

Vegetation Monitoring Procedure for the Southern Plains Grassland Protocol

Standard Operating Procedure (SOP) #15: Canopy Closure

Version 1.0 (May 2024)

Revision History Log:

Prev. Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #

This Standard Operating Procedure gives step-by-step instructions for sampling overstory canopy closure with a spherical concave densiometer. Canopy closure is the proportion of the sky obscured by vegetation when viewed from a single point. It is measured at three locations along the 50m transect. Canopy measurements should not occur until the crew has set up and photographed the transect line and completed the Line-Point Intercept procedure (see SOP #6). Procedures are done in this order to avoid trampling vegetation along the transect before it is monitored.

Preparation for Data Collection

1. If using paper data sheets, be sure to record the park, plot name, date, and recorder/observer at the top of all pages.
2. If using a field laptop, confirm that the Grasslands Database is open to the appropriate plot. Open the densiometer tab.

Data Collection

1. Canopy closure measurements are collected at the 10-m, 25-m, and 40-m mark on the transect line.
2. Hold the densiometer 12” in front of you at elbow height with your elbows steadied against your torso. Level the densiometer using the bubble level. Position your body so that your forehead is visible at the top of the mirror as you make the reading (Figure 1). Count the number of point intersections covered by live or dead vegetation above the V (maximum is 17).
3. Four measurements are made, in each of the cardinal directions (N, S, E, W). Keep the densiometer in the same place as you rotate it and yourself for each reading.
4. Record the location along the transect and each of the four measurements into the database or a paper datasheet (Figure 2). If using paper data sheets, the data will either need to be entered into the database while at the plot or at the end of the same day. If entered after leaving the plot, a second technician must perform a 100% check. Do not discard paper data sheets – they will need to be scanned (see SOP #13 – Daily Data Management).

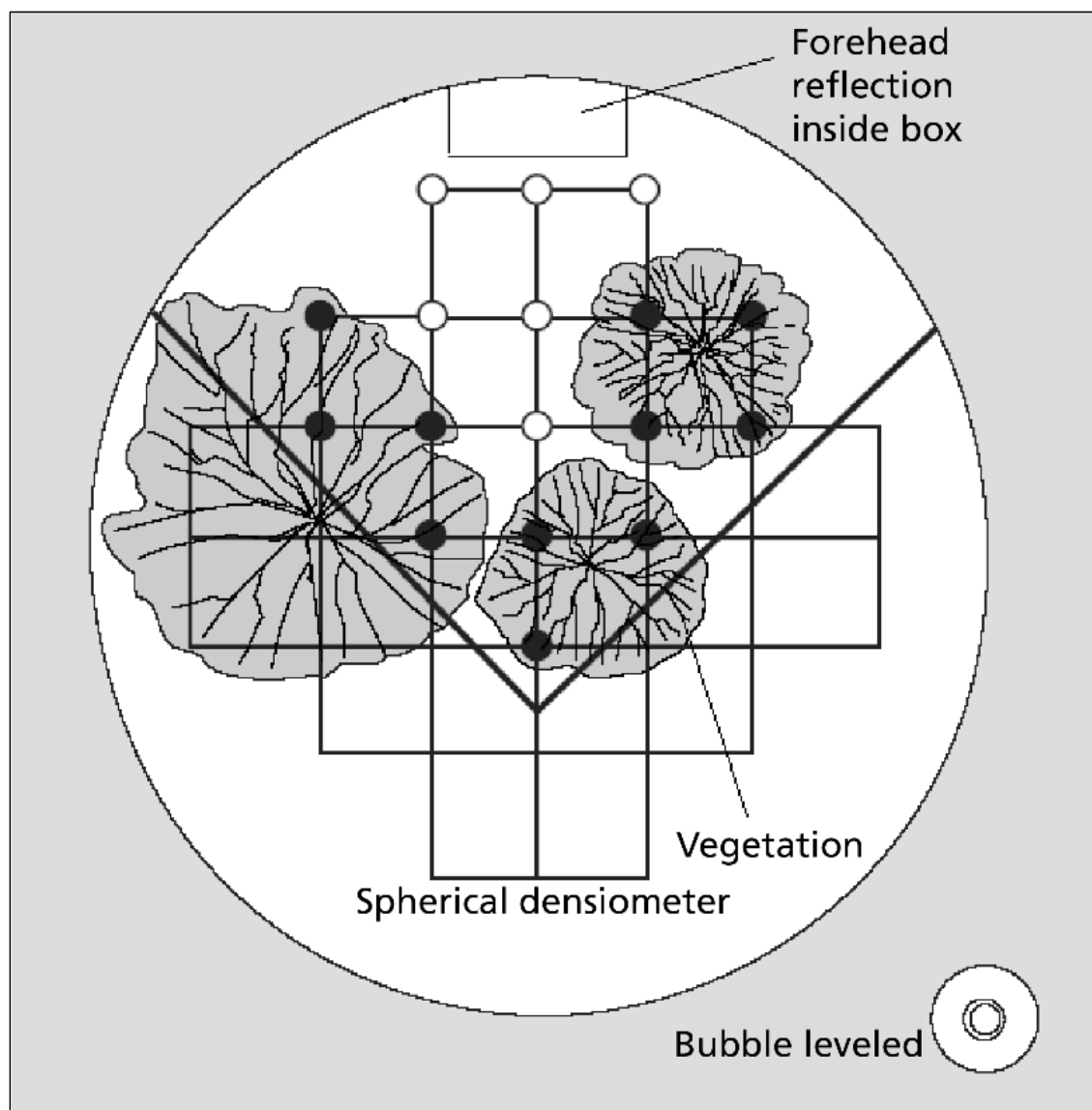


Figure 1. A modified concave spherical densiometer. Note the bubble level, the right angle marking the area sampled, and the 17 points of intersection. Closed circles represent line intersections where vegetation is present and consequently counted in measurement of canopy closure (example shows 11 out of 17 points). Source: Fitzpatrick, F.A., I.R. Waite, P.J. D'Arconte, M.R. Meador, M.A. Maupin, and M.E. Gurtz. 1998. Revised methods for characterizing stream habitat in the National Water-Quality Assessment Program: U.S. Geological Survey Open-File Report 98-4052.

Point Line						
Densiometer						
Circular Quadrats						
Shrub Density						
Field Notes						
Quad - Veg Plots						
Quad - Surface Cover						
Tape (m)	North	East	South	West	Notes (double click to zoom)	
10	12	17	0	10		Delete
25						Delete
						Delete

Figure 2. Densiometer Tab in the Data Entry Form, showing the tape location (m) and the four cardinal directions. NPS figure

QA/QC and Database Backup

Once data collection is finished, the crew lead (or lead technician) is responsible for ensuring that all QA/QC checks are completed, and, if using the database, that a pdf of the field data (field datasheet) is printed and a backup of the database is made before leaving the plot.

1. Confirm that 4 measurements were made at each location on the transect line.
2. If using the database, print a field datasheet and save the file to the appropriate park folder. For example, LAMR field datasheets will be saved to the C:\Grasslands\Data\Raw_Datasheets\LAMR folder. Use the following nomenclature: "PARKlast 2 digits of year + Transect name + Date printed". If edits are made to the plot data later in the day, a new field datasheet must be printed. Do not overwrite previous datasheets – add a lowercase letter to the end of the file name.
3. Exit the database and save a backup. File path for backups: C:\Grasslands\Data\Backups, then save into the appropriate park folder.