United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

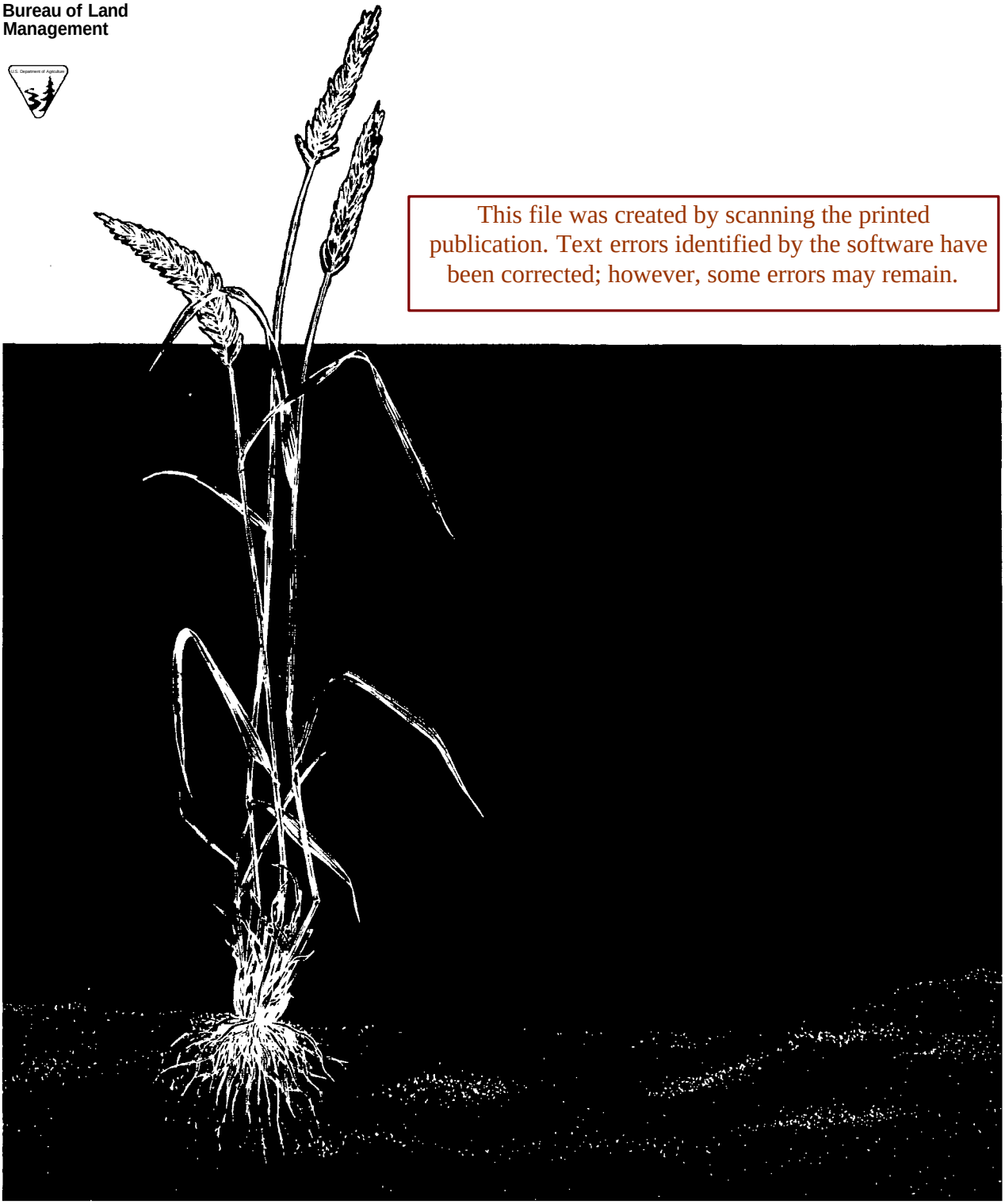
Resource Bulletin
PNW-RB-157
June 1988

U.S. Department
of the Interior

**Bureau of Land
Management**

The Vale Rangeland Rehabilitation Program: An Evaluation

Harold F. Heady, Editor



Authors

BARBARA H. ALLEN is assistant professor, University of California, Berkeley. She has an A.B. degree in anthiopology and graduate degrees in range management. Before joining the faculty she was regional ecologist, USDA Forest Service, Pacific Southwest Region. Her main research interests are ecosystem classification, meadow ecology, and forest grazing.

E. THOMAS BARTLETT is professor of range science, Colorado State University, Fort Collins. He holds degrees from Utah State University and the University of Arizona. His research and teaching concentrate on economics, policy issues, multiple-use planning, andvaluation of rangeland resources.

JAMES W. BARTOLOME is associate professor of range ecology, University of California, Berkeley, where he has been on the faculty since **1979.** His interests are the ecology and management of grassland, oak savannah, conifer forest, and sagebrush types. He coauthored the evaluation of the Vale Project published in **1977.**

HAROLD F. HEADY is professor emeritus of range management, University of California, Berkeley, and was principal investigator of both the **1977** and this Vale Program evaluation. He has been professionally concerned with sagebrush ecology and use since doing range survey in southern Idaho in summer **1936.**

LYNN HUNTSINGER works in the Rangeland Resources Assessment Program, California Department of Forestry and Fire Protection, Sacramento. She holds an undergraduate degree in Chinese history and is a Ph.D. candidate in range at the University of California, Berkeley. Her major interests are China's rangelands, land-owner attitudes, and grazing in mixed forests.

THOMAS M. QUIGLEY is research scientist, USDA Forest Service, Pacific Northwest Research Station, La Grande, Oregon. He has interests and publications in range economics, modeling the ranching industry, estimating the demand for Forest Service forage, grazing fee policy, and the costs and benefits of range improvements.

Abstract

Heady, Harold F., **ed.** 1988. The Vale rangeland rehabilitation program: an evaluation. Resour. Bull. PNW-RB-157. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management. 151 p.

This manuscript discusses the initiation, execution, and outcome of an 1l-year (1962-1972) rangeland rehabilitation program in southeastern Oregon. Resource Bull. PNW-70 (1977) is updated with 1986 measurements and evaluations of vegetational conditions, wildlife, recreational use, livestock grazing, and management of public rangelands. The mix of multiple uses has changed since 1977 as a resutt of new laws, regulations and public opinion. Perceptions about the management of the area's public land are surveyed. The lessons from this large and successful program should serve as a guide for managing other rangelands.

Preface

The first edition of this report, "The Vale Rangeland Rehabilitation Program: The Desert Repaired in Southeastern Oregon" by **H.** F. Heady and J. W. Bartolome, described and evaluated results of the large-scale rangeland rehabilitation program on lands administered by the Vale, Oregon, District of the Bureau of Land Management (BLM). That 1977 publication, which is no longer available, included many maps of district characteristics, listed the projects undertaken over a 1O-year period, and showed their locations. Selected as a U.S. contribution to a worldwide review of desertification problems and solutions, the publication was widely distributed by the United Nations Environment Program. It was reprinted in 1980 along with other studies in a hard-cover **book** entitled "Desertification," edited by M. R. Biswas and A. K. Biswas and published by Pergamn Press.

Since the earlier report was published, many legislative and societal changes have taken place: New laws affecting rangeland management have been enacted; interest in management of public lands has heightened; Federal support has been redirected; market and nonmarket values of rangeland resources have shifted; and the costs and benefits of ranching have changed from those of a decade ago. For all of these reasons, it seemed appropriate in 1986 to do another study with the following objectives:

- To evaluate the responses of vegetation and other resources to land treatments and grazing management since the baseline descriptions in 1975.
- To analyze the economic impacts of the Vale Program.
- To determine the life expectancy of various range improvements, including associated maintenance and operational costs that affect their life expectancy.
- To ascertain user, public, and BLM perceptions of the Vale Program.
- To update the lessons learned in the Vale Program and again make them available for guidance in land rehabilitation elsewhere.

This report goes beyond a biological and physical characterization of the area because the program cannot be fully understood without an analysis of the many factors surrounding its initiation. Presented are the history of land use in Malheur County, some practical politics of land management, multiple use relationships, impacts of range rehabilitation on many parts of the rangeland ecosystem, community reactions to the program, and economics of rangeland rehabilitation. Because the public land use issues embodied in the Vale Program are seldom analyzed on so large a scale, the program's evaluation should be useful far beyond the boundaries of Malheur County, Oregon.

All resource management programs, including the Vale Program, aim to accomplish good ends. The kinds of products and the quantities of each may be indicated in the plans for the program; but society, economics, and political events may change them. Competition and controversies develop, so managers of public lands must answer changing multiple use questions as time goes on. The public, through Federal and State laws and court decisions, now asks for more consideration of environmental impacts, deeper analysis of land use alternatives, better informed resource allocation, and more and longer term resource planning than it did when the Vale Program was initiated, carried forth, and first evaluated.

The Vale Program began without full inventory and analysis of the landscape conditions. Little monitoring of effects of the early land treatments was done beyond estimates and evaluations needed for further on-the-spot decisions. By 1975, however, more systematic sampling of vegetation had been initiated, and the same sampling procedures were used in **1986.** In addition to an evaluation of effects on vegetation, the 1986 study included an analysis of economic impacts, an opinion survey, and an updated literature search.

