered and accessed through secondary repositories serving specific ecosystem science domains (e.g. PASTA (LTER Network Repository), DataONE, or The Knowledge Network for BioComplexity).

*The following information is copied from the SGS-LTER field protocols to provide specific details on how these data were collected.*

### ARS #155 BOGR Removal Experiment (revised 4/12/0 by Nicole Kaplan)

**Principal Investigator(s):** Bill Lauenroth

**Study Objectives:** to characterize important species in the Shortgrass Steppe plant community.

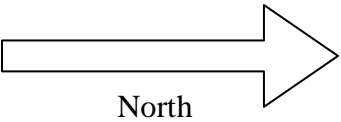
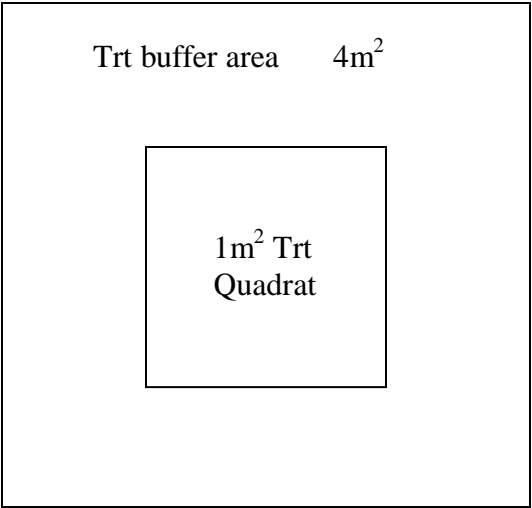
#### ***What to know before you start sampling***

- ✓ ***You are familiar with the study sites and treatment plots***
- ✓ ***You are familiar with the density and point-frame methods***
- ✓ ***You are familiar with the species codes***

**Study Area Location and Design:** 6 Grazing (Grazing and Texture, GZTX) Enclosures Sites (5a, 5b, 7, 11, 19, 24): 2 sets of treatment/control plots inside the Grazed/Ungrazed enclosure and 2 sets of treatment/control plots outside the GU enclosure. There are 8 quadrats at each GZTX site. **Control plots are not marked well (only 4 red nails, one at each corner of the plot), are located 3 meters to the north of each BOGR removal plot and should have no obvious disturbances.** BOGR removal treatment plots were disturbed in 1997 and have 4 orange nails, one at each corner of the plot. Each season the orange nails in the corners of the treatment quadrats and the red nails in the corners of the control quadrats need to be checked and replaced if missing. **Note that the nails in the treatment quadrats mark the corners of a buffer area around the actual 1m<sup>2</sup> sampling area.** (See GZTX maps provided under ARS #32.)

#### **Experimental Design:**

- 6 sites
- 2 grazing treatments per site
- 2 disturbance sub-treatments per grazing treatment
- 2 plots per sub treatment
- Plots sampled once per year, mid-season
- Individual plots are 1 m<sup>2</sup>



## Density and Cover Sampling Protocols

Equipment: BOGR REMOVAL EXPERIMENT DATA SHEET; meter squared wood or metal quadrat; Point frame apparatus; plant press for unknowns.

Methods: First, measure plant species density in the 1 m<sup>2</sup> quadrats by counting the number of individuals of each species. Sod-forming grasses such as Bogr and Buda (most likely in the control plots) should be counted as individuals when there is no connection by rhizomes or stolons present. Use your fingers to run along the base of these plants to help identify true individuals. Also, keep track of what you have and have not counted. The large frame may be divided by string in order to make it more manageable. Density of OPPO is counted as the number of live cladodes (pads). Density of bunch-grass species such as SIHY, ARLO, SPCR is the number of clumps, and for grasses such as FEOC, AGSM it's the number of tillers. Density for forbs and shrubs is the number of stems separately emerging from the surface of the ground.

Second, the Point Frame Intercept technique is repeated in four locations in each 1 m<sup>2</sup> quadrat halfway along the diagonal. This will provide a total of 40 points of contact for each quadrat. The categories to record are plant species code including BOGR and BUDA, litter (code = litt), bare ground (code = bare), and lichen (code = pach). Be very critical about what the contact really is. If the tip intercepts dead crown, record it as litter. If the tip intercepts live crown of a plant, record the species code. The accuracy of the method is determined by how carefully contacts are identified. Record only what the exact tip of the point touches at the soil surface. Ignore hits on leaves as point moves through the frame to touch what occurs at the basal level. Repeat density and point frame sampling for each control and treatment plot, inside and outside the GU enclosure.

Other details: Unknowns should be labeled as forb, grass or shrub with the codes UNFB, UNGR, or UNSH.

### Field Procedures for digital photography:

Equipment: Digital camera, white or metal 1m<sup>2</sup> frame, digital camera log book, SGS-LTER flash card for that year's data.

Method: Place the 1m<sup>2</sup> frame over the quadrat. Stand directly over the plot to gain a bird's eye view of the plot. Run your finger along the edge of the frame and pull vegetation in that is rooted within the frame and out that is rooted outside of the frame. Pictures should be captured at a 640 x 480 resolution. Review the picture on the screen to be sure that the image was captured and that is not a shadow cast over the quadrat. Keep track of the image # and plot label in the digital camera on the data sheet on which you have recorded the vegetation data from that quadrat. It is very important to keep this record it is the only way to identify this image as this quadrat!!!!

**Archiving Images:**

The images will be stored on the SGS-LTER field season memory cards each year. Label each memory card with the date and Number Card of Total Number of Cards. When you fill a memory card, remove it from the camera and return it to the black cabinet. Insert a fresh memory card and label it correctly. Remove the batteries from the camera and put them in the charger overnight. The images will be downloaded from the memory card and archived by the data manager.

**QAQC Instructions:**

There are a few sampling procedures that must be followed in order to assure consistency through years, and to make certain that all quadrats have been sampled. These are permanent quadrats. It does matter how they are coded on the data sheet (i.e east or west, treatment or control, inside or outside) and **must** be labeled the same each year. When all four quadrats on either side of the fence are sampled you need to review the datasheet to ensure that they were coded correctly and the image number was recorded from the digital camera. Check to see that you have an east and west treatment and control from that side of fence on which you are working and all 40 hit records have been filled in clearly. CAN OTHER PEOPLE UNDERSTAND YOUR WRITING ??? Then you may move onto the next quadrats for sampling.