Environmentally Imposed Problems of the Range Beef Cattle Industry in Eastern Oregon

by

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Beef cattle ranches provide a substantial portion of income in Oregon. Range beef cattle ranches are located on land having relatively low productivity and value. The ranches of interest for this study were among the largest and most extensive in the state.

The purpose of the study was to examine the physical environment of eastern Oregon rangelands, and the environmentally imposed problems facing cattle ranchers. An attempt was made to determine the possible future direction of eastern Oregon beef ranches.

The analysis revealed several major environmental problems. Most limiting is the lack of water, retarding forage growth, restricting livestock grazing, and inhibiting stock movement. The biotic productivity of rangelands is low, with concurrent low forage production, thereby lowering feed efficiency by forcing cattle to travel farther for feed than if they were on pasture. Many areas suffer from historic overgrazing, a practice not yet halted. Distance provides major problems by isolating ranchers from town, stores, and schools, and increasing the time required for tasks away from the ranch base.

It may be concluded that ranches may expect increasing pressure as alternative uses for the land are developed. However, range beef cattle ranching is expected to survive on a more limited scale if improvements in cattle's genetic qualities, ranch and range management are made.

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STATEMENT OF PROBLEM

Livestock raising is Oregon's major agricultural industry. Cattle and calf income contributes the largest dollar amount to the total agricultural income of Oregon, averaging over 51 percent of all income from livestock and livestock products (Agricultural Experiment Station Report, 1968).

This paper will examine one facet of the livestock industry, range beef cattle ranching in eastern Oregon. The focus will be on the physical environment of eastern Oregon rangeland, and the environmental problems with which range beef ranchers must contend. Based on these factors, an attempt will be made to predict the future direction of range beef cattle ranching in eastern Oregon.

METHODOLOGY

Research Methods

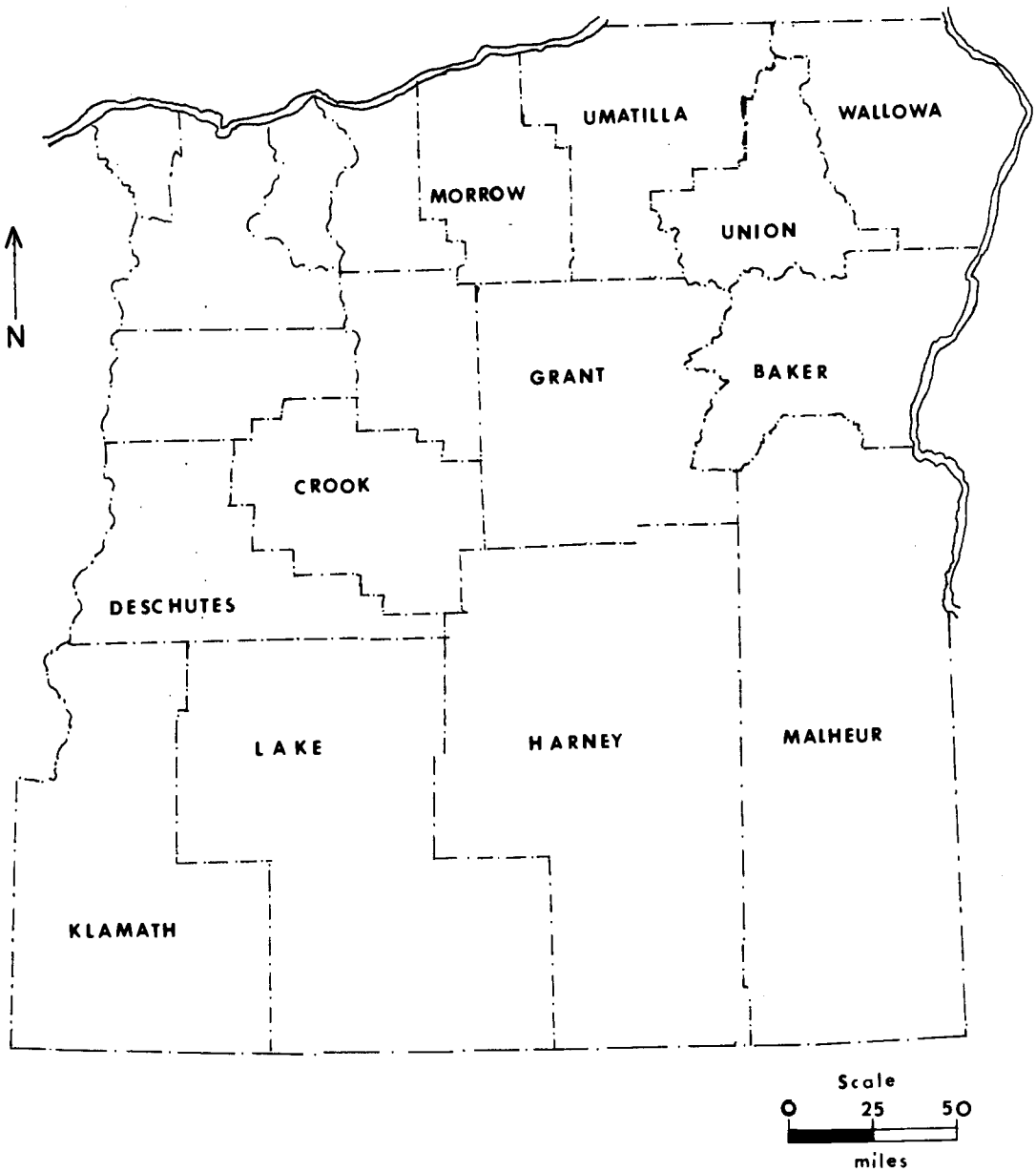
Examination of the range beef cattle ranches in eastern Oregon was done on the basis of overall characteristics, physiographic regions, and specific sampling of individual ranches.

