MANAGEMENT

for

Livestock, Wildlife and Watersheds

through

Montana Soil and Water Conservation Districts

U.S. DEPARTMENT OF AGRICULTURE • Soil Conservation Service

FOREWORD

The Soil Conservation Service, through local Soil and Water Conservation Districts, has been helping Montana ranchers with range conservation management plans for over twenty years.

During that period forage production for livestock has increased by over one-third million animal units on private lands. Establishment of waterspreading systems and seeding of tame pastures has helped bring about the increase. The most important factor contributing to the increase, however, is that ranchers have a better understanding of the needs of plants and their response to grazing. Range condition in the state has improved because of proper use, deferred grazing and brush control. Better grazing distribution is obtained with fences, salting and stockwater developments.

Well managed rangelands protect watersheds by increasing water intake, thus reducing runoff and sedimentation.

Montana's wildlife and recreation resource has been enhanced as a result of the improved management.

While these ranchers are to be commended for their progress, only one-half of the rangelands in the state are now managed for optimum return. Good management on the other half could increase net income to producers by about $25,000,000 annually.

The staff of the Soil Conservation Service, cooperating with other State and Federal agencies and working through Soil and Water Conservation Districts, will continue to assist ranchers improve their range resource.

A.B. Linford
State Conservationist
Soil Conservation Service

RANGE MANAGEMENT FOR LIVESTOCK, WILDLIFE, RECREATION AND WATERSHEDS

by Clayton E. Ogle and Robert L. Ross*

Rangelands are a significant part of the resource base of the State. They not only provide feed and forage for livestock and wildlife, but also protect watersheds, and provide recreation values which are of prime importance to the owner and the public.

Privately owned lands provide 89% of the forage for the 3,214,700 animal units in the State. [1/] Publicly owned lands furnish:

Bureau of Land Management	5% [2/]
National Forests	2%
State of Montana	4%

In addition to livestock grazing, a major portion of big game forage is produced on private lands.

Rangelands and Grazable Woodlands cover 70% of Montana's total area, contributing recreation and other public values such as camping, fishing, rock hounding, photography and sightseeing. Production of clear usable water from this vast area is important to Montana's future.

Montana Land Use and Ownership Statistics

Land Use:

Range and Pasture	54,107,043 acres	58%
Cropland	14,988,775 acres	16%
Grazable Woodland	11,545,119 acres	12%
Non-grazable Woodland	9,631,485 acres	11%
Other	2,815,901 acres	3%
	93,089,323	

Ownership Pattern:

Privately Owned	60,672,604 acres	65%
National Forest	16,670,385 acres	18%
Bureau of Land Management	8,226,327 acres	9%
State of Montana	4,286,000 acres	5%
Bureau of Sport Fisheries & Wildlife	1,124,889 acres)	
National Park Service	1,156,128 acres)	
Bureau of Indian Affairs	125,105 acres)	3%
Army Corps of Engineers	610,085 acres)	
Bureau of Reclamation	162,000 acres)	
Agricultural Research Service	55,800 acres)	
	93,089,323	

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Livestock Industry

Livestock production is the major income producing industry in the State. The sale of cattle and sheep add about $250,000,000 income each year. Nearly every Montana citizen is directly or indirectly dependent upon the production of livestock.

Good amounts of old and new vegetation insure high rates of water intake on the range in the foreground. Closely grazed range in the background lowers water intake rates resulting in runoff, sedimentation and a drouthy soil condition.

Watersheds

Improvement of watersheds and water intake on rangelands must be a primary consideration of range management and grazing system plans. Soil moisture is one of the important factors limiting production on rangelands. Storage of soil moisture is dependent on water intake rates, precipitation and storage capacity of the soil. Of these three factors, only water intake can be influenced materially by the land manager.

Water intake studies in six northern and central plains states, over a twelve-year period, showed old and new vegetation had the greatest correlation with water intake rate. When grass is grazed to ground level and old plant growth removed, water intake rates drop materially. 3/

With few exceptions, mulch is the primary factor in determining infiltration of rain water and in prevention of erosion. One authority, F.L. Duley, reported, after extensive study, that mulch has a far greater effect on the intake of water than the differences in the kind of soil, degree of slope, the moisture content of the soil, or all of these factors combined. 4/

Surface cover must be adequate to cushion the impact of falling raindrops. 5/ This insures soil condition favorable to advancing the plant cover to a higher range condition class by ecological succession.

