

Herbage Production on High Sierra Nevada Meadows

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Highlight

A preliminary sample of five High Sierra Nevada meadows in California ranged from 835 to 1,436 lb/acre of herbaceous material, with sedges contributing more than grasses.

In 1963, I made a study of herbage production in the meadows of the High Sierra in central California. The study was designed to obtain preliminary sampling information for an intensive study that was to follow. The study was discontinued after completion of the preliminary sample. Because there is little published information on the Sierra Nevada Meadows, this preliminary survey data should be of interest to range managers.

I selected five meadows of 24 to 45 acres at an elevation of 6,500 to 7,000 ft in the vicinity of Jackass Meadow, Sierra National Forest, California. Three of the meadows are called John Brown, Strawberry, and Marshall. They are used heavily by cattle during the entire grazing season (mid-June to mid-September). The wet sites are trampled, and some parts are eroded. The other two meadows—both parts of Jackass Meadow—are referred to as North and South Jackass. They are lightly grazed during summer, with most of the use in fall. A favorable time of the year for a short period of heavy use is fall, when the meadows are

relatively dry and the grasses and sedges have headed out.

Among the common grasses present on the dry sites are Idaho fescue (*Festuca idahoensis*), California danthonia (*Danthonia californica*) and pullup muhly (*Muhlenbergia filiformis*). Sedges (*Carex* spp.), present on both wet and dry sites, are more plentiful than the grasses.

The five meadows were sampled in September. Sampling intensity ranged from 1 plot/acre to 1 plot/2.3 acres, or 14 to 26 plots/meadow. All plots were protected from grazing during the previous summer by a wire-mesh cage of the type described by Westfall and Duncan (1961). A total of 108 square-foot plots were clipped 0.5 inch from ground level to estimate production and to obtain information on probable sampling requirements for future studies. The clipped vegetation was air-dried and weighed to the nearest tenth gram. Jeffery shootingstar (*Dodecatheon jeffreyi*), the only abundant plant observed to be unpalatable, was excluded from the sample.

Production on the five meadows ranged from 835 to 1,436 lb/acre (Table 1). Estimates of carrying capacity were based on 40% of the available herbage being used and were determined by methods recommended by Wood et al (1960). From this preliminary sample, about 100 plots/meadow probably would be necessary to estimate herbage production with a standard error of about 10%. But this requirement may change, depending on weather patterns. Although wet and dry sites were studied, I did not have enough data to make any recommendations on sampling requirements for these sites. Furthermore, it might be difficult to recognize the vegetation sites in spring during exceptionally high moisture conditions. When I selected our potential sample plots, virtually all sites were wet due to

Table 1. Production and estimated carrying capacity for the 1963 growing season, selected meadows, Sierra National Forest, California.

Meadow	Acres	Prod.	
		(lb/acre)	CC ¹
North Jackass	31	1436	24
South Jackass	45	888	22
Marshall	42	835	19
Strawberry	37	909	18
Brown	24	1178	15

¹ CC = Estimated carrying capacity, 1000 lb AUM.

Table 2. Percent weight composition (Comp.) and production in lb/acre (Prod.) of the major species groups on North Jackass and Marshall Meadows, Sierra National Forest, California.

Species	Comp.	Prod.
<i>Carex nebraskensis</i>	11	123
Unknown carex	12	130
Other grass-like spp.	40	452
<i>Muhlenbergia filiformis</i>	21	239
<i>Danthonia californica</i>	2	24
<i>Agrostis idahoensis</i>	1	6
Other grasses	(1)	(1)
All legumes	3	30
Other	10	115
	100	1,119

¹ Trace.

heavy winter snowfall and late runoff.

The plots on North Jackass and Marshall Meadows were also sampled with a point frame for foliar composition. The clipped material was sorted by hand for plant group composition by weight. *Carex* plants, the most abundant plants present, and other grass-like plants accounted for 63% of the composition, by weight, and produced 705 lb/acre. Grasses were second, with 25% of the composition and 269 lb/acre. Clover and forbs accounted for the remainder (Table 2).

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From this sample it appeared that any additional ecological or management studies made should emphasize the "grass-like" plants. A partial list of plants is included to give some indication of the species encountered in High Sierra Nevada meadows (Table 3).

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Table 3. Partial list of plants found on high Sierra Nevada in the vicinity of Jackass Meadow, Sierra National Forest, California.¹

CYPERACEAE	GRAMINEAE
<i>Carex abrupta</i> Mack.	<i>Poa palustris</i> L.
<i>C. integra</i> Mack.	<i>Puccinellia erecta</i> (Hitchc.) Munz
<i>C. nebraskensis</i> Dewey	<i>Danthonia californica</i> var. <i>americana</i> (Scribn.) Hitchc.
<i>C. ozmantha</i> (Fern.) Mack.	<i>Deschampsia elongata</i> (Hook.) Munro ex Benth.
<i>C. simulata</i> Mack.	<i>Agrostis idahoensis</i> Nash
<i>C. teneraeformis</i> Mack.	<i>A. scabra</i> Willd.
<i>Eleocharis acicularis</i> (L.) R. & S.	<i>Muhlenbergia filiformis</i> (Thurb.) Rydb.
<i>E. acicularis</i> var. <i>bella</i> Piper	MISCELLANEOUS FLOWERING PLANTS
<i>Scirpus congdoni</i> Britt.	<i>Viola macloskeyi</i> Lloyd
JUNCACEAE	<i>Polygonum bistortoides</i> Pursh
<i>Juncus bufonius</i> L.	<i>Dodecatheon jeffryi</i> Van Houtte
LEGUMINOSAE	<i>Mimulus primuloides</i> Benth.
<i>Lupinus nevadensis</i> Heller	<i>Penstemon oreocharis</i> Greene
<i>Lotus purshianus</i> (Benth.) Clem. & Clem.	<i>Potentilla gracilis</i> ssp. <i>muttallii</i> (Lehm.) Keck
<i>Trifolium bolanderi</i> Gray	<i>Epilobium glaberrimum</i> Barb.
<i>T. longipes</i> Nutt.	<i>Perideridia parishii</i> (C. & R.) Nels. & Macbr.
<i>T. microcephalum</i> Pursh	<i>Aster foliaceus</i> Lindl.
<i>T. monanthum</i> var. <i>parvum</i> (Kell.) McDerm.	<i>Phalacroseris bolanderi</i> var. <i>coronata</i> Hall
	<i>Brodiaea lutea</i> (Lindl.) var. <i>analina</i> (Greene) Munz

¹ Taxonomic determinations were made by the U.S. Forest Service Herbarium staff.