The research area involves that land east of the Cascade Mountains used by large range cattle ranches (Figure 1). Within this area are two physiographic provinces divided into regions: the Columbia Intermontane Province (subdivided into the Columbia Basin, the Central Mountains, the High Lava Plains, the Malheur-Owyhee Uplands, and the Snake River Lava Plains), and the Basin and Range (Allison, 1968). All but the Snake River Lava Plains pertain to this study.

It was necessary to define size limits for ranches studied. After reviewing beef ranch characteristics with county extension agents, two arbitrary boundaries were set; a minimum of 1,000 cattle in the basic herd, and a minimum of 40,000 acres of land available for grazing. Ranches running fewer than 1,000 head were felt to lack sufficient size, and those with fewer than 40,000 acres were considered to be conducting a pasture-based, rather than an open range operation.

Approximately 50 cattle ranches in eastern Oregon meet these specifications. Each qualifying ranch was assigned a number, then 20 were selected, using a random number table. However, since the ranchers' cooperation was necessary for the researcher to visit each ranch and obtain data, the eventual selection of 14 ranches was not entirely random. Ranchers names were obtained from the appropriate county agents,

Figure 1. Counties in Research Area



then permission to interview was sought by mail, and a personal interview followed. By request, names of ranchers and ranches will not be disclosed.

Terminology

Fundamental to this study are two terms: cattle ranch, and range.

A cattle ranch is defined as a commercial, farm-type establishment maintained for breeding, raising, and selling calves and beef cows under range conditions. Ranches may incorporate pasture and cultivated land, but the majority of the land is open range (Stein, 1966, and U.S.D.A., 1970).

Range is land unsuited for cultivation, but best used for grazing by ruminant animals. Eastern Oregon range is predominantly semi-desert, and due to combined influences of topography, soils and climate, has a low per-acre biotic productivity (Wood, 1971). Naturally occurring vegetation consists of varying densities of grasses and brush, with juniper and pine present on higher elevations, and in areas of slightly greater precipitation. Where water has been supplied by irrigation, the land is no longer considered range (Calef, 1960).

PHYSIOGRAPHY

Eastern Oregon rangelands cover a massive area, yet certain characteristics are evident throughout. Vegetation is generally sparse, and the soils are too poor, too rocky, too alkalai, or the slopes too steep for cultivation. Water is scarce. Many streams are intermittent. The relatively few permanent rivers carry a comparatively small volume of water, too small for large scale irrigation. Temperatures are more extreme than on the coast, reflecting the influence of a continental climate. The land is thinly populated.

Regions

As previously mentioned, the physiographic regions of interest here are the Columbia Basin, the Central Mountains, the High Lava Plains, the Malheur-Owyhee Upland, and the Basin and Range (Figure 2).

The Columbia Basin occupies an extensive area south of the Columbia River, between the Cascade Mountains and the Central Mountains. Topography varies from gently undulating to moderately hilly, with a limited number of steep slopes. The region is partly a low sand and gravel plain, partly a plateau with isolated basaltic buttes, and cut with canyons. Massive lava flows in the Miocene epoch deposited the basalt. Plio-Pleistocene sand covers some areas, notably, near Boardman. The soils of the Columbia Basin were formed under grassland or grassland-shrub vegetation, but most soil variations correspond to differences in precipitation. The soils vary from light and alkaline near the Columbia River to dark and nearly neutral on the higher elevations (Franklin, 1969; Allison, 1968).