Hen mallard nesting on range near a stockwater pond. Montana ranchers have built over 34,000 ponds. Many produce waterfowl and fish for the sportsman.

Recreation and Wildlife

Outdoor recreation is Montana's third largest industry with an annual income of $122,000,000. 1/ It has one of the best growth potentials of any segment of the state's economy.

The sportsmen use rangelands as a place to hunt and observe wildlife. Proper use of the soil, water and plant resources of the range provide abundant food and cover for wildlife. Well fed game animals and birds produce good populations.

Montana ranchers have constructed 34,000 ponds. Many of them support fish and waterfowl. Thousands of acres of water surface provide courting, resting and feeding areas for waterfowl. Studies in ten Soil

Conservation Districts revealed an average of 1.8 broods of waterfowl were produced on observed ponds.

1/ Source - State Advertising Director.

Rancher and Range Conservationist discuss management plans. Range management is achieved only when the livestock owner understands range mangement principles and participates in management decisions on Montana's ranges.

Management Responsibility

This information points out the responsibility the individual rancher has in managing the rangelands of Montana. Proper range management on either private or public lands will be achieved, if the individual who owns and manages the livestock understands the basic needs of the plants and their response to grazing.

This means that techniques of determining range condition must be scientifically sound, simple enough to be generally understood, practical enough that ranchers will adopt them, and a fast enough method to get over large acreages in a minimum of time.

The site classification method, which the SCS has been using, meets the above requirements. 6/ It is basically sound and understandable to ranchers. Ranchers have been using and depending on the ecological site classification method of making range inventories for the past 20 years in Montana. It is reasonably fast and there is no need for re-surveys to obtain the basic site information. Current forage production and check of condition classes are obtained periodically as the need arises.

To appraise the resources of rangeland and develop information useful in its management, it is essential that three basic factors be considered---soil, climate and vegetation. Range management is dependent upon an understanding of the potential production that might be expected in normal years from a given kind of range. This ecological approach is based on the premise that climax kind of vegetation will result in the highest practical returns in terms of forage production for livestock or game animals, recreation values, and watershed protection. It provides the highest degree of natural soil stabilization and water conservation.

Range Sites

Each distinct kind of rangeland constitutes a range site. A range site is a complex of soil and climate that has its own environment which produces a distinctive plant community.

The term "rangeland" is limited to land on which the climax vegetation is suitable for grazing and grazing is the primary use. Forest lands, for example, are not classified into range sites.

It is not possible to depend upon vegetation alone to identify range sites. As range conditions decline, it becomes increasingly difficult and finally impossible to identify a site by vegetation alone. Consequently, in the absence of the original kind of plant cover, the permanent and hence applicable features of the site must be used as the identifying criteria. Normally these are the kinds of soil, climate, and topography. These criteria must be consistently associated with the respective range site. Criteria not consistently associated with significant differences in kind and/or amount of climax vegetation such as minor changes in rainfall, minor soil differences to topographic changes, merely add unnecessary detail and are certain to prove misleading.

Range sites are characterized by:

(a) Significant differences in soil (Texture, depth, permeability).
(b) Significant differences in climax vegetation.
(c) Similarity of climax vegetation but with significant differences in forage yields.
(d) Differences in exposure (temperature).
(e) Differences in precipitation.
(f) Differences in topographic position (overflow, or areas of run-in moisture).

A range site may be identified by considering any one or all of the above factors. It should be recognized that there are small differences throughout any area of delineation for survey or management purposes. The areas may have minor differences in elevation, exposure, temperature, distribution and amount of precipitation, or differences in many other factors. It is not feasible or necessary to make fine separations because many of them could not be recognized and are not significant in terms of production or management. With the exception of salts in toxic quantities, the principal and only significant factor limiting forage production on natural grassland, is the amount of available moisture in the soil. The only significant differences in the soil are those that affect available moisture. Differences in amounts of available moisture are caused by climate or by special factors, such as sub-irrigation or overflow, etc.