Several terms are defined to clarify their use within this work. Rangeland refers to the land and its resources of soil, water, vegetation, and wild animals. Rangeland management means land management for all purposes. Livestock management principally concerns the movement and husbandry of domestic animals. Wildlife includes game, fish and other wild animals. Animal unit month (AUM) refers to a mature cow (with or without a calf) grazing for 1 month, or its equivalent in other kinds and classes of livestock. Any cow or horse over **6** months old is counted as an animal unit (AU) by the BLM: The word "Program" is used throughout to encompass the 10-year rehabilitation program that began in **1962,** while "project" denotes a specific operation, as the "Chicken Creek Seeding Project."

Acknowledgments

This study was funded by the United States Department of the Interior, Bureau of Land Management and is the second decadal review of the Vale District's Rangeland Rehabilitation Program.

The authors wish to express their appreciation to the personnel of the Vale District for many hours of assistance in providing data, assistance and counsel; to BLM's Portland State Office for coordination and review; to the Pacific Northwest Research Station for their assistance throughout the life of the project; and to the many individuals who so graciously completed the questionnaires and msponded to interviews.

Contents

Chapter 1 The Vale BLM District

Harold F. Heady

Ecological Features

Location and Extent

The Vale Rangeland Rehabilitation Program, located in southeastern Oregon roughly within the latitudes 42 and 44 degrees north and longitudes 117 and 118 west (Fig. 1-1), forms a rectangle approximately 175 by 60 miles (280 by 100 km) encompassing 6.5 million acres (2.6 million ha). At the time of the program's inception, its boundaries coincided closely with those of the Vale BLM District and Malheur County, Oregon. However, since the first evaluation of the program in 1977 by Heady and Bartolome, the Vale BLM District has been enlarged to include most of Baker County, Oregon. To avoid confusion with the present Vale District, throughout this report we will refer to the area covered by the rehabilitation program as the "study area," the "program area," or, in some instances, "Malheur County."

Physiography

Elevations in Malheur County range from 2,000 to nearly 8,000 feet (600 to 2,400 m). The higher elevations are in the Trout Creek Mountains to the southwest and in the upper reaches of Bully Creek in the northwest. The former drain northward into a closed basin or southward toward the Quinn River, while the latter drain eastward toward the Snake River. Main drainages are the Malheur River which flows from the west and the Owyhee River which flows northward through the southeastern corner of Oregon.

Figure 1-1. Location **of Malheur County Oregon and the Vale BLM District at the time of the rehabilitation program.**

The most extensive landform is a gently sloping to rolling lava plateau with elevations above 4,000 feet (1,200 m). This plateau has been carved extensively into canyons with vertical cliffs by branches of the Owyhee River and Succor Creek (Kittleman 1973). Mesas of several thousand acres, the remnants of earlier plateaus, are important as management units with well-defined topographic boundaries. The variety of physiographic features such as the rugged Owyhee Breaks along the east side of the Owyhee Reservoir and the Rome Coliseums, Mahogany Mountains, and Three Finger Rock contrast with the broad, flat expanse of Barren Valley in the west-central portion of the area. Numerous closed basins indicate the existence of ancient lakes. Relatively recent lava flows (some probably between 500 and 3,000 years of age) in the central region still remain devoid of soil and vegetation. The Jordan Craters and caves in the lava flows appear as if they were formed only yesterday. The older lava has varying degrees of soil development. Basaltic and rhyolitic lava and tuffs, ranging in age from Miocene to Recent, underlie extensive areas.

Climate

The study area is in a semiarid transition zone between continental and Pacific coastal types. Rainfall and temperature vary widely from season to season. The region is cold desert typical of the Great Basin. Most of the program area receives an average of 7 to **12** inches **(180** to 300 mm) *of* precipitation annually. Average annual precipitation strongly correlates with elevation, with only the higher mountains receiving more than **15** inches (380 mm).

Table 1-1. Precipitation In Inches at Vale, Oregon, on an annual basis of July 1 to June 30

Year ending	Total	July-December	January-June
1986	9.20[a]	4.72	4.48[b]
1985	7.07	4.27	2.80
1984	14.05	8.25	5.80
1983	16.12	7.97	8.15
1982	13.75	8.03	5.72
1981	11.13	4.03	7.10
1980	13.63	6.31	7.32
1979	8.38	2.22	6.16
1978	15.14	5.90	9.24
1977	7.42	3.51	3.91
1976	8.98	5.69	3.29
1975	9.44	3.40	6.04
1974	6.98	4.11	2.87
1973	7.29	4.19	3.10
1972	7.91	4.16	3.75
1971	9.80	5.52	4.28
1970	10.27	3.54	6.73
1969	12.59	5.90	6.69
1968	6.79	2.63	4.16
1967	11.13	5.37	5.76
1966	6.57	4.36	2.21
1965	10.12	5.43	4.69
1964	11.19	4.12	7.07
1963	10.54	5.40	5.14
1962	9.39	4.38	5.01
1961	7.68	4.56	3.12
1960	10.96	4.39	6.57
1959	6.23	1.99	4.24
1958	10.74	2.75	7.99
1957	12.47	4.68	7.79
1956	10.01	4.90	5.11
1955	8.01	3.01	5.00
Mean	10.03	4.68	5.35
% of mean		47%	53%

Source: U.S. Dept. Commerce, 1955-1986.
[a] To convert inches to millimeters multiply by 25.4.
[b] May data missing.

Significant moisture for plant growth falls as snow from November to March and as rain showers in April and May. Thunderstorms in summer are ineffective for forage production. At Vale, Oregon, yearly precipitation (July 1 to June 30) averaged 10 inches (255 mm) between 1955 and 1986 (Table 1-1), but varied from about 6 inches to more than 16 inches. During the 11 years (1962 to 1972) when major vegetational

manipulation was occurring in the Vale Program, 6 years received above-average annual precipitation and only 1 year (1966) was exceptionally dry from January to June. Seasonal rainfall varied more than total rainfall over the 32-year period: 43 to 176 percent of normal for July to December and 41 to 173 percent for January to June, compared with 62 and 161 percent for the entire year. During this time, a period of 5 consecutive years with above-normal rainfall and another with 7 consecutive dry years occurred.

Temperatures vary greatly by season and are markedly influenced by elevation. Danner, Oregon, at an elevation of 4,000 feet (1,200 m) near the center of Malheur County, showed a range of mean monthly temperatures from 68.5 °F in July to 24.6 °F in January (20.3 to -3.7 °C) over a 32-year period. All mean monthly temperatures for November through March were below 40 °F (4.6 °C).

The cold winters and lack of summer moisture limit the actual growing season to a short period in spring and early summer. The frost-free season is less than 90 days in areas above 4,500 feet (1,375 m), which limits agriculture to the growing of feeds. Grazing on green feed is restricted by the ephemeral nature of watering places as well as the short growing season. Few permanent water sources exist over much of the program area, especially outside of patented land, aside from livestock water developments.

Soils

Published soil surveys for Malheur County are limited to the cultivated land along the flood plains of the Snake and Malheur Rivers. These soils produce harvested forage and pasture but are considered rangeland only where they cannot be irrigated. The original vegetation was probably dominated by basin big sagebrush.

Upland soils are being studied. Those on old fans and terrace remnants are loamy and well-drained with cemented hardpans about 10 to 20 inches (250-500 mm) below the surface. A coarse gravel and cobble pavement is often present. Native vegetation is highly vaned (Lovell and others 1969). Other soils on gently sloping to rolling plateaus have developed from rhyolites and basalts. Typically, these soils are fine loamy to clayey, light colored, very stony, and usually less than 20 inches (0.5 m) thick. Often a thin silica-cemented hardpan is present. These upland soils with near-maximum depth were the major areas for rangeland seeding. Native vegetation is the sagebrush/bunchgrass type (Lovell and others 1969). Small areas of soils that developed from granitic parent material have little potential for forage production.

Vegetation

Dealy and others (1981) have given a succinct description of plant communities in southeastern Oregon. Their area of concern was larger than the program area but nearly all of the descriptions apply, so it is appropriate to summarize their vegetational types and subtypes (Table 1-2). The draft environmental impact statement for grazing management (BLM 1983) for that portion of the Vale District south of the Malheur River gives a different set of categories of vegetation on public land (Table 1-3). These are included mainly to indicate the size of the major vegetational types.