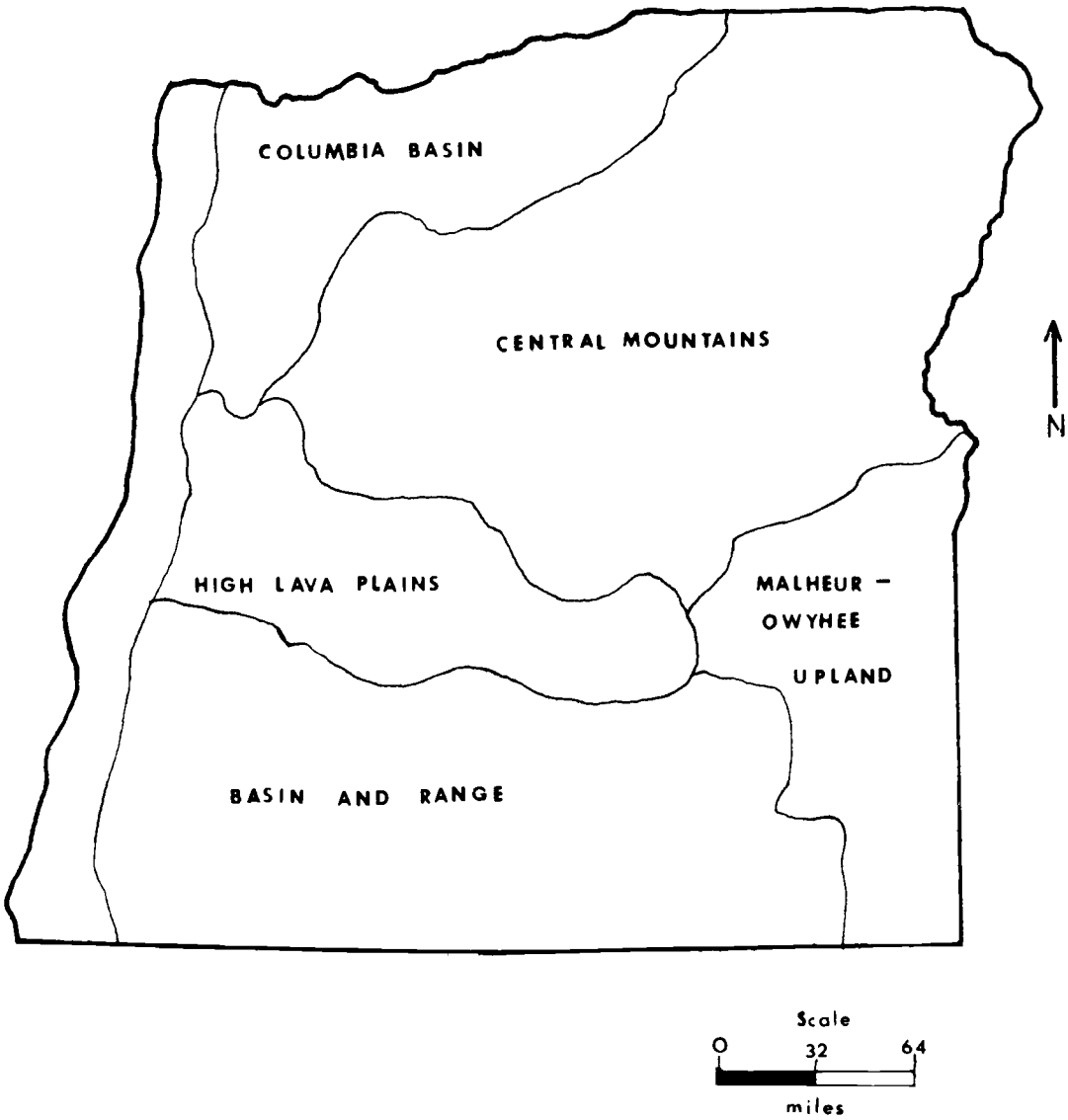


Figure 2. Physiographic Regions of Eastern Oregon

The High Lava Plains of central Oregon is an area of young lava flows broken by scattered lava buttes and cinder cones. The relief is moderate, and most of the region has a base elevation of 4,000 to 5,000 feet. The geology is largely Pliocene and Pleistocene lavas, tuffs and alluvium, with Quarternary valley fill deposits overlying the older volcanic flows. The combination of porous bedrock and scant rainfall results in many streams having only seasonal flow. Soils in the central and eastern portions are mainly Browns, Chestnuts and Lithosols, supporting grassland-shrub vegetation. Further west, open coniferous forests are supported by regosolic soils on a pumice base (Franklin, 1969; Allison, 1968; Dyrness 1958).

The Basin and Range in southern Oregon is a high lava plain characterised by fault block mountains enclosing basins with internal drainage. The province is largely comprised of flows of basalt, pyroclastics, and alluvium dating from the Miocene to Recent epochs. The soils in the west which developed under forest vegetation, on a pumice base, are slightly acid, with greated water holding properties than might be expected. South and east of the pumice plateau, open forests interspersed with grassland-shrub are based on Brown Forest soils, Regosols, and Lithosols (Franklin, 1969; Allison, 1968; D-rness, 1958).

The Malheur-Owyhee Upland is essentially a plateau of 4,000 to 8,000 feet elevation, drained by the Owyhee River and its tributaries. Much of the land is rolling hills of low relief, underlain by Cenozoic lava flows, tuffs and lake beds. Brown, Chestnut and Lithosol soils predominate, supporting desert-shrub and grassland-shrub vegetation (Franklin, 1969; Allison, 1968).

Climate

The eastern Oregon rangeland under study is classified by Köppen as having highland, and dry steppe climates (Strahler, 1969). January temperatures average between 20° and 32°F., and July temperatures between 62° and 74°F. The commonly experienced temperature extremes differ markedly from these figures, however, dropping to below zero degrees in winter, and reaching over 100°F in summer (Rudd, 1968).

The frost-free season is short in most areas, precluding the growing of most crops, even if sufficient water were available.

Average annual precipitation is irregular and exceedingly low. A small area of the Wallowa Range receives 30 to 50 inches per year, and the surrounding area 20 to 30 inches of preciptation. However, the rest of eastern Oregon averages less than 20 inches of precipitation each year, with large areas averaging less than 10 inches annually (Figure 3). Much precipitation arrives as snow (Rudd, 1968). Even so, the total runoff (Figure 4,5), snowfall, and rainfall are exceeded by the evapotranspiration rate, and the area is essentially a water deficient region (Wood, 1971).

Vegetation

The natural vegetation of eastern Oregon is not of high forage value. Factors of soil and water generally dictate that the useful forage production available for conversion to meat by beef cattle is measured in acres per animal unit. For comparison, the carrying capacity of most good quality pastures is noted in animal units per acre.

Much of the southern half of eastern Oregon is grassland-shrub range.

This is a spring-fall use range (Figure 6). Principle brush species are sagebrush (Artemesia spp.), rabbitbrush (Chrysothamnus spp.), and bitterbrush (Purshia tridentata), while the most common grasses are bluebunch wheatgrass (Agropyron spicatum), Idaho fescue (Festuca idahoensis), Sandberg bluegrass (Poa secunda), and squirreltail (Sitanion spp.) (Franklin, 1969; Poulton, 1968). The carrying capacity of this range varies greatly with the range condition. Where there is over 15 percent brush cover, and the range is in poor condition, 20 to 40 acres per AUM is the rule. When the range is in fair condition, approximately 10 acres per AUM is required. This range in good condition will support a cow on five acres per month (Isley). If the brush has been destroyed and the land re-seeded with a good cattle grass (example: crested wheatgrass), the range may support one AUM per 3 to 5 acres (Frischknecht).

Desert shrub range exists over saline soils in limited areas of southeastern Oregon. It is primarily a poor quality, browse, winter range utilized by sheep (Isley) (Figure 7).

Juniper (Juniperus spp.) range occurs frequently in the northern areas. Considered a spring-fall range, it may be grazed in summer if other summer range is unavailable. Although the understory is similar to that of the grassland-shrub, juniper range varies trmendously (Figure 8). Some areas are extremely rocky; others, where juniper is invading, are typical big sagebrush lands, and can be similarly productive. Range inhabited by juniper for a long time is characteristically rocky, with low forage production. However, good production can occur where there is a considerable amount of stone, in reasonably deep profile soil. Under these conditions more moisture than usual is retained. With suc- variability in terrain and conditions, the carrying capacity of juniper

range is between 5 and 50 acres per AUM (Poulton, 1968; Isley).