RANGE SITE CRITERIA

Range sites are kinds of range land that differ from each other in their ability to produce a significantly different kind or amount of climax or original vegetation. Only natural grasslands are classified as range sites. In order to fully designate a range site, a soil-group name is combined with the precipitation zone and geographic location; e.g., Sandy 10 - 14" p.z., Glaciated Plains, Montana

The following range soil-groups are listed in presumed order of natural productivity, considering total airdry weight of all herbage produced through the entire year by all seed plants per unit of area, in ordinary years under climax plant cover.

I. Soil-groups that can produce more herbage than ordinary range uplands because of plainly superior soil moisture availability.

WL - WET LAND: Lands where seepage, ponding, etc., raises the water table to above the surface during only a part of the growing season. Too wet for cultivated crops but too dry for common reed, cattails, or true aquatics.

Sb - SUBIRRIGATED: Lands with an effective subsurface ground water table and water rarely over the surface during the growing season.

SL - SALINE LOWLAND: Subirrigated and overflow lands where salt and/or alkali accumulations are apparent and salt tolerant plants occur over a major part of the area.

Ov - OVERFLOW: Areas regularly receiving more than normal soil moisture because of run-in or stream overflow.

II. Soil-groups with no obvious soil or moisture limiting factors. The vegetation can make a normal response to climate.

Sa - SANDS: Sands and loamy sands more than 20 inches deep.

Sy - SANDY: Coarse to fine sandy loams more than 20 inches deep.

Si - SILTY: Soils more than 20 inches deep of very fine sandy loam, loam, or silt loam. This includes soils with 2 inches or more loam or silt loam over clayey subsoils.

Cy - CLAYEY: Granular silty clay, sandy clay or clay more than 20 inches deep.

III. Soil-groups with characteristics or topographic features that limit moisture holding capacity or affect infiltration rates.

St - STONY: Soils more than 20 inches deep with cobbles or stones occupying 40 to 80 percent of the surface.

Ly - LIMY: Soils more than 20 inches deep that are strongly calcareous within 4 inches of the surface.

SwC - SHALLOW CLAY: Shallow granular clay soils that are 10 to 20 inches deep to underlying shale or nearly impervious clays.

SwG - SHALLOW TO GRAVEL: Soils that are 10 to 20 inches deep to sandy gravel. Few roots penetrate deeper than 20 inches.

Sw - SHALLOW: Soils 10 to 20 inches deep to hard rock or softbeds of decomposed granite, siltstone, or sandstone. Few roots penetrate deeper than 20 inches.

Ps - PANSPOTS: Areas of silty, clayey or sandy soils in complex with shallow depressions of hard clays or other nearly impervious materials at or near the surface. The shallow depressions occupy 20 to 50 percent of the site.

DC - DENSE CLAY: Relatively impervious deep nongranular clays--may be overlain by thin ineffectual layers of other materials. The dispersed layer is very hard to extremely hard when dry and very sticky when wet.

TB - THIN BREAKS: Mixed soils of various depths with hard rock outcrops at different levels on steep irregular slopes. Trees may occur locally above outcrops.

Gr - GRAVEL: Course textured soils with more than 50 percent gravel and cobbles underlain by loose sand and gravel at less than 20 inches.

VS - VERY SHALLOW: Areas where few roots can penetrate deeper than 10 inches. Outcropping of gravel or bedrock is characteristic. Joints in bedrock may develop deep soil pockets usually marked by tall grasses, shrubs, or stunted trees.

SU - SALINE UPLAND: Soils more than 20 inches deep with salt and/or alkali accumulations. Salt tolerant plants occur over a major part of the area.

Sh - SHALE: Readily puddled uplands where some unweathered angular raw shale fragments are exposed at the surface and little, if any, soil profile development is evident.

B1 - BADLANDS: Nearly barren lands broken by drainages intermingled with small grazable areas.

Range Condition

Range condition is the present state of the vegetation in relation to the climax kind of vegetation for that site. The purpose in classifying range condition is to measure any deterioration that has taken place in the plant community. It also provides a basis for predicting the degree of improvement that is possible.