Table 1-2. Plant communities in southeastern Oregon (Dealy and others 1981)

Community	Number of subtypes	Elevational range		General soil characteristics
		M	Ft	
Riparian	None	All		Highly variable
Quaking aspen	Two	1,525	5,000	Moderately deep
		2,134	7,000	to deep
Curlleaf mountain-mahogany	Five	1,600	5,250	Shallow to moderately deep and stony
		1,950	6,400	
Western juniper	Two	777	2,550	Moderately shallow, stoniness variable
		1,450	4,750	
Big sagebrush and similar species	Seven	600	2,000	Moderately deep to deep, stoniness variable
		2,400	8,000	
Low sagebrush species	Five	915	3,000	Very shallow and mostly very stony
		2,400	8,000	
Greasewood and saltbush types	Two	600	2,000	Deep to moderately deep, alkaline
		1,525	5,000	
Meadows	Two	All		Permanently or seasonally wet

Table 1-3. Areas of plant communities in the study area as given in the *draft* environmental impact statement (BLM 1983)

	Acres	Hectares
Big sagebrush	2,529,634	1,023,743
Low sagebrush	640,263	259,114
Crested wheatgrass seedings	320,293	129,623
Desert shrub	192,603	77,946
Native bunchgrasses	123,485	49,974
Rabbitbrush	116,216	47,033
Juniper/mahogany	66,787	27,028
Riparian	2,969	1,202
Total	3,992,250	1,615,663

Riparian habitats are small in area, but highly important for wildlife habitat, for livestock grazing, and because of their potential for erosion. Some of the major species occurring there are willow, aspen, mountain alder, cottonwood, hawthorn, wild cherry, wild rose, mock orange, and numerous moisture-loving grasses and sedges. [Scientific names of plants according to Hitchcock and Cronquist (1979) are listed in Appendix 1.] Damage of riparian vegetation commonly occurred because grazing, trails, pioneer movements, and later recreational activities concentrated there.

The quaking aspen types, which are usually near water, are today in variable condition. Stands in good or excellent condition usually have an understory of grasses and forbs. However, many stands are in deteriorated condition because of livestock use, and these frequently have an understory of mountain big sagebrush.

Curlleaf mountainmahogany is commonly an overstory above mountain big sagebrush, mountain snowberry, Idaho fescue, bigbluegrass, and bluebunch wheatgrass. These stands are sensitive to damage by fire and generally attract big game species and livestock.

Western juniper is a sparsely distributed overstory tree with understories of big sagebrush, bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, Thurber's needlegrass, and occasional rabbitbrush and antelope bitterbrush. The juniper type is essentially sagebmshlgrass with the addition of scattered juniper trees. The shrubs and grasses are typical of adjacent areas without trees. Western juniper and sagebrush are sensitive to fire; without fire they tend to increase, especially if grazing is severe.

Sagebrush species dominate the vegetation over most of the program area; Dealy and others **(1981)** record **14** species and subspecies in the area (listed in the Appendix). The low sage species make up less than a fourth of this vegetation, while the basin, mountain, and Wyoming subspecies are the dominant plants over considerable areas. Associated with the latter are bluebunch wheatgrass, Idaho fescue, Sandberg bluegrass, needle-and-thread, basin **wildrye,** and squirreltail. Cheatgrass dominates in recently burned areas where crested wheatgrass has not become a thick stand through seeding. Cheatgrass can be found in all the vegetational types in the region. Threetip sagebrush is another tall sagebrush but it is uncommon and found mostly on north- and east-facing slopes and on alluvial outwash areas. It is one of the few resprouting sage species. The silver sages are closely associated with seasonal flooding and are often found in a ring around areas that accumulate water.

Low sagebrush types include those dominated by stiff, cleftleaf, and those with "low" in the name. Local in distribution, most are restricted to shallow and droughty soils. Their palatability, especially to big game species, is high.

Lower elevation vegetation types receiving annual rainfall of less than 10 inches (250 mm) and with alkaline soils of the sierozem desert type also intergrade with the sagebrush/grass type. Shadscale, budsage, and spiny hopsage characterize the desert shrub type which is often found in a mosaic with Wyoming big sagebrush. Principal grasses are squirreltail and Sandberg bluegrass. This vegetation constitutes desirable winter range for livestock because of the many palatable browse species.

Wet and seasonally wet grassland communities, mostly meadows, are scattered throughout the study area. They have been grazed, often heavily. Some near ranch headquarters are in excellent condition, mowed for native hays and irrigated from local streams to increase forage production. They are favored habitats for wildlife as well as livestock.

Range Conditlon

The vast area described as sagebrush/grass is characterized by complex, intergrading mixtures of several dominant plant species, depending on prior use, fire history and microsite. Excellent range may contain up to 25 percent sagebrush, covering **10** to **15** percent of the soil.

When the Vale Program began, the mix of bunchgrasses and sagebrush was strongly tipped toward high brush density, many annuals, and few palatable perennial grasses as a result of a century of often exploitive grazing and little fire. In some locations, a perennial grass understory was almost absent, with annuals or bare soil occurring between the shrubs. In 1961 only 1 percent of the Vale District was described as excellent, or near-climax range. Ninety-nine percent reflected varying degrees of range deterioration exemplified by a reduction in perennials in the understory and an increase in brush density.

Large burned areas without sagebrush and with expanses of either cheatgrass, Sandberg bluegrass, or both dominated at the time of the survey in 1963. Abundant halogeton, lupine, and larkspur, also indicating poor condition ranges, were located in small areas north of Jordan Valley, southwest of Rome and near McDermitt. These areas have been substantially reduced in size since the survey as a resutt of plant succession and improving range condition. The lupine and larkspur present no problem today because their density has decreased and livestock prefer other forages. A newcomer, medusahead, has become established on heavy soils. Its abundance vanes yearly.

The grazing management EIS (BLM 1983) gave the native range as being 20 percent in late successional stage, 60 percent in middle stage, 8 percent in early stage and 4 percent unknown. For the 8 percent in seedings, most were in excellent condition. These percentages are for the nearly 4 million acres (Table 1-3). The EIS stated further that 16 percent of the range is In upward trend, 75 percent static, 5 percent downward, and 4 percent unknown.

Although survey methods differ, the data available in the literature indicate that native range in climax and near-climax condition has increased from 1 percent in 1961 to 20 percent in 1983. Approximately 80 percent of the seeded areas are in good and excellent condition. This is an exceptional and rapid change for an area with only 10 inches (250 mm) of average annual rainfall, indicating that range improvement can be attained with management.

Demography and Economic Profile Of Malhuer County, Oregon

Population

All but a few of the Vale District grazing permittees reside nearby. Census data for Malheur County (the program area) show the population of 23,380 in 1970 and 27,225 in 1981 to be highly concentrated in the irrigated crop region near Ontario. Fewer than 850 persons now reside in the remainder of the county, giving that large area an average density of one person per 6,000 acres (2,400 ha) and making it one of the most thinly populated areas in the United States. During the 1970's the rural population declined in Malheur County, as did the number of people in the 20- to 40-year-old age group, while the number of persons older than 40 increased. These demographic changes approximate similar trends across the country.

Economy

The economic base of Malheur County is primarily agriculture and related industries; livestock raising, the largest single component, contributed about $15 million or 22 percent of the total county income in 1983 (BLM 1983). Nearly 100,000 acres (40,470 ha) of privately owned irrigated land depend on the Owyhee Reservoir for water. Additional lands are irrigated from the Malheur River and Bully Creek. Major economic inputs to the county are from hunting and other forms of wildland recreation, mainly those associated with water.

Table 1-4. Numbers of livestock grazed and forage provided by all lands and public lands in Malheur County

Year	Cattle'	Horses and mules	Sheep	Malheur County	Public land in Malheur County	Forage from public land in Malheur County
	---- Number ----			------- AUM's -------		%
1920	62,265	22,740	403,685	1,988,904	[b]	[b]
1930	37,149	13,608	342,264	1,430,518	b	[b]
1940	65,234	12,901	131,300	1,132,812	419,592	37
1950	114,672	7,327	50,874	1,586,086	463,935	29
1960	60,000	[c]	55,744	854,028	463,935	54
1970	70,000	[c]	23,000	895,200	442,974	49
1975	90,000	[c]	8,000	1,099,200	415,868	38
1980	83,000	[c]		996,000	420,342	42
1985	70,000	[c]	2,960	847,104	381,093	45

Sources: BLM 1977-1985 and Oregon State University 1986.
[a] Data for 1960-1985 *are* for mother cows only.
[b] Unknown (before BLM was established).
[c] Combined with cattle numbers (does not include wild horses).

Malheur County livestock trends since 1920 typify those observed in many parts of the Intermountain West (Table 1-4). Cattle numbers nearly doubled between 1920 and 1950 with a corresponding dramatic decline in horse, mule, and sheep numbers. The 1985 cattle numbers approximate those of 1920, but many fewer horses and sheep were present.

Overall forage consumption, as indicated by AUM's of livestock use on public lands in the county, appears to have steadily declined since the 1950's, with the lowest use of forage in the program area occurring in 1985. Almost all rangeland livestock operators in Malheur County graze at least a little on BLM land (Howell 1987), and during the 50 years of BLM control these lands have contributed approximately 40 to 50 percent of the feed for livestock in the county. Our survey of permittees showed that 44 percent of their forage supply came from BLM lands and 49 percent from their own private lands (see Chapter 7). Other sources of forage reported were state, Forest Service, and private-lease lands.

Ranches in Malheur County are typically small with an average herd size of 280 head in 1961 and 320 head in 1974. There has been a trend toward consolidation into larger operations (Table 1-5), as reflected by a reduction in the number of ranches in county from 719 in 1964 to 419 in 1970. Sheep ranches with grazing permits on the public land declined from 14 in 1961 to one in 1974 and 1985 (Table 1-5).