For cattle, conifer grasslands are a summer and early fall range. The typical overstory is Ponderosa pine (Pinus ponderosa), with some Douglas fir (Pseudotsuga menziesii) and lodgepole pine (Pinus contorta). The understory is typically sagebrush-grass, or bunchgrass, pinegrass (Calamagrosis rubescens), or elk sedge (Carex geyeri). The carrying capacity of this range is approximately 6 to 15 acres per AUM (Poulton, 1968; Isley).

Mountain grass ranges are usually summer grazing areas. The major forage species are the sedges, Idaho fescue, green fescue (Festruca veridula) and sheep fescue (Festuca ovina). Mountain grasslands are frequently steep or fragile areas, and although many are quite productive, forage consumption is seldom the limiting factor. On these ranges trampling, or excessive use of bedgrounds and other flat areas takes precedence to grazing pressure. The average carrying capacities are approximately 4 to 7 acres per AUM (Franklin, 1969; Isley).

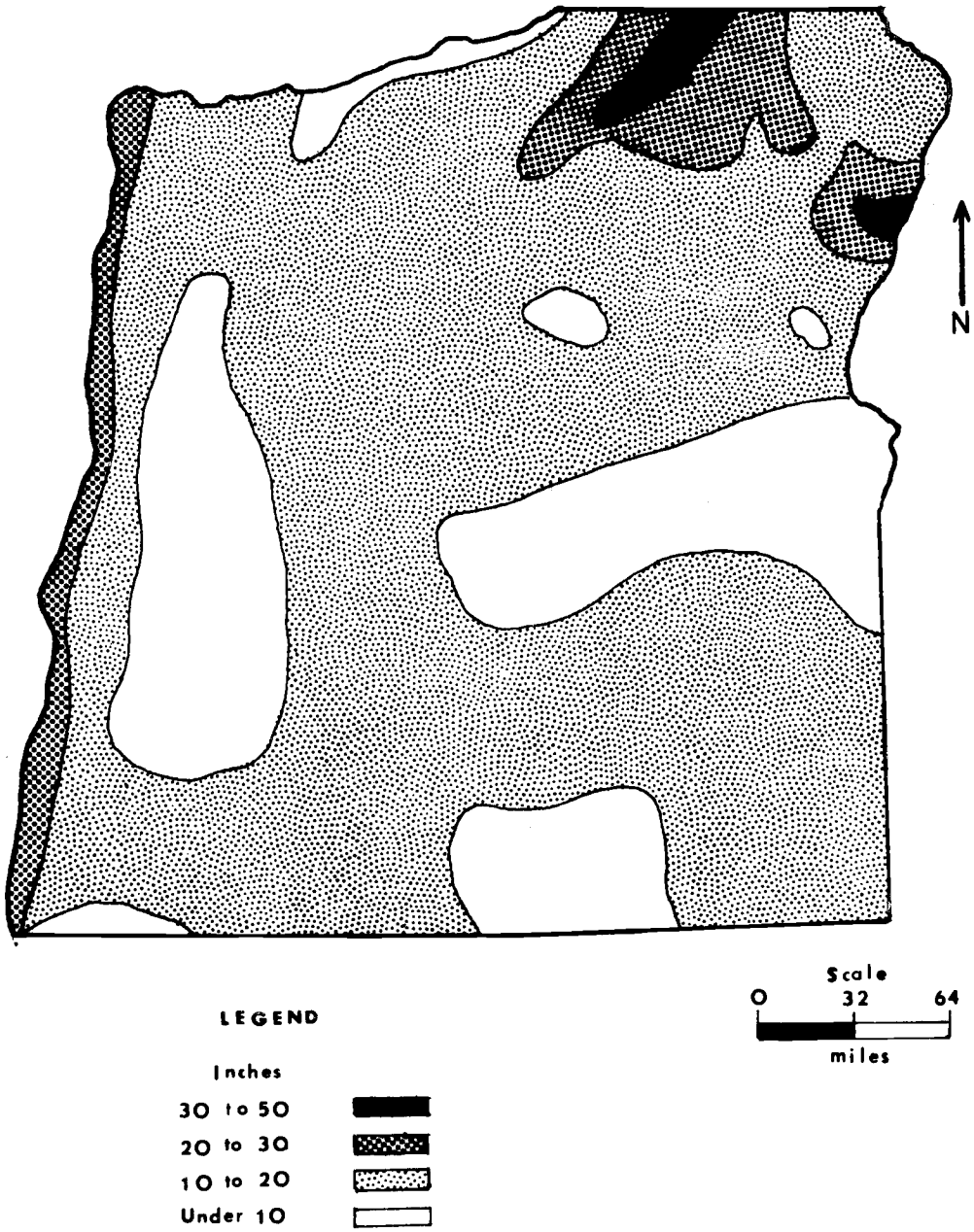


Figure 3. Average Annual Precipitation in Inches (Rudd, 1968).