Changes in range condition are brought about primarily by intensity of grazing use. However, a series of dry or wet years or disturbances by fire, landslides, or more rarely abnormal insect infestation and disease, etc., may cause changes in range condition. Excessive removal of top growth detrimentally affects the growth of both roots and shoots. 7/ 8/ 9/ 10/ 11/

Major departure from climax indicates a depleted range condition. A major decline is usually accompanied by site deterioration brought about by accelerating erosion. Improvement in range condition is brought about by increasing the proportion of climax species, although the management goal may stop somewhat short of full climax.

Plant density, vigor, erosion and natural mulch are not used as primary criteria for determining range condition. Density varies so greatly that it is unreliable. For example, cheatgrass brome, blue grama or threadleaf sedge may provide a high density of ground cover on a poor condition range. Likewise, vigor alone is not a reliable factor due to seasonal variations and response to grazing pressures and/or climatic factors. Erosion and lack of normal amounts of natural mulch are commonly products of a decline in range condition and ordinarily, together with density and vigor, follow changes in plant composition. Accordingly, changes in composition are used as the primary criteria for determining range conditions and for practical purposes, may usually be expected to reflect density, vigor, erosion and natural mulch conditions.

In rare instances, however, the single factor of percent climax composition is not adequate to determine condition. This condition may occur where there has been a rapid loss of density without the usual occupation of bared areas by invading plants, or where accelerated erosion of steep slopes prevents invading plants from becoming established. Where this occurs, criteria are developed to reduce the condition rating accordingly.

On some sites, depletion of range cover and subsequent soil depletion and erosion have progressed to the point where the original productive potential of the site has been materially reduced. Examples are deeply gullied meadows or flood plains or upland ranges from which top soil has been removed exposing subsoil or rock. When this happens, the

vegetation for the eroded or changed site will be different from the original climax vegetation, depending on the degree of erosion.

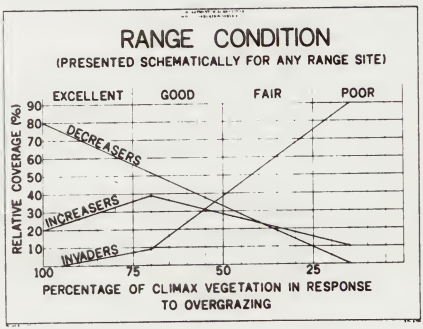
The evaluation of condition class by range sites is based upon composition of the vegetation by species in total amounts of vegetation produced. Plant species are segregated into three categories based upon the ecological response to grazing. 12/

(a) Decreasers - These are climax dominant plants. They develop in harmony with the climate and soil and make the best use of site factors for total production. In grasslands they are usually those plants most relished by grazing animals and are therefore the first to be reduced in amounts of overuse. In other words, they are the first to decrease under close use.

(b) Increasers - These are components of the climax vegetation and may be co-dominant. These plants increase to fill the voids left by the decreasers as they decline, until they in turn may be weakened by continued close grazing and also begin to decline.

(c) Invaders - These are plants that may not be present at all in the climax composition, or if they are, normally make up less than 2½ percent of the total production. They invade into the voids that develop as the decreasers and increasers are weakened or killed.

Exotics - These are species which have been introduced and are not native to the area. These are classed as invaders in making range condition determinations on native range. On reseeded areas, the amounts may significantly affect recommended stocking rates.



Range condition is determined by adding the percent of air dry weight of the decreasers that are present and the present percent of increasers, up to, but not exceeding the maximum usually found in the climax plant community.

Range condition on a given site may vary from near zero to near one hundred percent of climax. To provide convenient divisions for management, four condition classes have been established.

Condition Class	Percent of Climax
Excellent	76-100
Good	51- 75
Fair	26- 50
Poor	0- 25

Technician guides have been developed and a sample is included for use in determining condition class by range sites.

U. S. Department of Agriculture
Soil Conservation Service
March, 1969

TECHNICIANS' GUIDE TO
RANGE SITES, CONDITION CLASSES AND RECOMMENDED STOCKING RATES
IN
SOIL CONSERVATION DISTRICTS OF THE FOOTHILLS AREA OF CENTRAL MONTANA
10-14" PRECIPITATION BELT