Employment in Malheur County has changed since 1970, with major increases in the service industries, trades occupations, and jobs relating to processing of food products from cultivated lands. Increased farm and ranch mechanization has resulted in decreases in agricultural employment. Ontario and perhaps Caldwell, Idaho, have become the trade centers of the region.

Table 1-5. Frequency distribution of grazing licenses and permits, Malheur County portion of the Vale BLM District (BLM 1961,1974, and 1985).

Animals	No. of permittees	Percent	No. of head	Percent
	1961 GRAZING YEAR			
Cattle and horses:				
1-25	21	6.6	418	0.5
26-50	23	7.2	938	1.1
51-100	62	19.5	4,994	5.5
101-200	81	25.5	12,591	14.1
201-350	50	15.7	13,872	15.5
351-500	27	8.5	11,374	12.7
501-1,000	42	13.2	27,539	30.9
Over 1,000	12	3.8	17,547	19.7
Total	318	100.0	89,273	100.0
Sheep and goats:				
251-500	2	14.3	900	2.2
501-1,000	2	14.3	1,317	3.3
1,001-2,500	8	57.1	15,050	37.6
2,501-5,000	1	7.2	4,810	12.0
5,001-10,000	0	0	0	0
Over 10,000	1	7.1	18,000	44.9
Total	14	100.0	40,077	100.0
	1974 GRAZING YEAR			
Cattle and horses:				
1-25	30	12.8	466	0.6
26-50	16	6.8	636	0.8
51-100	30	12.8	2,257	3.0
101-200	45	19.2	7,209	9.5
201-350	40	17.0	11,466	15.1
351-500	25	10.6	10,705	14.1
501-1,000	37	15.7	26,116	34.4
Over 1,000	12	5.1	17,038	22.5
Total	235	100.0	75,890	100.0
Sheep and goats:				
5,000-10,000	1	100.0	8,000	100.0
	1985 GRAZING YEAR			
Cattle and horses:				
1-25	3	1.6	52	0.1
26-50	9	4.9	350	0.4
51-100	12	6.6	892	0.9
101-200	31	16.9	4,823	4.9
201-350	42	23.0	10,972	11.2
351-500	22	12.0	9,226	9.5
501-1,000	41	22.4	27,701	28.4
Over 1,000	23	12.6	43,535	44.6
Total	183	100.0	97,551	100.0
Sheep and goats:				
Over 1,000	1	100.0	2,960	100.0

In summary, the ranching population is small and most jobs stem from crop-related industries. Malheur County has lower income and higher unemployment than most urban communities in the Intermountain area. Significant out-migration, except from Ontario, foretells continuing shortages of social services and limited cultural amenities. Diversification and industrialization beyond that dependent on food have little chance of increasing. The rangeland rehabilitation program and the continuing inflow of new monies to manage the Federal rangeland resources have helped to stabilize the county's economy.

History of Land Use and Its Effects

Vegetation Before Grazing By Domestic Animals

Although a few head of horses may have grazed in the region as early as **1818** when Donald McKenzie sent trappers to follow the Owyhee River, locally heavy stocking of domestic animals probably began with the discovery of gold in **1863.** Evidence from many sources, most of it circumstantial, contributed to the following visualization of the pristine climax vegetation present in **1863.**

Oliphant **(1968)** cites writings of Harvey H. Hines, a Methodist minister, who stated in **1882** that the lower Malheur River plains were covered with sagebrush. But **1882** was nearly **40** years after people crossed from Snake River to Vale on the Oregon Trail. The surveyor-general of Idaho reported some lands in Oregon and Nevada as grazed-out in **1871.** Vale **(1975)** reviewed **29** journals and diaries of early travelers who mainly followed river routes along the Oregon and California trails in the sagebmshlgrass region. They reported abundant sagebrush on lower slopes and terraces and large amounts of grass at upper elevations. Hines also described the higher country south of Vale, Oregon, in **1882** as mostly covered with bunchgrass.

Apparently there were two major types of pristine vegetation in the program area. One type was dominated by big sagebrush and bluebunch wheatgrass. The relative herbage cover of shrubs probably vaned according to the incidence of fire. Mehringer **(1986)** presents evidence that sagebrush has been a part of this vegetation for thousands of years. The presence of other species varied with elevation, soil, and rainfall. Sandberg bluegrass and squirrettail were found in dry areas; low sagebrush occurred on shallow soils; Idaho fescue and bitterbrush reached codominance with bluebunch wheatgrass and big sagebrush at upper elevations. This combination composed the understory in the juniper type. Other minor species included Thurber's needlegrass, prairie junegrass, needle-and-thread and several shrubs. This grassland with its variable shrub component extended over at least **90** percent of the program area. The landscape probably showed a mosaic of sagebrush densities at any given time, with density low immediately following fire and gradually increasing until the next fire occurred. Another type of mosaic superimposed on the firedependent one would be related to site or what has come to be known as habitat type.

The second major vegetational type, composed primarily of shrubs, grew on alkaline soils and was dominated by shadscale with other shrubs including spiny hopsage, winter fat, budsage, and greasewood. Bluebunch wheatgrass occurred in this type but larger amaunts of squirreltail and Indian ricegrass characterized the grass component. The grasses dominated if the soil was sandy. This type occupied only about **6** percent of the program area. These descriptions of the pristine vegetation are consistent with the present sagebrush/grass habitat types as suggested by Daubenmire **(1970)** for southeastern Washington.

We offer several other hypotheses about the pristine vegetation. Grasses occurred between widely spaced shrubs as well as under their canopies. With infrequent grazing or fire, large amounts of litter accumulated in the centers of some of the bunchgrasses and under the shrubs. Grazed or burned bluebunch wheatgrass plants often appeared more vigorous than those left untouched for years. Riparian communities and wet meadows occupied small areas but were highly Important to the survival of many wildlife species. The pristine vegetation, of course, did not contain the several introduced species present in small amounts in today's climax vegetation and in larger amounts in seral vegetation. The native grasses did not burn as readily as the alien cheatgrass. The influence of fire changed after cheatgrass became abundant about **1920** and with it were increased numbers of **fires** set by humans. In today's management, the climax, seral vegetation, and the stages of range or ecological condition are defined in terms of relative composition of species that are always present.

Wild Animals 1776-1962

During October **1776,** Father Escalante, a Franciscan friar, led a party eastward across northern Utah to Utah Lake and southward to Arizona. He made no mention of deer and elk, seen earlier in Colorado, and experienced difficulty in finding game meat for food (Utah Fish and Game Commission **1948).** In **1826,** Peter Skene Ogden found deer to be abundant along the Snake River near the mouth of the Malheur River, but scarce across Oregon to the west (Davies and others **1961).** Apparently, buffalo, bighorn sheep, antelope, elk, and deer were present near Salt Lake, in southeastern Idaho (Williams and others **1971),** and in eastern Oregon. In March **1826,** Ogden's men found elk near the present site of Twin Falls in southern Idaho; but **3** months later they were eating horse meat during their travels along the headwaters of the Bruneau and Owyhee Rivers (Cline **1974).** Clearly the populations of elk, deer, antelope, and buffalo were small and occurred sporadically in the northern Intermountain region when the fur trappers crisscrossed the Owyhee region from **1818** to **1830.** Beaver, the objective of the expeditions, varied in density from stream to stream.

Wild animal populations are directly related to abundance of food and water and to sufficient cover and space for reproduction (Thomas and others **1976).** The changes in vegetation described in previous sections also meant changes in the quantity and quality of food and cover for wildlife. For example, nearty all accounts of mule deer from the **1920's** to the mid-1960's described them as scarce in the climax vegetation and abundant in the shrub stage of succession. Areas with high densities of sagebrush, which are generally only poor or fair cattle range, usually provide excellent browse for deer. Sage grouse also do well in sagebrush but antelope reach peak numbers where grassland and low shrubs predominate. Each spedes has its own best habitat (Kindschy **1986).** Use of the range has affected the various wildlife species to differing degrees. The habitat may have improved for some species and deteriorated for others. Causes of changes in numbers of wild animals are not clear. The situations for a few of the **341** species of vertebrates in the program area are given in Chapter 5.

Domestk Lhrestock Prior to 1934

When Captain George Vancouver arrived on the Washington coast In **1792,** he recorded the presence of cattle, sheep, goats, pigs, and poultry belonging to Spaniards. Cattle raising had spread up the Columbia and Snake River systems to Fort Boise and Fort Hall in Idaho as early as **1834.** The first of a flood of people traveling by covered wagon passed through Vale and the northern part of the Malheur County beginning about **1843.** All these early travelers and settlers maintained livestock on which they depended for food, power, and clothing. Good historical accounts of early land.use, most of which are directly applicable to Malheur County, can be found in Oliphant **(1968)** and Hanley and Lucia **(1974).**

The rush for gold in California intensified the need for livestock and resulted in the beginning of an animal industry throughout the western states. Between **1850** and **1865,** all creek beds and likely geological formations were searched for gold and silver. In **1863,** Michael Jordan discovered gold In Jordan Creek and others opened mines at Silver City In the Owyhee Mountains not far to the east. People came to the area by the thousands — miners, Chinese laborers, freighters, stagecoach operators, road builders, saloon keepers, bawdy house madams, ranchers, and roustabouts. Many used the route from McDermitt to the Rome crossing of the Owyhee River to get to the Jordan Valley. All needed horses for travel and cattle for food.

