MONITORING RANGELAND BROWSE VEGETATION

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Rangeland vegetation monitoring is a useful tool to detect changes in plant communities induced by management practices and/or natural processes. Information obtained through vegetation monitoring can be used to determine if management goals are being met and to adjust management practices if needed.

There are many attributes of plant communities that may be monitored, but not all of these are useful to interpret or feasible to measure. The appropriateness of a particular attribute depends upon the vegetation type (e.g. shrubs or grasses) and the management goals for which the data will be interpreted.

Some of the important measurable attributes of shrub communities are:

1. *density* - the number of individual plants per unit area.

2. *cover* - an expression of the soil surface which is overhung (covered) by either the plant crown and shoot (canopy) or encountered by basal stems (basal cover).

3. *age and form class* - age classes consisting of seedling, young, sprout, mature and decadent (25% or greater dead wood) and the degree of hedging (form class) describing the availability of the shrub to browsing animals and the degree of hedging the plant has received.

There are a variety of other plant attributes such as height, stem diameter, leader length, and biomass, but for shrub dominated rangeland, density, canopy cover and age and form class are those which can be measured and interpreted for analysis for resource managers. Belt transects are used to determine density and age and form class, and line-intercept data are collected to estimate canopy cover.

Belt transects are merely two-dimensional, very long rectangular plots. The line-intercept method is based on the principle of reducing the belt-transect with dimensions of length and width to a line with only one dimension; length.

DENSITY & AGE AND FORM CLASS

Determining plant density is accomplished by counting the number of individuals in a known area. Density counts should be kept by species, and by age and form class within species. The age classes give a representation of the diversity present in the shrub community and the form classes represent the amount of use the shrubs are receiving. The age and form class designations are:

Age Classes

S - seedling
Y - young
Sp - sprout
M - mature
D - decadent

Form Classes

1 - All available, little/no hedging
2 - All available, moderately hedged
3 - All available, closely hedged
4 - Largely available, little/no hedging
5 - Largely available, moderately hedged
6 - Largely available, closely hedged
7 - Mostly unavailable
8 - Unavailable

These data can be collected, for example, by establishing a 100 foot transect and recording the plants present (species, age and form class) along a belt 6 feet on either side of the 100 foot tape (12 foot width total). The results can easily be converted to plants per acre on either a species, age and form class, or age and form class within species basis. The length of the transect and width of belt will vary depending upon the shrub community to be measured. Where shrubs are numerous, smaller transects and belts may be used whereas sparse shrub communities will require larger sampling units. As a general rule, 20 to 30 individual shrubs of the target species should be contained within the belt transect.

PLANT COVER

Usually cover is defined as the vertical projection of the crown or shoot area of a plant to the ground surface expressed as a fraction or a percent of a reference area (canopy cover). Cover may also apply to the basal area in relation to ground surface (basal cover). The basal area is the area outline of a plant near the soil surface.

Cover as a measure of plant distribution is often considered as being of greater ecological significance than density, largely because cover gives a better measure of plant biomass than does the numbers of individuals. Also very important is the relationship of plant cover to the potential for soil erosion.

A fast and efficient way to estimate shrub canopy cover over large areas of rangeland is with the line-intercept method. As mentioned earlier, the line-intercept method is based on the belt transect, a long, rectangular quadrat, which has two dimensions and reducing it to one dimension; length. This line consists of a tape laid out on the ground on the center of the belt transect and the plant crowns that overlap or intercept the line are recorded by species. The beginning and end of where the canopy overhangs the tape is recorded and later converted to percent cover. Where plant canopy gaps occur within individual shrubs, rounding out canopy edges and filling in interval gaps is recommended (Figure 1). The line-intercept is most useful where cover assessment of a large area is required.

These methods may be modified based on attributes of specific plant communities and objectives for the analysis. But for general estimates of shrub numbers and cover some form of belt and line intercept transects are efficient and reliable sampling methods.