PART I: KEY SPECIES AND THEIR RESPONSE TO GRAZING AS JUDGED FROM CLIMAX

DECREASERS	INCREASERS (By Range Sites*)	Maximum Percent Dry Weight Produced Annually in Climax																					INVADERS**
		WL	Sb	SL	Ov	Sa	Sy	Si	Cy	St	Ly	SwC	SwG	Sw	Ps	DC	TB	Gr	VS	SU	Sh	Bl	
Basin wildrye	Western wheatgrass	-	5	20	30	5	10	25	35	15	20	d	d	20	d	d	20	d	d	d	d	d	Annual bromes
Cordgrasses	Idaho fescue	-	-	-	-	-	-	20	20	10	-	15	-	15	-	-	10	-	-	-	-	-	Sixweeks fescue
Tufted hairgrass	Needleandthread	-	-	-	5	20	25	20	-	15	20	-	d	20	d	-	-	d	-	-	-	d	Kentucky bluegrass
Tall reedgrasses	Sand dropseed	-	-	-	-	5	5	-	-	-	-	-	5	-	-	-	5	d	d	-	-	-	Canada bluegrass
Rough fescue	Prairie junegrass	-	-	-	-	5	5	5	-	5	5	-	5	5	5	-	5	5	5	-	-	5	All other annuals
Canada wildrye	Plains reedgrass	-	-	-	-	-	5	5	10	5	5	10	-	5	10	10	5	-	5	-	5	5	and exotics
Big Bluegrass	Plains muhly	-	-	-	-	-	5	-	-	-	10	-	5	5	-	-	10	5	5	-	-	5	Foxtail barley
Prairie sandreed	Blue grama	-	-	-	-	-	-	5	-	-	-	-	5	5	-	-	5	5	5	-	-	5	Tumblegrass
Spike fescue	Sandberg bluegrass	-	-	-	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	10	5	5	Red threeawn
Alkali sacaton	Squirreltail	-	-	5	-	-	-	-	-	-	-	-	-	-	-	5	5	-	-	d	d	5	Needleleaf sedge
Alkali bluegrass	Sedge increasers	25	15	10	-	-	10	5	-	-	-	-	5	-	-	-	5	5	-	-	-	5	Curlycup gumweed
Green needlegrass	Mat muhly	-	5	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Broom snakeweed
Bluegunch wheatgrass	Saltgrass	-	-	20	-	-	-	-	-	-	-	-	-	-	5	5	-	-	-	d	d	d	Dandelion
Slender wheatgrass	Forb increasers	10	10	-	5	5	5	5	10	5	5	10	5	5	-	10	5	5	5	10	5	5	Bull thistle
Indian ricegrass	Big sagebrush	-	-	-	-	-	-	5	5	-	-	5	-	-	-	-	5	-	-	-	-	-	Canada thistle
Little bluestem	Silver sagebrush	-	-	-	5	5	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Leafy spurge
Sideoats grama	Greasewood	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10	-	Toadflaxes
Canby bluegrass	Conifers	-	5	-	-	-	-	-	-	-	-	5	5	5	-	-	10	-	5	-	-	-	Knapweeds
Alkaligrass	Other woody incr.	10	15	5	5	5	5	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	Rabbitbrushes
Sun sedge																							
Winterfat																							
Forb decreasers																							
Mt. Mahogany																							
Skunkbush sumac																							
Other woody decreasers																							

*The symbol "-" means the species has less than 2½% coverage or is not present in the climax vegetation of the site. The symbol "d" means the species is a decreaser on the site. The above abbreviations refer to the following sites: WL - WET LAND; Sb - SUBIRRIGATED; SL - SALINE LOWLAND; Ov - OVERFLOW; Sa - SANDS; Sy - SANDY; Si - SILTY; Cy - CLAYEY; St - STONY; Ly - LIMY; SwC - SHALLOW CLAY; SwG - SHALLOW TO GRAVEL; Sw - SHALLOW; Ps - PANSPOTS; DC - DENSE CLAY; TB - THIN BREAKS; Gr - GRAVEL; VS - VERY SHALLOW; SU - SALINE UPLAND; Sh - SHALE; Bl - BADLANDS.