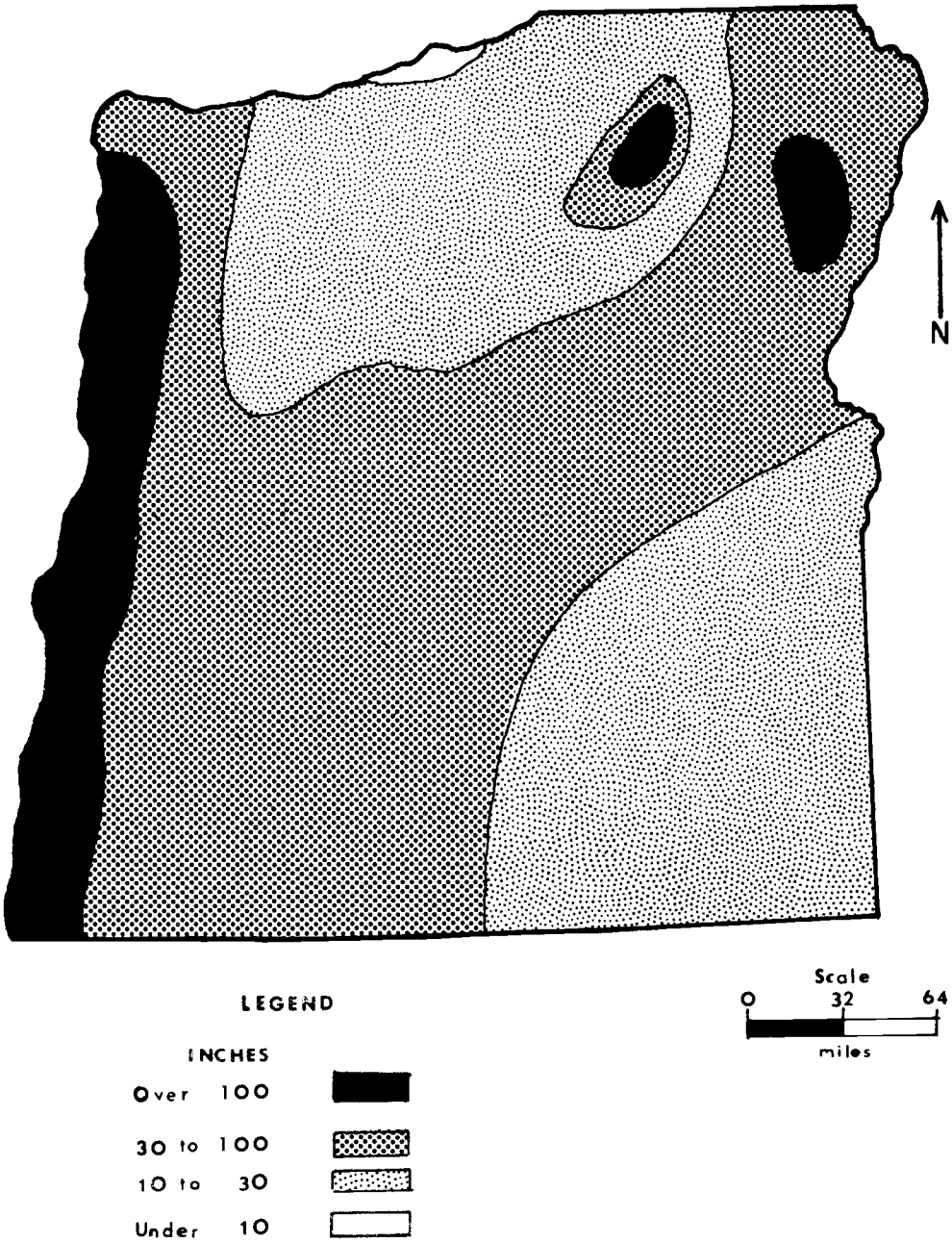


Figure 4. Average Annual Snowfall in Inches (Rudd, 1968).

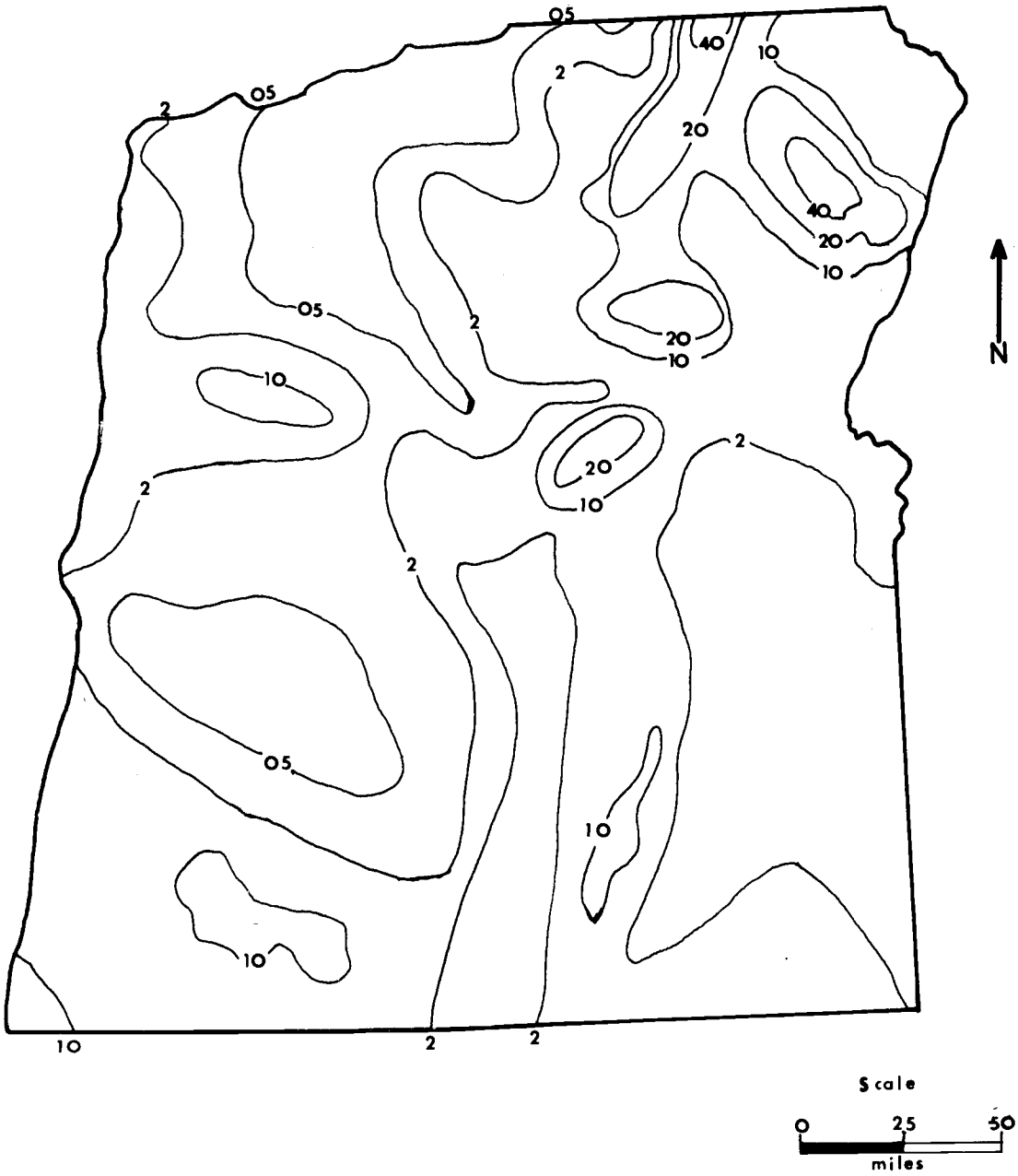


Figure 5. Mean Annual Runoff in Inches (Pacific Northwest River Basins Commission, 1971).