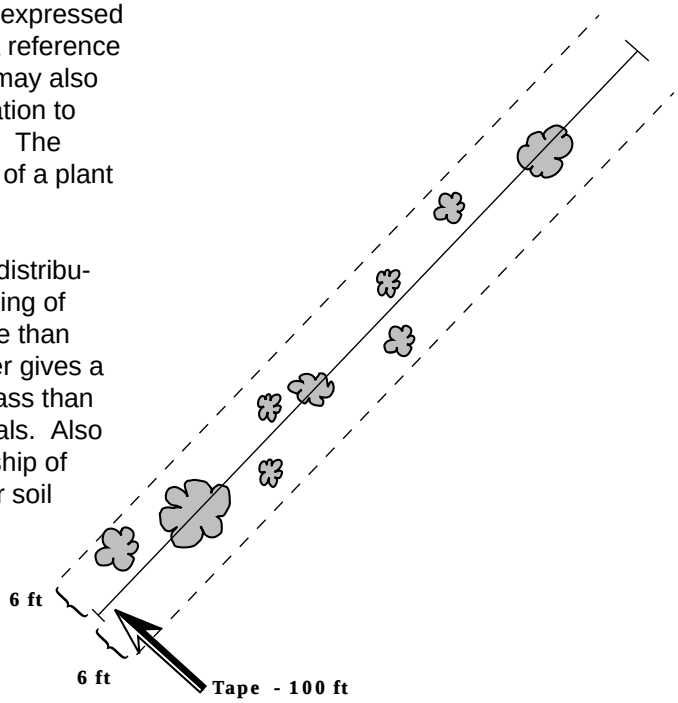

Figure 1. Where gaps occur within plant canopies along the tape, visual projections of edges and gaps are required.

THE BASIC PROCEDURES

1. Select monitoring location.
2. Establish rain gauge.
3. Establish transect end points with permanent stakes.
4. Establish photo point (take picture)
5. To read transect:

   a. record positions along tape where shrub canopies intercept line.

   b. walk along tape holding a 12 ft pole horizontally to transect so 6 ft project on each side of line. Count and record the number of shrubs in each species of interest in one of the age and form classes. The length of pole may be variable, depending on the shrub community to be measured. Sampling poles can be made of PVC segments to fit together into various lengths.

EQUIPMENT

1. 100 ft or 30 m tape (longer if vegetation is very sparse)
2. stakes for transect end points
3. springs for each end of tape (optional)
4. photo ID placard
5. metal fence post
6. PVC pipe, capped to serve as rain gauge (add inch or so of oil to limit evaporation)
7. 12 ft pole (or other chosen length)
8. data forms (example in figure 3).

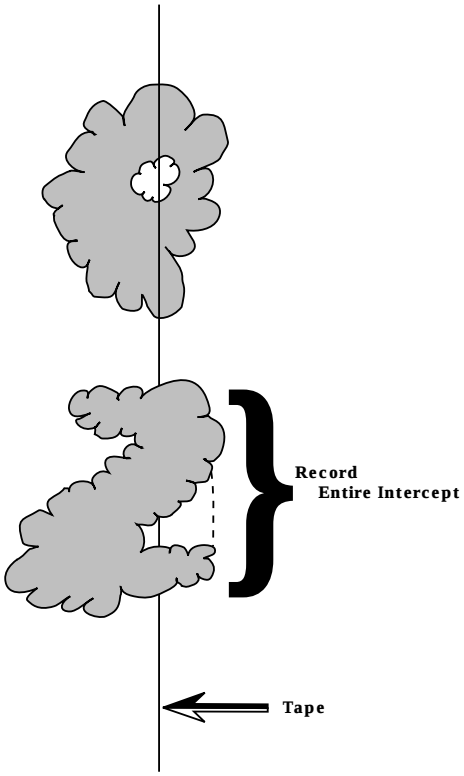

Figure 2. Diagram of line-intercept and belt transect indicating shrub cover and density. Dotted line represents imaginary boundaries created by moving pole down center line.

Figure 3. Example of a data form used to record density, cover and growth form data.

Line Intercept Transect

Location:									**Transect No.** **Length:**		**Examiner**	**Date**		
Species			**Species**			**Species**			**Species**			**Species**		
Actual Intercept	Total Inches	Age & Form Class	Actual Intercept	Total Inches	Age & Form Class	Actual Intercept	Total Inches	Age & For Class	Actual Intercept	Total Inches	Age & Form Class	Actual Intercept	Total Inches	Age & Form Class
Total														

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