Occasional raids by Indian parties until **1878** restricted travel to major thoroughfares but didn't reduce the use of extensive rangeland areas by livestock. Beginning in **1865,** Malheur County, as well as adjoining regions, became stocked with cattle owned by a few ranchers who controlled large land areas. Between **1876** and **1882,** as many as **150,000** cattle per year were trailed eastward from Oregon and Washington to Denver and the northern Great Plains. It was also a time of great livestock losses from poisonous plants, drought, blackleg and other diseases, and winter weather. The long and severe winter of **1889-90** nearly obliterated many cattle herds, thus ending an era of control by western cattle barons. Sheep were completely eliminated. In the following years, many herds and bands were brought from southern ranges to fully stock the Owyhee ranges again. Speculators fueled the herd buildup with financial support.

Sheep raising and farming began in the Owyhee country about **1865.** Many sheep were in migrant bands herded over "free" range, ignoring the land claims of the cattlemen. Homesteaders gradually fenced the water, further complicating use of rangeland. Although resident cattlemen, sheepmen, and farmers often remained helpful to each other, migrants of all three types caused great conflicts. They used the grass and water, plowed some land, then moved on "to greener pastures." The catastrophic winter of **1889-90** tipped the subsequent balance of use toward more sheep on Malheur rangelands. For example, by the early **1930's** there were an estimated **200,000** sheep in the Jordan Creek Valley alone. Cattle now dominate again; by **1975** only **7,400** sheep were grazed under BLM permit in the study area.

Horses arrived in eastern Oregon about 1750, and most settlers who came later also owned horses (Jackman and Long 1964). The well-known trappers, Donald MacKenzie in 1818 and Peter Skene Ogden In 1824-29, each had parties of 30 to 50 men and well over 200 horses (Cline 1974). Indians stole horses until after the last Indian war in 1878. Horses quickly became feral, and wild horses have existed throughout the period that domestic animals have been in the region. Thousands roamed the ranges of the Owyhee country from 1900 to the mid-1940s. During that time, gathering mustangs (from the Spanish *mestengo* meaning wild horse) provided income for ranchers in the area. Herds were reduced to k w numbers following World War II.

Thus, beginning in 1875, cattle, sheep, and horses occupied the grazing land of the program area in large numbers for about 60 years. Little hay or other winter feed was available so range use was yearlong. Grazing on farm-raised feed and hay increased after the winter of 1889-90. Probably, range deterioration had reached severe proportions by 1900. Failure to control livestock on the public domain permitted continued rangeland deterioration and erosion until 1934, when Congress passed the Taylor Grazing Act.

History of Land Ownership

In 1862, Congress passed the Homestead Act, which provided title to 160 acres (64.8 ha) to settlers who lived on the land and used it over a 5-year period. This act and its later versions, the Desert Land Act of 1877, the Enlarged Homestead Act of 1909, and the Grazing Homestead Ad of 1916, had a pronounced influence on the pattern of land ownership In Oregon and throughout the West.

Other early events affecting today's "checkerboard" ownership pattern included Federal grants to the state of sections 16 and 36 in every township for the support of public schools; grants to the builders of military roads and later railroads as incentives to hasten the opening of travel and commerce; and lands withdrawn for Indian reservations and public reserves of various kinds. Table 1-6 shows the results of these factors in terms of land ownership In the study area. Differences between 1961 and 1986 reflect changes both in the boundaries of the Vale District and changes in ownership. Since 1976, land trades between BLM and the state of Oregon have largely consolidated the crazyquilt ownership pattern caused by the school lands, which is shown by less Federal and more state land.

Land Use 1934 to 1962

Until 1934, the public domain was free to be claimed by the user whether the purpose was to graze it or to "prove a claim" and actually be granted a deed or patent. The land belonged to all and yet no one was responsible for sound land use. A 1642 Virginia law, upheld for the Northwest Territory In 1792, stated: "The open woods and unenclosed grounds within the Territory shall be taken and considered as the common pasturage or herbage of the citizen thereof saving to all persons their rights to fencing" (Oliphant 1968). This law was interpreted to mean free range and a lawful fence. Year-long grazing, and practices of Spanish origin such as branding and the cooperative roundup developed as a result.

Table **1-6.** Land administration **in** the Vale Program Area for **1961,1976 and 1986 (BLM 1963** through **1986).**

Land ownership	1961		1976		1986	
	Acres[a]	%	Acres	%	Acres	%
BLM:						
Public	**4,578,311**	**70.0**	**4,604,878**	**71.1**	**4,570,097**	**70.6**
Reserved	**6,833**	.0	**58,438**	.9	**58,438**	.9
Other Fed.	**53,674**	.8	**21,778**	.3	**21,778**	.3
Non-Fed.	**304,900**	**4.7**	**298,920**	**4.6**	**186,309**	**2.9**
Total	**4,943,718**	**75.5**	**4,984,014**	**77.0**	**4,836,622**	**74.7**
OTHER:						
Federal	**128,465**	2.0	**27,560**	.4	**27,560**	.4
Private & State	**1,466,633**	**22.5**	**1,463,191**	**22.6**	**1,610,583**	**24.9**
Total	**1,595,098**	**24.5**	**1,490,751**	**23.0**	**1,638,143**	**25.3**
Total	**6,538,816**	**100.0**	**6,474,765**	**100.0**	**6,474,765**	**100.0**

[a] **One acre equals 0.405 hectare.**

Free range and the right of transit between States without taxes favored nomadic herds of livestock, mainly sheep. These **customs** received sanction in an **1890** U.S. Supreme Court decision which stated that English common law did not prevail **be-**cause it was ill-adapted to the nature and conditions of this country. According to English law, "every man must restrain his stock within his own grounds, and if he does not do so, and they get upon the unenclosed grounds of his neighbor, it is trespass for which their owner is responsible." In western America the rules of the cooperative round-up prevailed.

Many conservationists, ranchers, farmers, politicians, and members of the general public recognized that rangelands were deteriorating, but accepted this as the price for developing the West. Ranchers overgrazed, miners prospected everywhere, and homesteaders made their own choices of land to plow. They not only did these things but were encouraged to do *SO* by the laws of the land, court decisions, and the overall public attitude. Some activities of cattle kings, migrant sheepmen, and homesteaders were regrettable in hindsight, but destructive land use was the accepted way of life in those times. In effect, social forces let to political decisions that sanctioned destruction of the range vegetation and retarded its recovery. Public as well as private interests contributed to rangeland deterioration and both should shoulder the responsibility for rehabilitation of public rangelands.

With passage of the Taylor Grazing Act in **1934,** a major step was taken to rectify the land use problem on the public domain. The purpose of the act was "to preserve the land and its resources from destruction or unnecessary injury and to provide for the orderly use, improvements, and development of the range." This act followed the various homestead acts, and essentially marked the end of that era. As might be expected, cattlemen, sheepmen, and farmers who had been fighting over land for 50 years found it difficult to submit to the new law at first. But regulations governing such things as issuance of permits, determination of grazing capacity, establishment of allotment boundaries, construction of improvements, and implementation of grazing fee formulas gradually became established.

Allocation of grazing privileges quickly became the principal issue. Final preference was to be given to those with commensurate or privately controlled supporting property but demand outstripped available AUM's of grazing. Therefore, in practice, first priority grazing privileges went to those with commensurate property and prior use during a 5-year period before passage of the law.

The new Grazing Service depended on advisory boards elected by the permittees to set grazing capacities and priorities of use. Persons most influential in the community became board members, thus assuming positions of power. Migrant sheepmen were out; permittees' grazing rights were not always reduced proportionally when cuts had to be made, and correct data on base properties were seldom available. The advisory boards supervised Federal expenditures and often selected and determined tenure of Federal employees, The advisory board in the Vale District at that time was notable for its independence and power. Its principal purposes were to maintain the status quo of range use and the lowest possible grazing fees.

An example of disputes that arose was described by Foss **(1960)** as the "Battle of Soldier Creek." Soldier Creek is a grazing unit near Jordan Valley in the central part of the program area. In **1935** the commensurate base for the unit was set at **77,419** AUM's, but the advisory board set grazing capacity at 43,260 AUM's. A range survey in **1951** set the grazing capacity at **31,284** AUM's; permittees continued to demand **77,419** AUM's even though many fewer AUM's were being used. In **1956** a careful study that marshalled data on base property indicated an eligibility for **31,000** AUM's. After numerous meetings that number was accepted and the dispute was resolved.

The ranchers in the Soldier Creek unit were anxious to maintain their ranges in order to stay in business. They built fences, developed additional water, and some removed sagebrush. Throughout the period, the ranchers were improving their stewardship of the land as well as attempting to protect their positions in arguments with the Federal agencies over permitted livestock numbers.

