

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 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 LTER data package, 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 #143 Cross Site Study – Aboveground Biomass

Principal Investigator(s): William Lauenroth

Study Objectives: To determine the important variables, which may control productivity, both in the SGS of the LTER and the taller prairie of Hayes, Kansas.

What to know before you start sampling

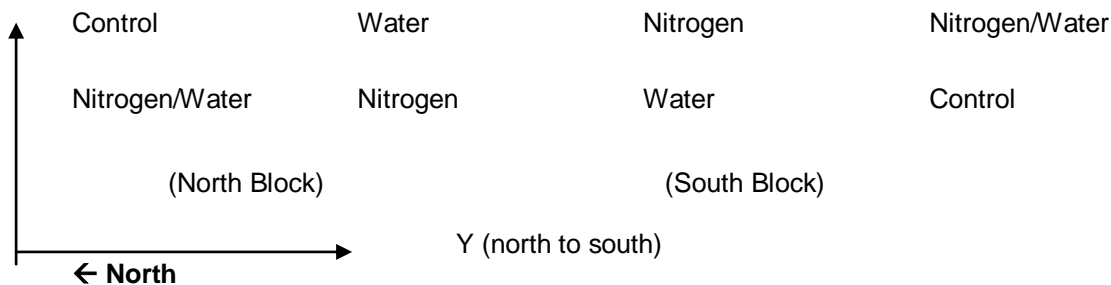
- ✓ ***Density and cover is collected in even years and aboveground biomass is harvest by clipping in odd years – know what kind of sampling you are performing this year?.***
- ✓ ***You are familiar with the experimental design and coordinate system***
- ✓ ***You are familiar with the species codes***
- ✓ ***You are familiar with Daubenmire's method for measuring density and basal cover of vegetation***
- ✓ ***Do not sample anything from inside the heating cones!!!!!!!***
- ✓ ***Be careful of wires and pipes running through the blocks.***

Study Area Locations: This experiment exists just east of the SGS-LTER headquarters building. This diagram is oriented as if you were looking at the blocks with your back towards the office buildings.

Experimental Design for Composition, Density and Cover:

- 2 blocks (north and south)
- 4 treatments in each block
- 50 plots per treatment
- Plots are sampled every other year, mid-season
- Individual plots are 10 m²

X (east to west)



Density and Basal Cover Protocol: Fifty random coordinates (x,y) between 0 and 30 meters are provided on a check-off sheet (see following pages). Lay out the measuring tapes along the x and y axis and pace off to each random coordinate and place a flag there, with the coordinates written on it. Place pins flags for all fifty random quadrats. The same set of fifty coordinates may be used for all treatment areas.

Place the Daubenmire .10 m² frame over the flag, with the legs up, if any. Go around the edge and determine what is rooted inside and out of the quadrat. The plants being measured must be rooted inside, regardless of the canopy cover.

Estimate the Basal vegetation cover using Daubenmire cover classes and count the number of individuals of each species are counted. Unknowns should be labeled as forb, grass or shrub with the codes UNFB, UNGR, or UNSH. If an unknown is encountered several times it should be given a number or name, and identified at a later date, **and the data sheets recoded with the correct four-letter species code.**

For basal cover, the code for bare ground is BARE, litter is LITT, and lichen is LICH. Scat, including rabbit, pronghorn, and cow should be considered as part of the litter cover. Record the Daubenmire code for the appropriate cover class. Please double-check that your percent basal cover does not exceed 100%. Of course, you will need to take into consideration whether a species is at the low end or the high end of the cover class.

Density of BOGR, BUDA, BARE, and LITT are not recorded (they are estimated in the basal cover reading.) Density if OPPO is counted as the number of live cladodes (pads). Density of bunchgrass species, such as SIHY, ARLO, SPCR, and STCO is the number of clumps, and for grasses such as AGSM, it's the number of tillers. Density of forbs and shrubs is the number of stems separately emerging from the surface of the ground.

REMEMBER look for CAHE. We identify only one Astragalus/Oxytropus to species—the vine like one is ASGR (with thinner leaves and small purple flowers). All others are lumped under the code ASOX. The two Orabanche species are coded OROB.

QAQC Instructions:

CAN OTHER PEOPLE UNDERSTAND YOUR WRITING ???

IMPORTANT – Use the check-off sheets provided. When starting a treatment plot, one person will be in charge of checking off quadrats on master check-off sheet as the flags are inserted in the ground. As each team collects data from a quadrat they must pull the flag to be re-used in the next treatment plot. When data have been collected from all quadrats in a treatment plot, each team of data collectors will call the coordinates and numbers of the quadrats from where they have collected data to the person with the check-off sheet. The person with the check-off sheet and the team member will double check the plot number and coordinates. The team member will make sure that this information is complete and correct on the data sheet. The person with the check-off sheet will double check that data have been collected from each and every quadrat. All sheets will be given to the call-check person, who

will be the last to leave the treatment area. Again, the call-check person must verify that all plots that are listed on the master check-off sheet are on the data sheets. This entails more than just counting the number of plots – are there two labeled the same?

