

SOIL AND VEGETATION INVENTORY OF
NEAR-PRISTINE SITES IN MONTANA

By

Robert L. Ross, State Range Conservationist
Earl P. Murray, Range Conservationist
June G. Haigh, Soil Scientist

Soil Conservation Service

Acknowledgment

We wish to acknowledge the cooperation of
the ranchers and many others who helped
make this inventory possible.

U.S. Department of Agriculture
Soil Conservation Service
Bozeman, Montana

July 1973

P R E F A C E

Nature had a good thing going with her perpetuating system of checks and balances between soil, climate, vegetation, and the living creatures; but when man entered the grassland picture, the scene changed.

As the settlers moved northward and westward into Montana Territory, much of the valley bottoms and deeper soils were plowed and farmed; but, primarily, Montana attracted rancher-type settlers who realized that the best use of the uplands was to leave them as rangeland.

At present, sixty-five million acres (70 percent) of the land area of Montana is rangeland. Rangeland is the basis for the livestock business which is the largest income-producing industry in the state. It also provides watershed protection, high quality water production, wildlife habitat, aesthetics, and many other values.

Rangelands have often been left in native vegetation because they are generally too steep, too dry, too rocky, or have too short a growing season to be used for cultivated crop production. Because of physical and climatic limitations, rangelands are easily damaged by excessive grazing.

Nature tries to keep the soil covered with vegetation as long as any soil remains. If the original kinds of taller-growing grasses are allowed to be grazed out, nature will cover the soil with either weedy, woody, spiny and unpalatable plants, or with grasses so short that they escape close grazing.

The misuse of rangelands by man in his effort to maximize profit, and his poor understanding of grazing management, has caused the over-grazing and the decimation of much of Montana's rangeland.

Overgrazing did not happen in a short time; but like population increases, water pollution, air pollution and erosion, the loss of nature's rich carpet of stirrup-high grass was so gradual that man was not aware of the changes.

Fortunately, there are many areas in Montana that still have the original or near-pristine kinds of vegetation. There has been little or no grazing by either domestic livestock or by wildlife in these areas.

Near-pristine areas show the kinds and/or amounts of vegetation that nature will produce on a given soil and in a given climate.

Climax or near-pristine vegetation provides benchmarks for determining the condition of rangelands. The Soil Conservation Service uses these areas to fulfill its responsibility for monitoring land-use conditions and for treatment needs.

For several years, the Soil Conservation Service has conducted detailed studies of soil, climate, and vegetation on near-pristine areas found throughout Montana. The purpose of these studies is to locate by geographical area those range sites in climax or near-pristine condition and to document plant communities by species.

Climax vegetation is not necessarily the goal of range management; however, it is an ecological benchmark on which range condition is based. The more closely the rangeland ecosystems are understood, the more accurate the range management techniques will be.

Our objective for managing plant communities in harmony with nature is to insure the continuing production of rangeland ecosystems on a sustained-yield basis.

A.B. Linford
State Conservationist
Soil Conservation Service

T A B L E O F C O N T E N T S

	<u>Page</u>
Highlights	1
Discussion	2
Methods and Procedures	3
Tables of Study Areas By Range Sites	
Foothill Geographical Area:	
Silty Range Site 10-14" Precipitation Zone	4
Silty Range Site 15-19" Precipitation Zone	5
Clayey Range Site 10-14" Precipitation Zone	6
Clayey Range Site 15-19" Precipitation Zone	6
Sandy Range Site 10-14" Precipitation Zone	7
Stony Range Site 10-14" Precipitation Zone	7
Limy Range Site 10-14" Precipitation Zone	8
Shallow to Gravel Range Site 10-14" Precipitation Zone . .	8
Sedimentary Plains Geographical Area:	
Silty Range Site 10-14" Precipitation Zone	9
Sandy Range Site 10-14" Precipitation Zone	10
Clayey Range Site 10-14" Precipitation Zone	11
Sands Range Site 10-14" Precipitation Zone	12
Thin Hilly Range Site 10-14" Precipitation Zone	12
Shallow Clay Range Site 10-14" Precipitation Zone	13
Shallow Range Site 10-14" Precipitation Zone	13
Very Shallow Range Site 10-14" Precipitation Zone	14
Shale Range Site 10-14" Precipitation Zone	14
Glaciated Plains Geographical Area:	
Silty Range Site 10-14" Precipitation Zone	15
Clayey Range Site 10-14" Precipitation Zone	16
Thin Hilly Range Site 10-14" Precipitation Zone	16
Rocky Mountain Geographical Area:	
Silty Range Site 10-14" Precipitation Zone	17
Silty Range Site 15-19" Precipitation Zone	18
Silty Range Site 20-24" Precipitation Zone	19
Shallow Range Site 20-24" Precipitation Zone	19
Photo of typical upland site in near-pristine condition	20
Photo of silty range site 10-14" precipitation zone	21
Photo of fence line contrast	22
Photo of soil profile	23
Comparison of near-pristine vegetation and adjacent grazed areas (Tables 25-33)	24
Narrative description of study sites	29
Supporting Data:	
Location Map of Near-Pristine Areas	
Geographical Area Map	
Precipitation Map	
Range Site Criteria	
List of Plant Species	