Pattern of Range Deterioration

In the study area, as elsewhere, ranges suffer most near water and centers of human population. The first overgrazed area occurred along the Oregon Trail where it crossed the northeast corner of Malheur County from the mouth of the Boise River to Vale and north to Farewell Bend on the Snake River. The trail was broad, and livestock were moved outward to find feed. Today that belt has some of the poorest range conditions in the program area. Other population concentrations and resultant heavy livestock pressures were found around Westfall, Harper, Rome, and, to a lesser extent, near Jordan Valley and McDermitt. Areas where more recent damage has occurred-but perhaps not to as serious an extent because of lack of water—are exemplified by the country near Skull Springs south of Harper and Antelope Creek northeast of McDermitt.

Until permanent stock water was developed after 1934, the remote areas were grazed only in the spring. Cattle and nomadic bands of sheep had to be moved to the creeks, rivers, and other permanent water sources as temporary water failed. In short, uncontrolled grazing led to centers of destruction concentrated around water and villages. These destroyed areas were usually located at the lowest elevations where temperatures were hottest, rainfall least, and the dry season longest. They remain as the areas in greatest need of repair and at the same time they are the hardest to rehabilitate. Unfortunately, the destroyed areas, because they are easily and often seen by the public, have led to a widely held belief that the Vale Rehabilitation Program has largely failed. As will be shown later in this report, the opposite is true.

Destruction of Cover

Reconstructing the pattern of range deterioration can only be done in general terms. Widespread exploitive grazing after 1878, and locally before that date, probably reduced the perennial bunchgrasses from the interspaces among the shrubs. Annuals may have invaded the bare ground, but one must keep in mind that Russian thistle, cheatgrass and other introduced seral species had not yet arrived. Therefore, the invading species were the unpalatable and poisonous species and shrubs, including big sagebrush and rabbitbrush. A temporary halt, or a couple of years of rest and recovery, occurred following the livestock die-off in the winter of 1889-90. Many more animals were lost to poisonous plants before 1934 than afterward. Also, the sagebrush thickened, in some places becoming monocultures with few other plants.

The greatest destruction of vegetation and increase of bare soil probably occurred between 1900 and 1920. Griffiths (1902), following his observations between Winnemucca, Nevada, and Ontario, Oregon, in 1901, reported finding large areas of bare soil and traveling several days across deteriorated ranges. Sandberg bluegrass, which matures in early spring, probably remained in the openings; but the dominant perennial grasses were found only in the protection of shrubs and rocks. They may have disappeared altogether from sizable acreages, especially following fire.

Russian thistle was introduced about 1900 and was followed by mustards (USDA Forest Service 1914). Cheatgrass arrived about 1915 and spread over large areas of rangeland during the 1920's (Stewart and Hull 1949, USDA Forest Service 1914). These invading species provided the beginning of increased ground cover and by the 1920's they produced scanty forage, but more than had been produced for several years. Because cheatgrass burns quickly, fires, which had been common in the 1860's to 1880's, again became common.

Plant succession underway by **1934** duplicated the stages and climax suggested by Piemeisel **(1938, 1951)** for big sagebrush/grass in the Burley BLM District in Idaho. Russian thistle is the first species to become established on bare soil. Next come the mustards and other annual forbs, and cheatgrass soon follows. Cheatgrass and Sandberg bluegrass may last for years as a two-species stand where burning removes the sagebrush; or, the three species may coexist where fire is absent for many years.

Range Rehabllltatlon Prlor to 1962

Only about **0.1** percent of the rangeland in the program area had received a forage improvement treatment prior to **1962.** This included about 30,000 acres **(1**2,000 ha) of brush control by spraying sagebrush, plowing and seeding to perennial grasses, and seeding after wildfires. Approximately **582** livestock watering points had been improved by ranchers and BLM personnel. Several drift fences to the extent of perhaps **500** miles **(800** km) gave minimal livestock control, but pastures had not been enclosed nor had seasonal grazing plans been established. The start toward range rehabilitation before **1962** came as a cooperative effort between the BLM and the permittees—contrary to many stories in the public press which condemned the ranchers for being interested only in range destruction.

The lack of management prior to **1962** needs **to** be mentioned in order to emphasize conditions at the beginning of the Vale Program. No grazing systems were in effect beyond stipulation of allotment boundaries and dates of grazing. Permitted numbers of livestock and **AUM's** of grazing may or may not have been the same as actual use because BLM personnel were too few to make effective checks on trespass livestock. Gully plugs to control erosion, firebreaks, and recreational sites had not been constructed. Resource surveys had covered only about **30** percent of **the** public land, and adjudications to determine commensurate property qualifications had been completed for less than half the permittees.

Range research at the Squaw Butte Experiment Station near Bums, Oregon, and at other places in the sagebrush/grass type added still another factor that made the Vale Program feasible. The station superintendent emphasized in talks to ranchers and BLM personnel that a twofold increase in **AUM's** could be attained. Six management practices were needed: **(1)** More water to improve animal distribution, (2) more riding to scatter the cows, **(3)** sagebrush control by spraying, (4) seeding of crested wheatgrass, (5) adjustments in opening and closing dates of grazing, and **(6)** sufficient winter feeding. These practices had increased annual meat production per cow on the Squaw Butte Station from 150 pounds (70 kg) in **1946** to approximately **400** pounds **(180** kg) in **1960** (BLM no date).

Thus, in **1961** the following factors were in place to favor initiation of a range rehabilitation program: **(1)** Range condition was poor, and if not deteriorating, it was certainly not improving; (2) continuing controversies had convinced ranchers and BLM personnel that a new approach was needed; **(3)** a start at cooperation had been made; (4) information on what to do and how to do it was available; and (5) local people, politicians, and the BLM were anxious to put a land management program in place that would end disagreements over adjudication of grazing permits and management of wasting resources. The need for funds forced all parties to turn to Congress for help.

References

Bureau of Land Management. 1961,1974,1975. Active grazing records. Vale District Office.

Bureau of Land Management. 1963 through 1986. BLM facts for Oregon and Washington. State Office, Portland, OR.

Bureau of Land Management. 1977 through 1985. Annual Statistical Grazing Reports for the Vale District.

Bureau of Land Management. 1983. Draft southern Malheur grazing management program environmental impact statement. District Office, Vale, Oregon. 105 pp.

Bureau of Land Management. [n.d.]. The Vale Project: A 7-year program for sustained yield natural resource management. Oregon State Office. 43 pp. (Mimeogr.)

Cline, G.G. 1974. Peter Skene Ogden and the Hudson's Bay Company. Univ. Okla. Press. Norman. 279 pp.

Daubenmire, Rexford F. 1970. Steppe vegetation of Washington. Wash. Agric. Expt. Station Tech. Bull. 62. 131 pp.

Davies, K.G., A.M. Johnson and D.O. Johnson. 1961. Peter Skene Ogden's Snake Country Journal, 1826-27. Hudson's Bay Rec. Soc. London. 255 pp.

Dealy, d. Edward, Donavin A. Leckenby and Diane M. Concannon. 1981. Wildlife habitats in managed rangelands—The Great Basin of southeastern Oregon. Plant communities and their importance to wildlife. Forest Service General Technical Report PNW-120. 66 pp.

Foss, P.O. 1960. Politics and grass: The administration of grazing on the public domain. 236 pp. Univ. Wash. Press. Seattle.

Griffiths, D. 1902. Forage conditions of the northern border of the Great Basin. Bur. Plant Ind. Bull. 15. 60 pp.

Hanley, Michael and E. Lucia. 1974. Owyhee trails: the West's forgotten corner. 314 p. Caxton Printers, Ltd., Caldwell, Idaho.

Heady, Harold F. and James Bartolome. 1977. The Vale rangeland rehabilitation program: The desert repaired in southeastern Oregon. USDA Forest Service Resource Bulletin PNW-70. 139 pp.

Hitchcock, C. Leo and Arthur Cronquist. 1973. Flora of the Pacific Northwest. 730 p. Univ., Wash. Press, Seattle.

Howell, Michael. 1987. Personal communication. Oregon Agricultural Extension Service, Ontario, Oregon.

Jackman, E.R. and R.A. Long. 1964. The Oregon desert. 407 pp. Caxton Printers, Caldwell, Idaho.

Klndschy, Robert R. 1986. Rangeland vegetative succession implications to wildlife. Rangelands **8: 157-1**59.

Klttleman, L.R. 1973. Guide to the geology of **the** Owyhee region of Oregon. Mus. Nat. **Hist.** Univ. Oreg. Bull. No. **21. 61** pp.

Lovell, B.B., M.G. Norgren, D.W. Anderson and G.H. Slmonsan. 1969. Owyhee drainage basin general soil map report with irrigable areas. **72** pp. Oreg. State Agric. Exp. Stn. and State Water Resour. Board.

Mehrlnger, Peter J. 1986. Western juniper in the Holocene. In: Proceedings of **the** Pinyon-juniper Conference, Reno, NV, Jan. **13-16.** pp. **1-11.** Intermountain Forest and Range Expt. Sta. Ogden, UT.

Ollphant, J.O. 1968. On the cattle ranges of Oregon Country. **372** pp. University Wash. Press, Seattle.

Oregon State Unlversity. 1966. Economic data for Oregon; Economic Information Office.