ARS #143 Cross Site Study – Density and Cover

Principal Investigator(s): William Lauenroth

Study Objectives: To determine the important variables, which may control productivity, both in the SGS of the LTER and the taller prairie of Hayes, Kansas.

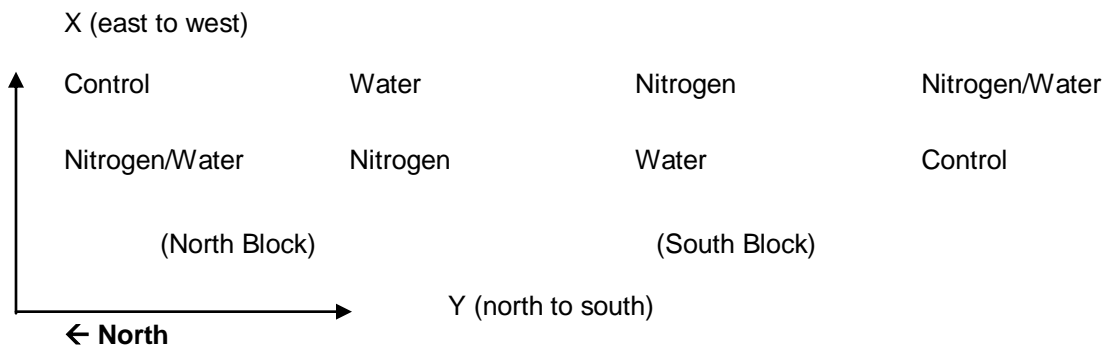
What to know before you start sampling

- ✓ **Density and cover is collected in even years and aboveground biomass is harvest by clipping in odd years – know what kind of sampling you are performing this year?.**
- ✓ **You are familiar with the experimental design and coordinate system**
- ✓ **You are familiar with the species codes**
- ✓ **You are familiar with Daubenmire's method for measuring density and basal cover of vegetation**
- ✓ **Do not sample anything from inside the heating cones!!!!!!!**
- ✓ **Be careful of wires and pipes running through the blocks.**

Study Area Locations: This experiment exists just east of the SGS-LTER headquarters building. This diagram is oriented as if you were looking at the blocks with your back towards the office buildings.

Experimental Design for Clipping:

- 2 blocks (north and south)
- 4 treatments in each block
- 10 plots per treatment
- Plots are sampled every other year, mid-season
- Individual plots are 1/4 m²



Ten random plots are clipped from within each block. Random numbers between 1 and 25 should be generated to establish plot coordinates x and y.

Clip at crown-level, except for shrubs. Only current year growth of shrubs are clipped that is green and has leaves, and which grows from an older, woodier branch. All live and recent dead material needs to be harvested from the plot – check your plot before moving to the next one. You can brush the old-dead material away from the clipped material with your fingers. Collect old dead and litter separately combined for all species and put it in a sample bag together (the gray colored material).

Plots are clipped by ARS Functional Groups. It is usually easier to first clip species other than BOGR and BUDA. There are three cactus species on the site. Only current year growth of OPPO is clipped – these are the small pads. The two “barrel” cactus are not clipped (ECVI and

COVI). There are only some times when combining of species may be done. You must follow these rules when combining species.

Labeling for cross site aboveground biomass samples:

Study	X-Site
Date	(day, month, year)
Block Location	N=North, S=South
Block Treatment	C=control, W=water, N=Nitrogen, N+W=Water & Nitrogen
Plot (x, y coordinates)	P # (x,y)
ARS Functional 4 letter code	BOBU, WSPG, CSPG, CSAG, FORB, and SS.
	<u>Label the bag that contains the litter with LITT.</u>

Place all envelopes or small bags from each plot into the largest sample bag from that plot. Note all small mammal, ant and any other disturbances on the largest sample bag from that plot. This is usually, but not always, the BOBU bag. If there happens to be one or more large bags from one plot, keep track of them by labeling the bags “1 of 3, 2 of 3, 3 of 3”. Make sure that your writing is clear and legible and that the bags are labeled using a sharpie permanent marker.

IMPORTANT When you are finished collecting samples at each location, gather all bags together and sort them out by block. Then check that all plots are there for each block, and they are labeled correctly. Check to see that all envelopes and small bags within the larger sample bags labeled with the correct location, transect-plot numbers, and species codes?

IMPORTANT Place the bags in the drying oven at a temperature of 55 C – not more and not less. Arrange bags by site or location in the oven. Be careful not to rip bags on the metal shelves of the drying oven.

IMPORTANT Organize the samples bags by project and then location and then put them in a larger bag to be transported to the SGS-LTER Sample Prep Lab. Double check that all of the blocks and plots sampled from one location are being transported to the SGS-LTER Sample Prep Lab together. Label the larger bags with the year the samples were collected, the name of the project, and the plot numbers and blocks from which the samples were collected. Make sure that the larger bags are tied down in the back of the pick-up truck when they are being transported to CSU campus. Keep an inventory of what bags have been brought to campus and what bags remain in the drying oven.