Highlight

Climax plant communities are recognized as being ecological standards used in monitoring rangeland ecosystems.

Climax or near-pristine areas inventoried in this study are categorized according to geographical areas, average annual precipitation, and soil characteristics.

In a northern grassland climate, climax vegetation is dominated by taller-growing, higher-producing grasses with a very small percentage of short grasses, forbs and shrubs. Disturbances to natural grasslands such as grazing, fire, and cultivation bring about changes in the composition of plant communities.

Near-pristine vegetation on the areas studied has a dominance (composition by weight) of rough fescue (*Festuca scabrella*) in the 15- to 19-inch precipitation zone, silty range site; a dominance of bluebunch wheatgrass (*Agropyron spicatum*) in the 10- to 14-inch precipitation zone, silty range site; and a very low percentage of annuals and big sagebrush (*Artemisia tridentata*) in all sites. In many instances, heavy invasions of big sagebrush, short grasses and annual and perennial forbs are evident on overgrazed ranges adjacent to the near-pristine areas studied.

Range research and ranchers' experience have proven that deteriorated ranges improve with well-planned and applied grazing management systems; this is a basic concept of range management.

The diet preference of grazing animals may change according to the availability of forage species in the plant community. Animals, domestic or wild, naturally graze preferred species first. If the preferred species have been eliminated from the plant community, grazing animals are forced

to graze on the less preferred species. In plant communities with high percentages of big sagebrush or other woody plants, there may be insufficient grasses or forbs to provide adequate forage at certain times of the year for either livestock or big game animals. Hence, grazing animals are forced to either go hungry or to use more sagebrush than naturally preferred.

The management of rangelands is based on the entire ecosystem and not on a specific plant or class of animal.

In addition to their value as natural vegetation reference points, relict areas serve not only as sanctuaries for small mammals and birds, but also as opportunities for studying the entire undisturbed biota.

Discussion

Climax plant communities align along a continuum; however, distinct plant communities do exist and can be identified. These communities are associated with recognizable differences in soil, physiography, and climate.

A specific soil or group of soils with similar characteristics in a given climate comprises a range site. In the absence of abnormal disturbance or physical site deterioration, the range site in climax condition supports a natural, native plant community (climax) that is typified by distinct kinds and/or amounts of vegetation which differs from any other range site. Through thousands of years, this natural plant community has evolved as best adapted to the particular environmental complexities of the site. It is relatively stable and is in dynamic equilibrium with its environment.

Relict or near-pristine areas provide a standard for comparing presently existing vegetation against nature's potential. Ecologically

viewed, range condition is a comparison of the present or existing plant community in relation to the climax or potential plant community for a particular range site.

Condition of most rangelands in Montana has changed considerably in the past hundred years because of grazing pressure and other disturbances; however, Montana has an abundance of relict areas supporting near-pristine vegetation that serve as benchmarks. These areas are widely distributed throughout the State representing all geographical areas and many range sites.

Methods and Procedures

For the most part, plant yield data were gathered by use of the double sampling method as described in SCS National Handbook for Rangeland and Related Grazing Lands. In some instances, actual clippings were avoided to protect the site and ocular estimates of species composition were recorded. The site number of ocular estimated studies are preceded by the number "0" and are asterisked and footnoted in the tables.

Annual precipitation figures are from precipitation maps based on data compiled by the SCS Snow Survey & Water Supply Forecast Unit and the National Weather Service.

Geographical areas are those used by SCS for Technician's Guide to Range Sites and Condition Classes. Detailed descriptions of soil series for individual relict areas are available from the Soil Conservation Service, Bozeman, Montana. Range sites are described in the attached Range Site Criteria.

The following tables are organized by geographical areas, range sites, and precipitation zones.