Figure 6. Grassland-shrub Range in the Basin and Range. Forage shown in early winter. Carrying capacity is approximately 15 acres per animal unit month.

Figure 7. Desert-shrub Range in the Basin and Range. Early winter. Carrying capacity is approximately 30 acres per animal unit month.

Figure 8. Juniper Range with a grassland-shrub understory on the High Lava Plains. Grassland-shrub range shown in foreground. Late Fall photograph. Carrying capacity is approximately 25 acres per animal unit month.

BEEF RANCHING SYSTEMS

Description

The eastern Oregon beef ranches examined in this paper are extensive, each encompassing in excess of 40,000 acres. They are lower order endeavors, less mechanized and technologically advanced than other forms of agriculture in the United States. They are located on land of relatively low productivity and value, and do not compete with cropping or occupy arable land adjacent to highly populated centers. The ranches are mostly family owned and operated cow-calf enterprises. A few of the largest ranches have on-ranch feedlots, but most feedlots are located near transport facilities along the Columbia River.

The typical ranch base is located on a nucleus of several thousand deeded acres containing a continuous water supply. Ranch buildings occupy two to four acres, and the remainder is in pasture, irrigated pasture, and hayfields. Most ranchers lease additional acreage for hay, pasture, and grazing. The largest part of each ranch is the open range. Parcels of open range vary in size from 22,000 acres to over 500,000 acres. Virtually all of this land is under federal control, and individual use rights are obtained through renewable grazing allotments from the U.S. Forest Service, Bureau of Land Management, or the Bureau of Indian Affairs. These permits are essential to ranch existance; over 40 percent of summer forage requirements, alone, are met by federal rangelands. The lands are grazed in rotation, using different spring-fall ranges, summer ranges, and winter range to minimize damage to the forage (Wood, 1971).

Regional Variations

Beef ranching exhibits surprisingly uniform characteristics throughout eastern Oregon. What regional differences do occur may be summarized as variations of scale, market age and market weight.

In the Columbia Basin, where the land is more fertile, and forage more plentiful, ranches are smaller (Table 1). Calves are marketed at approximately 500 pounds for weaners, and 700 pounds for 16 to 18 month old calves (Table 2).

In the Central Mountains, the rugged terrain inhibits grazing movement and access. One rancher must drive his cattle through the town of John Day to move them to winter range. Ranches are slightly larger than in the Columbia Basin (Table 1), but market weight and age of calves appears the same (Table 2).

On the High Lava Plains conditions are drier. Ranches are still larger (Table 1), but again market weight and age appear constant (Table 2). Ranchers here raise virtually all of their feed.

The largest ranches are located in the Basin and Range, and Owyhee Upland (Table 1). In the vicinity of the Steens Mountain, dry range is used, necessitating the daily trucking of water to cattle grazing 15 to 40 miles from the ranch base. On this land more acres are required to support each animal, and the desert calves were reported to be marketed earlier (six to eight months old) and at lighter weights (400 to 500 pounds) than elsewhere (Table 2).

Table 1. Ranch Size and Land Use for Ranches Sampled[a]

Ranch	Nearest Community	Number of Acres Deeded	Leased	Permit	Cropped	Total Acres	% of Roughage Grown	Purchased	Roughage Grown
A	Umatilla	3,600	10,000	31,000	330	44,600	90	10	hay, alfalfa
B	Umatilla	5,000	6,000	38,000	300	49,000	90	10	hay, oats, alfalfa
C	Heppner	2,000	8,000	60,000	500	75,000	95	5	hay, alfalfa
D	Baker	22,000	30,000	120,000	1,500	178,000	90	10	hay, grass
E	Keating	18,000	10,000	80,000	800	112,000	90	10	hay, alfalfa
F	John Day	20,000	23,000	23,000	2,000	68,000	90	10	meadow hay
G	John Day	19,000	5,000	90,000	1,500	114,000	90	10	hay
H	Burns	11,000	5,000	150,000	3,500	166,000	90	10	hay, grass
I	Burns	25,000	4,000	144,000	2,000	174,000	100	0	wild hay, grass, alfalfa
J	Prineville	21,000	6,000	100,000	1,100	128,000	90	10	hay
K	Lakeview	32,000	10,000	500,000	5,000	542,000	100	0	hay, grains, alfalfa
L	Lakeview	68,000	113,000	308,000	11,000	489,000	100	0	hay, alfalfa, grain
M	Princeton	28,000	0	73,000	900	101,000	100	0	hay, alfalfa
N	McDermitt	63,000	0	420,000	5,400	490,000	100	0	hay, oats, barley

[a]For convenience and anonymity, ranches are designated by letter.

[b]This column represents the total acres each rancher reported using. It is not the sum of the previous columns; some ranchers use land to which they have no deed, lease, or use permit.

Table 2. Number, Kind, and Weights of Cattle on Ranches Sampled.

