

Guidelines for Describing Grazing Management and Utilization when Conducting Botanical Surveys

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Grazing animals affect plants in several interrelated ways. In addition to defoliating and trampling plants, grazing animals affect the surrounding soil by other mechanical means, such as breaking the soil surface and transferring seed, and by removing and redistributing nutrients through excreta. The effects of grazing on a specific plant species or individual plants depend not only on the plant's palatability, the availability of alternative plants, and site characteristics, but also on grazing management. Grazing management factors, including season of grazing, grazing pressure, length of grazing period, and species and class of grazing animal, can affect plants. Collecting data in a botanical survey to help identify the effects of grazing management on plant communities is essential for evaluating grazing impacts, determining management considerations, and developing conservation plans.

Resource professionals must often survey specific plant populations to collect data for the Endangered Species Act, for mitigation and conservation plans, or for other natural resource research. In a grazed ecosystem, the resource professional should describe grazing management and utilization in addition to collecting data on the targeted survey plant population(s). This publication outlines the data needed to describe grazing management and utilization. Steps 1 and 6 should be completed and/or reviewed every time the plant population is surveyed. Step 7, estimating residual dry matter, should be done at the end of the grazing and growing season.

DESCRIBING GRAZING MANAGEMENT: STEPS 1-4

Step 1. Size of Grazing Unit (Form 1)

Determine the size of the grazing unit in which the surveyed plant population is located. A grazing unit is typically defined by fencelines or other physical barriers.

Step 2. Season of Grazing (Form 1)

Record the dates that grazing unit was grazed. If the number, species, or class of grazing animals varied during the grazing season, record grazing dates for each variation. It will also be helpful to indicate the amount and dates if supplemental forage or feed (hay, liquid, blocks) was fed.

Step 3. Animal Units in the Grazing Unit (Form 1)

Multiply the number of individuals for each species and class in the grazing unit by the corresponding animal unit equivalent (AUE) (table 1) to determine the animal units (AU) by species and class. Total the AUE for each grazing period.

Step 4. Grazing Pressure (Form 1)

Calculate the grazing pressure for each grazing period. The grazing pressure is animal demand per unit area during the grazing time period.

Form 1. Season of grazing and animal unit equivalents (AUE).

Grazing unit location: _____							Acres: _____		
Grazing period		Grazing animals					Supplement		Grazing pressure (AU/acres)
Date on	Date off	Species	Class	Number (head) A	AUE value (table 1) B	Total AU (A×B)	Type	Amount	

Example: Field A, 800 acres, was grazed by 42 fall-calving cows/calves from November 1 to May 1. From November 1 to February 1 the cows were fed 10 pounds/head/day of alfalfa hay. From February 15 to May 1, 20 weaned lambs grazed with the cows/calves. Trace mineral salt was available for the cows and sheep throughout the grazing season. Form 1 would be completed as follows:

Grazing unit location: Field A

Acres: 800

Grazing period		Grazing animals					Supplement		Grazing pressure (AU/acres)
Date on	Date off	Species	Class	Number (head) A	AUE value (table 1) B	Total AU (A×B)	Type	Amount	
Nov. 1	Feb. 1	cattle	cows/calves	42	1.0	42.0	alfalfa hay mineral	10 lb/hd/day free choice	.053
Feb. 1	Feb. 15	cattle	cows/calves	42	1.0	42.0	mineral	free choice	.053
Feb. 15	May 1	cattle sheep	cows/calves weaned lambs	42 20	1.0 0.14	42.00 2.80 44.80	mineral mineral	free choice free choice	.056

Table 1. Animal unit equivalents (AUE) for various species and classes.

Species and class	AUE
Cattle	
Mature bull	1.5
Mature cow or cow/calf pairs	1.0
Cow/calf pairs (calves over 6 months)	1.35
Stockers or yearlings (12–24 months)	0.8
Sheep	
Ewe/lamb pair	0.3
Mature sheep, nonlactating	0.2
Weaned lambs	0.14
Others	
Saddle horse	1.25
Deer, blacktail	0.2
Deer, mule	0.23
Elk	0.60

Adapted from Vallentine 1990.

ESTIMATING THE UTILIZATION OF SURVEYED PLANT POPULATION AND RESIDUAL DRY MATTER: STEPS 5–7

Typically, estimates of vegetation utilization and residual dry matter are determined for the entire grazing management unit. Although information for the entire grazing unit is invaluable, these guidelines recognize that professionals conducting botanical plant surveys for specific species may not have the time or resources to monitor extensive range sites. The following guidelines for estimating vegetation utilization and residual dry matter, therefore, apply specifically to the surveyed plant population and the immediately surrounding site.

Step 5. Visual Utilization Estimate (Form 2)

The degree of utilization should be estimated for each plant population surveyed. The estimate should be based on use classes 1 to 5 as described in table 2. Record the use class every time the population is surveyed and also at the end of the grazing season. Whenever the use class is recorded, note the physiological stage of the surveyed plant. Some plants may be palatable early in the grazing season but not later, or vice versa. The use class should be estimated at the same sample points where botanical

Form 2. Surveyed plant population utilization.

Survey date	Plant population			
	Location	Size (acres)	Physiological stage	Use class

Table 2. Determining use class for surveyed plant population.

Use class	Degree of use	Description
1: None	0–15%	Little or no use of surveyed species.
2: Light	16–35%	Less than one-third of the surveyed species shows evidence of being grazed. Trampling damage is minimal.
3: Moderate	36–65%	Grazing is spotty but evident (over one-third of the surveyed species shows evidence of being grazed). Trampling damage may be evident.
4: Heavy	66–80%	Surveyed species is closely cropped. Trampling damage may be evident.
5: Severe	Over 80%	Surveyed species grubbed. Trampling damage should be evident.