Plemeisel, R. L. 1938. Changes in **weedy** plant cover on cleared sagebrush land and their probable causes. U. S. Dept. Agric. Tech. Bull. **654.**

Plemelsel, R.L. 1951. Causes affecting change and rate of change in a vegetation of annuals in Idaho. Ecology **32: 53-72.**

Stewart, G. and A.C. Hull. 1949. Cheatgrass (*Bromus tectorum* L.)—an ecologic intruder in southern Idaho. Ecology **30: 58-74.**

Thomas, Jack Ward, R.J. Mller, H. Black, Jon E. Rodlek and Chris Maser. 1976. Guidelines for maintaining and enhancing wildlife habitat in forest management in the Blue Mountains of Oregon and Washington. **41st** North Am. Wildl. and Nat. Resour. Conf., Washington, D. C. 45 pp (Mimeo.)

Utah Flsh and Game Commission. 1948. Twenty-eighth biennial report. 80 pp. State of Utah.

U.S. Department of Agriculture, Forest Service. 1914. Notes on National Forest range plants: Part **1.** Grasses. **224** pp. Off. Grazing Studies.

U. S. Department of Commerce. 1955-1986. Climatological data for Oregon. Annual reports, National Oceanic and Atmospheric Administration.

Vale, T.R. 1975. Presettlement vegetation in the sagebrush-grass area of the Intermountain West. J. Range Management **28: 32-36.**

Wllllgms, G., D.E. Mller and D.H. Mller. 1971. Peter Skene Ogden's Snake country journals. **1827-28** and **1828-29. 201** pp. Hudson's Bay Rec. Soc., London.

Chapter 2 The Vale Rehabilitation Program

Harold F. Heady

Preparation and Approval

Original **Proposal**

The original proposal for rehabilitating deteriorated range in southeastern Oregon was prepared as a 28-page document by personnel of the Vale BLM District in **1961.** It gave concrete suggestions. A paragraph quoted from a letter written by three members of the Oregon State BLM Advisory Board on February **19, 1962,** indicates the praise and enthusiasm by people in Oregon for the proposal:

> The Bureau has had inadequate funds to improve the range and has, therefore, been forced to evaluate carrying capacities with little hope of improvement. This plan provides for positive improvement and continuous evaluation while improvement is underway. It also provides for adjudication on the basis of actual use supported by observations of range condition and trend. These things can be accomplished with adequate money and personnel.

Contingent upon funding by Congress, the program proposal specifically offered "... a solution to the national problem of depleted and deteriorating public rangelands. It proposed to do so without impairing the livestock industry and local economies. The Vale Program would be a practical demonstration of the government's ability to **solve** a critical national problem" (BLM no date).

The Vale proposal listed eight objectives:

1. To correct erosion and accompanying downstream sedimentation—and prevent further soil losses.
2. To increase the forage supply for wildlife and livestock.
3. To stabilize the livestock industry at the present or an increased level of production.
4. To facilitate fire control by replacing high hazard cheatgrass and sagebrush with low hazard perennial grasses and improving detection and suppression facilities.
5. To prevent the encroachment and spread of noxious and poisonous weeds.
6. To accomplish necessary land tenure adjustments.
7. To safeguard public lands from improper recreational use.
8. To provide for the development of access roads and service roads in the vast areas of untapped recreational potential.

While the proposal did not specifically state the procedures necessary for meeting these eight objectives, it did mention methods such as brush control, range seeding, water development, and fencing. It also encouraged development of a plan or project for each specific area with the understanding that the program needed to be flexible so that lessons learned from early mistakes could be applied later. All in all, it was hoped that the Vale Program would be a model for other land treatment programs.

Unlike many earlier range improvement programs, this one emphasized wildlife, recreational facilities, and watershed values, and included mention of riparian conditions. Experts in these subject areas contributed to the proposal and to the individual projects from the beginning.

If objectives for a similar proposal were written today, more emphasis would be given to such items as resource inventories, repair of riparian habitats, protection of heritage sites, development of recreational uses, and establishment of wilderness areas. The increasing importance of these subjects is indicative of changing emphasis in the use and management of public lands since 1962.

Passage Through Congress

Easy passage of the Vale Program proposal through Congress resutted from the emergence of several coincidental factors. First, the early 1960's marked the end of the bulk of legal actions by public range users to delay implementation of cuts in permits that had resulted from adjudication. Second, this period marked a re-emphasis on conservation by the Federal government. Third, Senator Wayne Morse of Oregon, a longtime critic of BLM policy, was a candidate for re-election in 1962. With Congressman Al Ullman, Morse became an ardent supporter of the Vale proposal. These two legislators, with the help of local support, guided through Congress in 1962 the special appropriations bill funding the Vale Program, although many questions were raised about its feasibility. The first large-scale projects in the Vale Program began in the Cow Creek area in the summer of 1962, even before the congressionally approved starting date of July 1, 1962.

Table 2-1. Orlglnal goals and actual accomplishments of the Vale Rehablllltatlon Program, **1963-1975** (BLM **1963** through **1986)**

Treatment or management aid	Unit	Program goal	Units completed as of **1975**	Percent of goal
Brush control	Acres	**730,000**	**369,515**	**50**
Seeding	Acres	**410,000**	**254,641**	**62**
Fencing	Miles	**2,000**	**2,152**	**107**
Reservoirs	**No.**	**400**	**574**	**143**
Springs	**No.**	**500**	**429**	**85**
Wells	**No.**	**100**	**28**	**28**
Pipelines	Miles	**120**	**442**	**368**
Water troughs	**No.**	**640**	**510**	**79**
Cattle guards	**No.**	**500**	**360**	**72**
Study areas	**No.**	**79**	**69**	**87**
costs	Million **$**	**16**	**10**[a]	**63**

[a] *See* **cost analysis in Chapter *6*.**

Land Treatment Projects

Land treatments were accelerated early in the program. Although they later slowed considerably due to receipt of less funding than requested. By the end of the formal Vale Program in **1973, 164** land treatment projects had been finished (Heady and Bartolome **1977).** While some aspects of the program goals were exceeded, others were not met (Table **2-1).**

The year by year accomplishments in land rehabilitation between **1934** and **1986** are given in Tables **2-2** and **2-3.** The number of projects, acreages, miles of pipelines, number of new watering points, costs, and magnitude of improvements are subject to considerable interpretation. For example, due to failures, a few areas underwent several treatments on the same acreage. These were recorded as separate projects. In other situations, it is not certain whether acreage is for a pasture or for a treatment that occupied part of a pasture, or if the acreage given is the contracted or the completed acreage. Sometimes estimates of size had to be made. Costs of projects were not always distinguishable from district operating expenses. Although some of our data differ from those of others and in a few instances from our **1977** report, we have used what appears to be the best information available. Wherever possible we have evaluated the overall Vale Program, thereby minimizing, but not eliminating, the importance of accurate data on individual projects.

Beginning in **1972,** improvements for wildlife habitat were listed separately. These have totaled 500 acres (202 ha) of brush control, **5,067** acres **(2,050** ha) of seeding, **32** miles **(51** km) of stream improvement for fish, **67** reservoirs, and at least **40** miles **(64** km) of fence. Included are projects for improving fish passage over dams, waterfalls, and through culverts; and planting of trees and shrubs in riparian areas. Most of this work was accomplished between **1981** and **1984.**

Table 2-2. Wells, pipelines, and other water developments In the Vale Program Area, *1934-1986* (BLM *1963* through *1986)*

Year	Reservoirs	Wells	Pipelines	Springs	Troughs
	No.	No.	Miles	No.	No.
1934-62	463	12	21	138	29
1963	24	2	13	17	20
1964	13	2	—	62	0
1965	54	1	9	49	13
1966	44	1	29	43	35
1967	52	1	38	30	39
1968	169	0	142	59	152
1969	69	7	29	52	44
1970	36	5	83	44	85
1971	31	3	29	11	39
1972	16	5	31	32	41
1973	15	1	11	2	11
1974	33	0	7	19	11
1975	18	0	21	9	20
1976	18	2	51	2	[a]
1977	0	0	0	0	
1978	5	1	4	0	
1979	6	0	6	5	
1980	23	0	24	0	
1981	0	0	9	3	
1982	30	14	32	372	
1983	35	0	6	29	
1984	8	0	4	2	
1985	0	0	7	0	
1986	0	0	0	0	
TOTALS					
1934-62	463	12	21	138	29
1963-75	574	28	442	429	510
1976-86	125	17	143	413	—
1934-86	1,162	57	606	980	539

[a] Numbers of troughs not available for 1976 through 1986.