**Introduced and natives that make up less than 2½% of climax.

EXAMPLE OF WORKSHEET IN DETERMINING
RANGE - CONDITION CLASSES

SITE: Silty 10-14" PZ Foothills
EXAMINER: Sam Arid
9/3/68

RANCH UNIT: Jim Doyle
LOCATION: SE¼ Section 6 in Upper Pasture

Plant Species	Present Percent Composition*	Maximum Percent Normally Found in Climax*	Percent of Present Composition Counted*
Decreasers:			
Bluebunch wheatgrass	10	)	10
Green needlegrass	5	) no limit	5
Basin wildrye	T	)	
Increasers:			
Needleandthread	10	20	10
Blue grama	20	5	5
Sandberg bluegrass	15	5	5
Forb increasers	15	5	5
Western wheatgrass	T	25	0
Invaders:			
Broom snakeweed	10	) none or	)
Salsify	5	) less than	) 0
Annuals	10	) 2½% each	) ___
Total	100%	XXX	40%
Range Condition	XXX	XXX	Fair

*Percentage by Air Dry Weight

Percent of species composition by weight is obtained by ocular estimate along with adequate clipping and weighing to assure accuracy.

Stocking Rates

Recommended stocking rates are based upon research data obtained from Experiment Stations throughout the Great Plains and from some adjacent states. They have been associated with range sites and condition classes at the stations where studies were conducted. Data were interpolated or extrapolated in a few instances to provide recommended stocking for range sites not represented in formal studies. The recommended stocking rates have been used now for many years on virtually thousands of ranches. The many observations of actual field use resulted in some minor changes, but the mass of relevant observations have reduced the range of probability for error to a minimum. Even so, recommended initial stocking rates are

just that and no more. We suggest to ranchers that they stock according to the current production. See the Guide to Degree of Use on page 19.

Ranges stocked at the recommended initial stocking rates will usually receive moderate to full use in normal years. Ranges in less than excellent condition class, other things being equal, generally show improvement. Those in excellent condition class are maintained.

GUIDE FOR MAKING RECOMMENDATIONS ON STOCKING

Guide to Departures from Basic Table by Soil Groups

For WET LAND sites use three times the values for 20-24" precipitation zone. For SUBIRRIGATED use two times the values for 20-24" p.z. For SALINE LOWLAND use values one-half to one higher than p.z. where located. For OVERFLOW use values of next highest p.z. For SANDS, SANDY, SILTY and CLAYEY sites use values given for the p.z. For STONY, LIMY, SHALLOW CLAY, SHALLOW TO GRAVEL, SHALLOW, PANSPOTS and DENSE CLAY sites use values one-half to one zone lower. For THIN BREAKS use values one to one and one-half zones lower. For GRAVEL, VERY SHALLOW and SALINE UPLANDS use values one and one-half to two zones lower than those for the p.z. but not less than one-half the values for the 5-9" p.z. For SHALE and BADLANDS use values two to three zones lower but not less than one-half the values for the 5-9" p.z.

Basic Table for Normal Soils of each Precipitation Zone.

Average Annual	Range Condition Percentage & Classes			
Precipitation Zone	100 - EC	- 75 - GC	- 50 - FC	- 25 - PC
(Inches)	(Animal Unit Months per Acre)			
25-29	1.0	.75	.5	.25
20-24	.8	.6	.4	.2
15-19	.6	.45	.3	.15
10-14	.4	.3	.2	.1
5-9	.2	.15	.1	.05

Experience has established this method of range inventory to be fast and reliable. Some basic training and experience is required by individuals making the survey. Readily available consultive help from experienced men is desirable when technicians are using the method for the first time. Minor things sometimes appear to assume major importance unless viewed from wide experience.

Long-Time Results

Montana agriculture statistics show a 932,600 increase in animal units of cattle in the past 20 years (a five year average of 1942-46 as compared to 1963-67). During the same period, sheep and horses declined

by 576,000 animal units. This leaves a total increase of over 1/3 million animal units in the past 20 years. (See Livestock Trends Chart in Montana).

This 13 percent increase, which is practically all on privately owned lands, can be attributed to several things. Establishment of water spreading systems to develop a winter feed base, seeding of tame pastures, balancing feed and forage and conversion of excess hay to irrigated pastures has helped bring about the increase. There has been a slight increase in the number of feedlot operations. However, the greatest factor contributing to the animal unit increase is in range management practices. Range condition on much of the rangeland in the state has improved as a result of proper use, deferred grazing and brush control. Better grazing distribution is being obtained on many areas through use of cross fences, salting methods and stockwater developments.