Note: If the surveyed species has a low-forage value, trampling damage may be evident before the plants appear grazed. These observations should be recorded. Adapted from Anderson and Currier 1973.

data are collected, and the survey method used should also be noted.

Step 6. Utilization Mapping

Include a map of the grazing unit with the surveyed plant population information. This map can help provide information about livestock distribution and its effects on plant communities. Factors in a grazing unit that influence livestock use should be present on the map, including physical features, such as topography, water sources, and soil and vegetation types (fig. 1), and fences, corrals, gates, roads, and shade. Aerial photos may be a good source of this information (see Nader et al. 1994). Utilization data for surveyed plants (Step 5) should be recorded on the grazing unit map. Residual dry matter estimates (Step 7) may also be recorded on the map.

Step 7. Estimate Residual Dry Matter (Form 3)

Residual dry matter (RDM) is the amount of dried plant material remaining above ground at the end of the growing season after the grazing period. RDM should be measured after the grazing and growing season. RDM reduces soil erosion, enhances water retention, and strengthens perennial plants. Suggested end-of-season RDM levels vary depending on specific site factors.

RDM estimates can be obtained by clipping and weighing, comparative yields, or visually by using photo

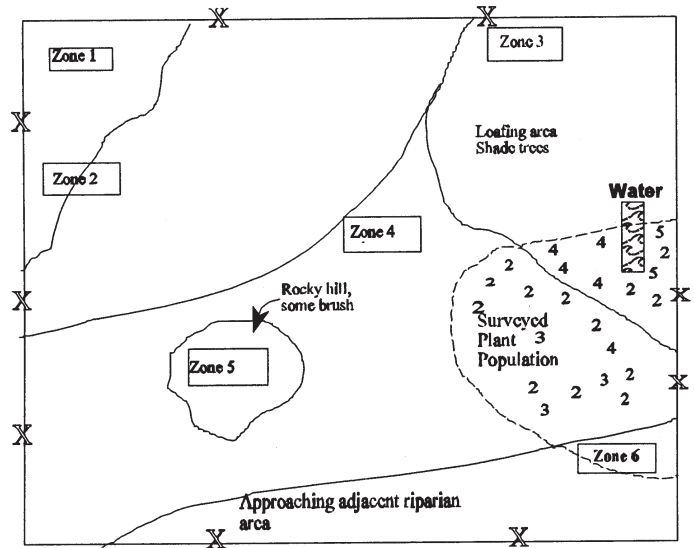


Figure 1. Sketch of grazing unit showing fences, gates, water, map units or zones, and use class for surveyed plant population. Map units or zones are determined based on topography, roads, hills, trees, water, gates, etc. and reflect expected differences in grazing use. Adapted from Nader et al. 1994.

Form 3. Estimated residual dry matter (RDM).

Samples	Dried weight (g)	Pounds/acre
1	x 100 =	
2	x 100 =	
3	x 100 =	
4	x 100 =	
5	x 100 =	
6	x 100 =	
7	x 100 =	
8	x 100 =	
9	x 100 =	
10	x 100 =	
11	x 100 =	
12	x 100 =	
13	x 100 =	
14	x 100 =	
15	x 100 =	

Note: If the standard deviation of these estimates is one-half or larger than the average, more samples should be collected and added to the average.

standards or descriptions (see Clawson, McDougald, and Duncan 1982). Clipping and weighing residual dry matter around the survey plant population should provide the most accurate information for estimating residue vegetation level. To estimate RDM using the clip-and-weigh method, collect 10 to 15 circular plot samples with an area of 0.96 square feet each from within the survey area.

Locate sample sites by random selection. Toss a sample hoop (see below) in a random direction or collect a sample every 5 or 10 paces.

A sample hoop enclosing an area of 0.96 square feet can be constructed from a wire cable or other material 41.66 inches (105.82 cm) long. Each gram of RDM inside a hoop whose area is 0.96 square feet represents 100 pounds per acre (112 kg/ha). Use hand shears to clip the aboveground plant material very close to the ground, leaving about ¼ to ½ inch (6–12 mm) stubble height. Clip all rooted plant material within the hoop. Avoid picking up dirt, rocks, and other nonplant material. Place the sample in a paper bag. The sample should be dried before it is weighed. To dry the sample, place in a heated environment for at least 24 hours. During this time, moisture from the vegetation is lost by evaporation and the plant material becomes "air dried." Weigh the sample in grams (remember to subtract the weight of the bag containing the sample).

CONCLUSION

Over time, plant population data collected by resource professionals should indicate whether changes have occurred and whether management practices should be adjusted. Grazing management data as described here will be key to helping land managers make these evaluations and adjustments. Stocking rate, time and distribution of grazing, and species of grazing animal can be adjusted to work toward the objective for the range site.

REFERENCES

- Anderson, E. W., and W. F. Currier. 1973. Evaluating zones of utilization. *J Range Mgmt* 26(2):87–91.
- Clawson, W. J., N. K. McDougald, and D. A. Duncan. 1982. Guidelines for residue management on annual range. Oakland: University of California Division of Agriculture and Natural Resources, Leaflet 21327.
- Nader, G. M., et al. 1994. How to monitor rangeland resources. Oakland: University of California Division of Agriculture and Natural Resources, Intermountain Workgroup Publication 2.
- Vallentine, J. F. 1990. Grazing management. San Diego: Academic Press.

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