Ranch	Kind of Cattle	Number of Cattle[a] on Ranch	Number of Calves Marketed	Market[a] Age	Market[a] Weight	Month[a] Sold	Percent Sold for[a] Feedlot Finishing
A	Hereford	1,600	550	14 mo.	600 lb.	Oct. Nov.	100
B	Hereford	1,400	450	16 mo.	700 lb.	Oct.	90
C	Hereford cross	1,300	500	16 mo.	700 lb.	Oct. Jan.	100
D	Angus x Charollais	3,300	1,000	10 mo.	500 lb.	Nov. Jan.	100
E	Angus cross	1,800	600	10 mo.	550 lb.	Nov. Jan.	100
F	Hereford	1,200	500	16 mo.	700 lb.	Oct. Nov.	100
G	Hereford	1,500	600	16 mo.	650 lb.	Oct.	90
H	Hereford	1,500	600	18 mo.	700 lb.	Oct. Nov.	80
I	Hereford	2,000	800	12 mo.	650 lb.	Oct.	100
J	Hereford cross	2,100	750	14 mo.	700 lb.	Oct.	100
K	Hereford	3,000	800	10 mo.	450 lb.	Oct. Nov.	100
L	Hereford cross	9,000	7,000	10 mo.	450 lb.	Sept. Oct. Jan.	100

[a]These figures are all averages, as reported by the ranchers.

Table 2. Continued.

Ranch	Kind of Cattle	Number of Cattle[a] on Ranch	Number of Calves Marketed	Market[a] Age	Market[a] Weight	Month[a] Sold	Percent Sold for[a] Feedlot Finishing
M	Hereford x Angus	1,600	800	6-8 mo.	350 to 500 lb.	Nov. Feb.	100
N	Hereford x Durham x Angus	3,000	1,500	6 mo.	400 lb.	Dec. Mar. Apr.	100

[a]These figures are all averages, as reported by the ranchers.

Transportation and Marketing

Highways provide the primary transportation; the importance of rail lines to eastern Oregon beef ranches is negligible. Despite this, the number of miles of paved road is comparatively small in relation to the massive area served (Figure 9). Ranches are isolated and supplies must be purchased in quantity, to avoid undue loss of time from work, and excess fuel consumption, and wear on equipment.

Cattle are customarily sold to feedlot buyers at the ranch, not brought to town as is the practice in other locales. The cost of feed is sufficiently high that approximately 75 percent of the beef purchased is shipped to neighboring states for finishing (Frischknecht). Most of the calves are trucked to Washington, Idaho, California, Colorado, and even as far as Oklahoma and Nebraska. The meat is then shipped back into Oregon for retail sale (Agricultural Experiment Station, 1968).

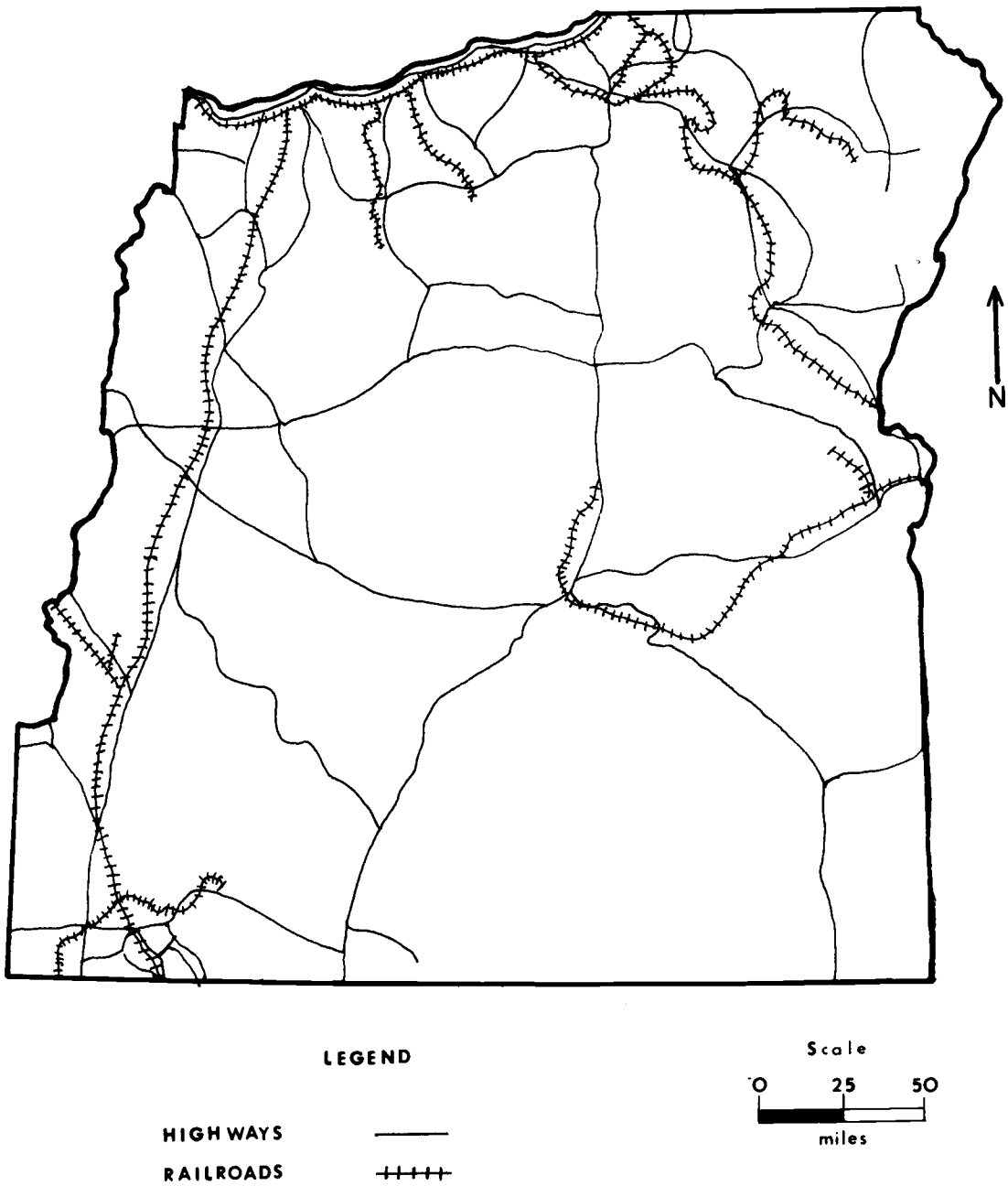


Figure 9. Transportation in Eastern Oregon - Highways and Railroads. (Highsmith, 1958)