An 18 year research study at the Miles City Range Experiment Station revealed that birth weight of calves, rate of gain, weaning weights, calf-weaning grade, and cow fertility were highest with moderate grazing.

Research conducted at experiment stations throughout the western range country has consistently shown the value of proper stocking. Good range management means high calf and lamb crop percentages, heavy weaning weights and high net returns to ranchers. It also means increased high quality forage for wildlife, improved watershed protection and high recreation values.

Costs and returns of different levels of range management carried out by ranchers throughout Montana prove that good range management has tremendous economic impact. The following example of a 5,000 acre range unit illustrates this economic impact.

5,000 ACRE RANCH

	Fair Range Condition		Good Range Condition
	Overgrazed	Proper Use	Proper Use
Animal Units	200	100	150
Calf Crop %	75%	88%	90%
Weaning Weights	325#	400#	440#
Winter Feed Period	5	4	3
Gross Income	$11,245.00	$ 9,221.00	$13,851.00
Annual Costs	$13,164.00	$ 7,401.00	$ 8,243.00
Net Return	$-1,919.00	$+1,820.00	$+5,608.00

The difference in net return between poor management in column 1 and good management in column 3 is $7,527. This divided by 5,000 acres means that management in column 3 netted $1.50 more per acre than management in column 1. The net return in column 3 was $3,888 more than in column 2.

To get an average net return of fair condition range, column 1 and column 2 were averaged together. The good condition range netted about $1.15 more per acre than fair condition range.

Economists state that money coming into an agricultural community will double through the business transactions within the community. This means the economic impact could be $2.30 per acre of each acre improved from fair to good condition.

There are approximately 30,000,000 acres of fair and poor condition range in Montana that have a potential of being improved to good or excellent condition. This 30,000,000 acres multiplied by $2.30 amounts to a potential increase of nearly $70,000,000.

GUIDE TO DEGREE OF USE

USE RATING	DESCRIPTION	YEARS*			
Unused	No livestock use				
Slight	Practically undisturbed. Only choice areas and choice forage grazed.				
Moderate	Most of the range is grazed. Little or no use of poor forage. Little trailing to grazing.				
Full (This or less use is Proper Use.) 40-60%	All fully accessible areas are grazed. Major sites have key forage species properly utilized. Overused areas less than 10% of pasture area.				
Close 60-80%	All accessible range plainly shows use and major sections are closely cropped. Livestock forced to use much poor forage.				
Severe 80-100%	Key forage species almost completely used. Low-value forage carrying grazing load. Trampling damage is widespread in accessible areas.				
Extreme	Range appears stripped of vegetation. Key forage species are weak from continual grazing of regrowth. Poor quality forage closely grazed. Livestock trail great distances for forage.				

*Show use by field nos.

1. Determine the degree of use at or near the end of the grazing period.
2. Proper use determination is based on key species on major sites, not total vegetation.
3. When properly grazed, the vegetation left will supply adequate cover for soil protection and will maintain or improve the quantity and quality of desirable vegetation.

Proper Use of Annual Growth

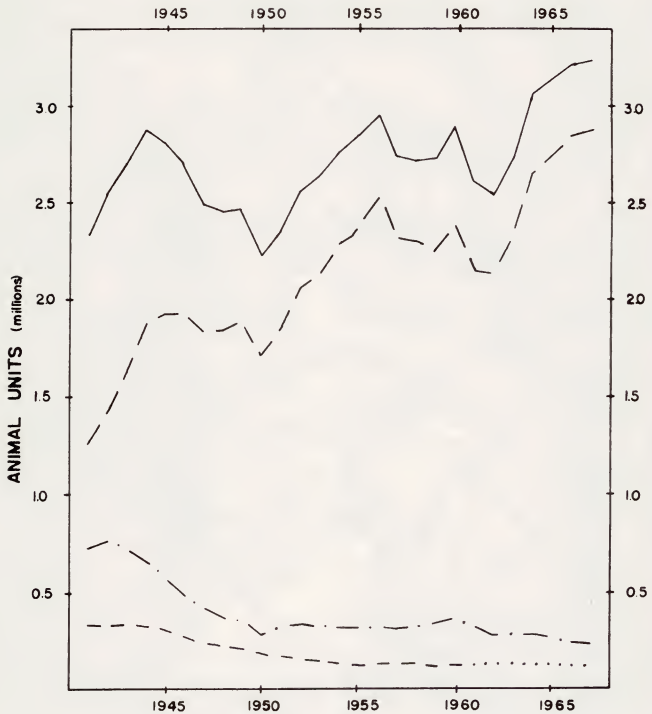
Depends on SEASON OF USE:

Spring Use (Moderate)

Summer and Early Fall Use (Full)

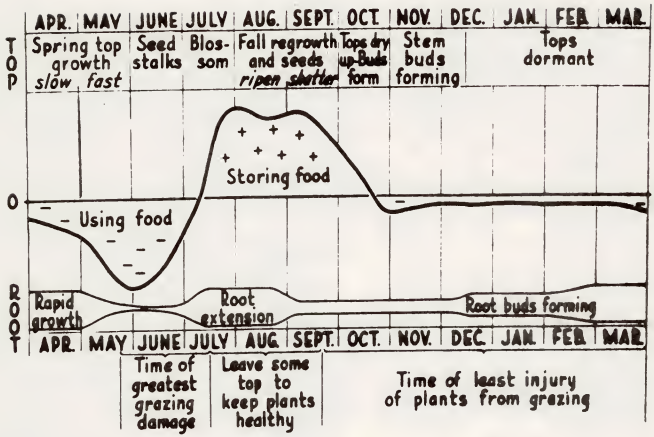
Late Fall and Winter Use - Dormant Season Use - (May approach close use if snow cover is not an important consideration.)

LIVESTOCK TRENDS IN MONTANA



SOURCE OF INFORMATION: SCS CALCULATIONS BASED ON MONTANA AGRICULTURE STATISTICS.

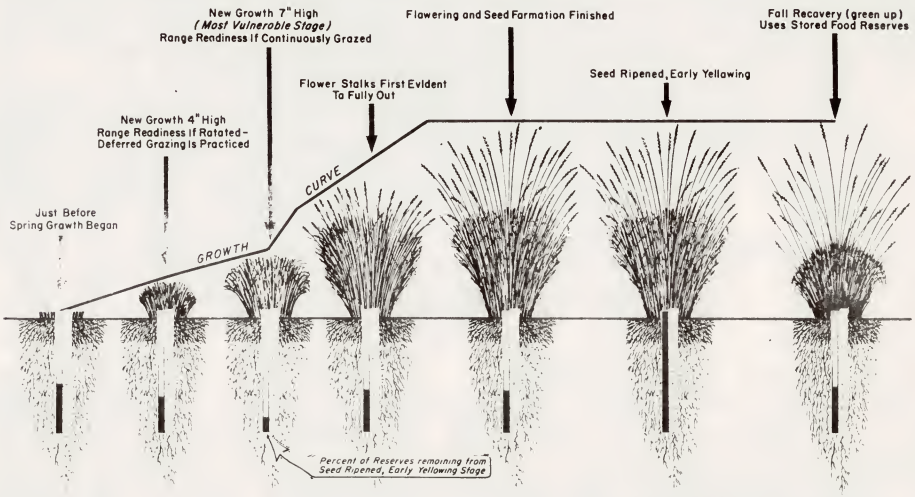
THE ANNUAL FOOD AND GROWTH CYCLES OF RANGE PLANTS



Perennial grasses store energy in the roots and crown. In the spring, energy is drawn from this reserve for new stem and leaf growth. Green leaves manufacture food for plant growth, seed production and to replenish energy in the roots to start the cycle over. Plants are most easily damaged by grazing from spring green up until plant maturity. Deferred grazing allows the plants to mature, produce seed and maintain vigor.

FOOD RESERVES STORED *in* ROOTS *and* LOWER SEED STALKS *of* BLUE BUNCH WHEATGRASS

IN RELATION TO GROWTH STAGES AS SHOWN BY RESERVE POLYSACCARIDES (Simple Sugars)



Data from Plant Physiology (1942) Vol 17, No 4, pp 540-557. Carbohydrate and Nitrogen Trends in Blue Bunch Wheatgrass (Agropyron spicatum) with special reference to Grazing Influences — by Samuel R. McClung

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