ENVIRONMENTAL CONSTRAINTS AND PROBLEMS

To date, ranchers have been bothered little, if any, by urban expansion. However, the factors of sun, limited rainfall and "wide open spaces" which characterize rangelands have begun to lure real estate developers. Subdivisions, such as the Sun River Estates near Burns, have begun to appear, and some ranchers have been asked to sell part of their more picturesque land for homesites. It may be expected that this pattern will continue, perhaps driving up land values, and taxes until it is increasingly difficult for ranchers to stay in business.

The single most limiting factor to the use of range may be the scarcity of water. The lack of water retards forage growth, restricts the length and location of livestock grazing, and inhibits stock movement. In dry years, less feed is produced by both range and pasture. Cattle must be moved more frequently from one area of grazing to another to avoid overgrazing the forage. Potentially good summer range may be unusable because the intermittent streams dry up in summer. In addition, cattle have to be moved around certain dry areas because the water is nonexistant, or nonpotable.

Hay and pasture production is also limited by the scarcity of water. In dry years, insufficient hay is produced on some ranches to meet the needs, because not only is hay quantity reduced, but ranchers must feed hay through the summer and fall to supplement inadequate range forage production. In these dry years, hay commands inflated prices, and ranch operating costs are proportionately increased.

Rangeland facilitates the existance of eastern Oregon beef ranches, yet it is also a major problem. By definition, range has low biotic productivity. Thus, cattle must graze miles further than is necessary on pasture to obtain comparable nourishment. Most of the topography is rugged, and the climate harsh, with cold winds and extreme temperatures. The effects of these factors result in each cow and calf expending more energy on body maintenance and survival than is required on pasture,under gentler conditions. The animal's meat producing efficiency is impaired, and it takes longer for them to reach market weight than for pasture-raised animals. In addition, breeding is more difficult than on pasture. Bulls customarily service approximately 28 cows, but must travel farther with their herds, over more dangerous terrain than faces animals on pasture. Servicing cows in rough country is both difficult and dangerous. Cows experiencing difficulty in calving may not receive prompt or necessary assistance, and calf numbers are frequently smaller than obtained on pasture. Ranchers in the drier areas of the Basin and Range and Malheur-Owyhee Upland customarily sell their calves before they are a year old to avoid wintering them over. The ranchers feel the reduction in selling price they must take is more than compensated for by the reduced feed consumption, and work load, resulting from having fewer animals to carry through the winter.

An additional modern environmental problem is the result of historic mismanagement. Despite their appearance, rangelands are fragile ecological systems. Many areas were abused by early settlers, who found vast fields of grass, and grazed their livestock on these until the land could no longer recover. Parts of the Basin and Range, near Frenchglen

and the Steens Mountain, were once grasslands, and are today semi-desert (Johnson, 1904; Jackman, 1964). Unfortunately, overgrazing has been reduced, but not eliminated.

The third major environmentally imposed problem is isolation. Distances in eastern Oregon are great, and the population small. Ranches are isolated from neighbor ranches, and from town services. The isolation is especially irritating to the wives of ranch workers, who lack outside company, miss the customary pleasures of community functions, and worry about the distances their children travel to school, and the quality of education received in school. In winter, travel is impared by snow, and children are kept home from school more because of the long, slow journey than excess quantities of snow.

The great distances also impair ranch work. Tasks that take short hours on small ranches occupy most, or all of the day when travel across hundreds of miles is involved. In addition, machinery which breaks down is more likely to be repaired on the ranch, no matter how poor the repair may be, than taken into town for expert servicing. Equipment wears out faster on the range because it is used over extensive areas of un-smoothed land and subjected to more travel abuse than on smaller operations.

CONCLUSIONS

Eastern Oregon range beef cattle ranches are comparatively primitive operations when compared to other forms of agriculture, yet they make commercial use of range resources which would otherwise be wasted. In doing so, they increase the monetary value of the land used.

Economies of scale are important. This writer believes that the largest of the ranches studied have the best chance of surviving the next fifty years.

Increasing pressure for alternative land uses is to be expected. This pressure will come from real estate developers, and from the recreation industry, interested in utilizing the range for other purposes. With real estate development, higher property values, and taxes may be expected.

These factors indicate improved efficiency of meat production, range and ranch management is essential if the range cattle ranches are to remain the business under expected pressures from other industries. It may be expected that range cattle ranches will decrease in importance as a source of meat, but not die out altogether. They represent a way of life which, when coupled with astute management practices, will be sufficiently desirable to be preserved for the lifestyle, as much as for economic gain.

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Mr. Arleigh Isley, Lake County Extension Agent, Lakeview, Oregon 1970, 1971.

Mr. Gene Nelson, Farm Management Specialist, Oregon State University, Corvallis. 1973, 1974.

APPENDIX A

GLOSSARY

AU - animal unit. The theoretical approximation of the amount of fodder a mature cow requires.

AUM - animal unit month. The theoretical approximation of the amount of fodder a mature cow will ear in one month.

carrying capacity - the number of AUM's an area of range can support over time without damage to the forage.

cow-calf ranch - a ranch where cows are bred to produce calves which are sold for meat.

finish - also finish out. A process of fattening cattle for market, using grains as food.

forage - here, also fodder. Natural food for livestock. Often entire plants are eaten, including leaves, stems, and grains.

hay - grasses and forbes cut and dried for livestock feed.

operation - ranch or ranch work.

range - open areas where reminant animals graze on the natural grasses, forbes, and browse.

weaner - a calf just removed from its mother in order to stop suckling.