Table 2-3. Fences, cattleguards, brush treatments, and seedings In the Vale Program Area (BLM 1934 through 1986)

	Fences	Cattle-guards	Brush control	Seeding
Year	Miles	No.	Acres	Acres
1934-62	586	[a]	[a]	60,873
1963	128	15	66,400	12,500
1964	129	45	39,503	9,866
1965	175	64	42,712	46,930
1966	248	62	48,100	47,350
1967	342	44	35,171	21,990
1968	365	26	44,951	25,146
1969	400	34	52,083	20,559
1970	136		24,100	11,600
1971	87		0	3,010
1972	62		8,295	150
1973	25		8,200	20,640
1974	43		0	11,140
1975	12	70[b]	0	23,760
1976	11	1	0	1,964
1977	9	1	0	0
1978	19	4	0	0
1979	78	4	0	0
1980	(19)[c]	0	0	0
1981	3	0	0	0
1982	14	62	0	1,400
1983	36	3	8,235	9,060
1984	2	1	4,250	0
1985	18	5	460	160
1986	11	9	425	425
TOTALS				
1934-62	586	—	—	60,873
1963-75	2,152	360	369,515	254,641
1976-86	182	90	13,370	13,009
Adjustment[c]	516	0	(19,295)'	28,196
1934-86[d]	3,436	450	363,590	356,719

[a] Numbers not available for some years. Total cattleguards for 1934-86 is a recorded number.
[b] Total number for 1970 through 1975.
[c] Adjustments to agree with 1977 cumulative totals, which were accepted as true values in BLM Facts. Parentheses indicate negative values.
[d] Adjusted totals.

The Rangeland Rehabilitation Operation

Program Plannlng

Planning in the Vale District contributed to the success of the program. Division of the District into three resource or management areas with separate managers spread the workload and responsibilities. The resource areas were further divided into 14 planning units. Because the area managers exercised considerable autonomy In proposing and developing improvement plans, projects, and grazing systems, the mixture of management practices and land treatments differed among the three resource areas. After 1977 the program area was reorganized into two resource areas.

Although area managers initiated planning and site selection for Improvement projects, the final authority for the coordinated program rested with the district manager. Prior to 1983, district personnel included about 40 permanent employees—more after 1983—and as many as 75 temporary employees during the field and fire season.

Site Selection

The original program called for a 2-year survey of 2,660,000 acres (1,100,000 ha) and improvement planning for 4,000,000 acres (1,600,000 ha) to aid in identifying the best sites for treatments (BLM, no date). Plowing, spraying, seeding, fencing, water development, and other practices were to follow careful planning. Shortly after funds became available, the program's congressional supporters expressed alarm that the first appropriations of more than $2 million would not show visible results on the land and that any delay in initiating rehabilitation could jeopardize future funding. BLM responded by immediately beginning land treatments but feared that poor site selection would generate habitat damage and ineffective treatment. However, excellent results were obtained, indicating that professional range managers can successfully estimate landscape potential in most instances. In the second year of the program, a resource survey enabled site selection to proceed according to plan as modified by the level of funding.

Because the Vale Program proposal required that selection of sites for treatment be based on their potential for improvement, those with greatest potential were treated first. As funding continued, progressively poorer sites were treated. Local needs for additional forage to satisfy obligated animal numbers did not play a major role in site selection for projects. Likelihood of success determined site selection, not degree of range deterioration.

Although several early Vale Program reports stated that the first land treatment projects, due to pressures for immediate results, directed efforts at the most depleted ranges, records do not bear this out. Sites treated from 1962 to 1964 had an estimated grazing capacity before treatment of between 21 and 24 acres/AUM (8.5-9.7 ha/AUM), which are higher capacities than lands treated in later years. The poorest land to be rehabilitated, averaging more then 40 acres/AUM (16 ha/AUM), received treatment in 1967-1968. Most areas with high site potential that required seeding (preceded by plowing or spraying) had been treated before 1968.

By 1968 the grazing capacity on untreated areas had increased due to improved range condition and reduced grazing pressure as more forage became available in the treated areas. Native perennial grasses on untreated sites recovered more rapidly than expected, reducing the need for seeding and increasing the effectiveness of spray-only treatments. Two-thirds of the pre-1969 projects included seeding, compared with only one-third after that date. Thus, successful early treatment and improved livestock management resulted in a shift in emphasis from plow-and-seed to spray-only after 1968.

Early selection of specific sites for treatment and determination of treatment prescriptions involved a complex set of factors and criteria, many of which were never formalized or recorded. Much of the process depended on the judgment of range conservationists, whose cumulative training and experience gave insights into recommendations that were correct biologically and effective managerially. For example, sagebrush with an adequate understory of native perennial grasses required only spraying and livestock control to improve the range—but "adequate perennial grasses" was a value judgment through the early program years.

The following guidelines for treatment emerged from experiences in the first few projects: (1) Plowing and seeding should be done in areas where few or no perennial grasses occur and where mature big sagebrush is at least 3 feet (1 m) tall. (2) Spray-only should be done where numerous perennial grasses occur in the sagebrush stands. (3) Spraying should not be combined with plow-seed treatments. (4) Drilling of seed after spraying and without plowing is effective on some rocky soils and on moderately steep slopes. (5) Proper seed-bed preparation is more important than degree of brush kill. (6) Treatment on old lake beds and alkali soil usually fails. (7) Steeply sloping areas, shallow rocky soils, vegetation with substantial browse for wildlife, and riparian vegetation should not be plowed, seeded, or sprayed.

Consideration of uses other than grazing strongly influenced site selection. Beginning In 1963, all potential treatment sites were evaluated by the district wildlife biologist, and rehabilitation projects were approved by representatives of the Oregon State Game Commission. A few treatments were altered, and 11 projects were canceled to preserve wildlife habitat. Some projects, when executed, did not preserve small areas designated as wildlife habitat due to contractor error and inadequate supervision by BLM personnel. As the program progressed, compatibility between site selection and wildlife habitat requirements improved.

Sixty-nine test plots and exclosures, built before and during the early years of the Vale Program, played a strong role in site and treatment selection. Some of the exclosures continue to provide useful vegetational information. Many areas-sites with alkaline soils, for example—on which test plot responses to treatment were poor did not show promise for large-scale success and were removed from consideration. Conversely, positive results on test plots led to successful projects on some areas originally rejected. Although test plot results did not guarantee success, their generally good predictive accuracy demonstrated the value of treatment testing for any large rangeland rehabilitation program.

The analysis of the Vale Program in **1977** showed that rehabilitating **10** percent or **less** of an area can permit rapid improvement of the remaining 90 percent through proper management. Thus, the Vale Program dealt with improvement of the whole district, not just the areas plowed, seeded, and sprayed. This is an example of improving range and forage conditions by intensively treating part of the land and managing all of it.

Overall, site selection in the program was excellent. Areas treated in the first year prior to surveys were successfully improved. Later, intimate knowledge of soils, climate, vegetation, and potential production formed an even better basis for site selection.

Brush Control

Plowing with a "brushland" disk-plow as a method of brush control became standard early in the Vale Program, and contract specifications changed little after a few projects determined the most effective and cost-effective treatment. As finalized and used, contracts required plowing to a depth of **4** to **6** Inches **(10** to 15 cm), and an estimated 90 percent kill of brush, which often required **two** passes over the land. Rangeland plowing generally commenced at the direction of BLM personnel in early summer prior to seed-drilling time. Timing of plowing was not particularly important in obtaining a heavy brush kill, but it may have been critical in preventing brush seedling establishment, since plowing after the sagebrush seed had matured fostered regeneration. Primary factors in the success of plowing were degree of rockiness, slope, and the species of brush. Low sagebrush and rabbitbrush resisted plowing.

Plowing was closely supervised, well executed, and generally effective. Contractors furnished labor, the power for pulling govemment-owned brushland plows, and all necessary maintenance of equipment.

Effects of spraying herbicides to control brush varied much more than those of plowing. Successful control of big sagebrush had been obtained in other places, *so* experiments with types of herbicides and rates of application were not required. The herbicide used, **2,4-D,** and the rate, **2** lb acid equivalent per acre **(2.2** kg/ha), did not change throughout the program. In most cases, **2,4-D** with a diesel oil carrier killed big sagebrush. Environmental considerations caused substitution of water for diesel oil in **1965,** which made timing of application critical. However, the water-based herbicide killed brush even better than oil-based herbicide when specifications were followed.

The application of **2,4-D** was done under contract and usually by fixed-wing aircraft, but occasionally by helicopter. Every contract for spraying specified that the BLM was to designate the spray mixture to be used, its rate of application, the area to be sprayed, and the timing. The officer in charge controlled the day-to-day progress of the operation. Spraying was hatted any time the winds exceeded **10** miles per hour **(16** km/hr). Although BLM personnel closely supervised most spray operations and aided in field applications, contractor compliance was less easily monitored than with plowing.

Soil moisture and plant phenology, as originally recommended at the Squaw Butte Experiment Station by Hyder and Sneva (1955), were used to indicate the season of spraying. Heading of Sandberg bluegrass and rapid spring growth indicate onset of effective spraying conditions. Sufficient soil moisture (more than 8 percent) for an adequate kill of big sagebrush remains until half the bluegrass leaves have dried. Timing the spraying for a maximum kill of big sagebrush often resulted in an unsatisfactory kill of rabbitbrush. The use of herbicides to reduce stands of woody species has been eliminated on the program area because of recent legal constraints.

Cessation of grazing for 2 years following treatment, especially sprayings, permitted fuel to accumulate, thus favoring fires. All or part of several projects were swept by wildfire, further reducing brush and leaving no detectable detrimental effects on forage for livestock the following year. Burning killed sagebrush more effectively than any treatment, and burned areas had the lowest average density of sagebrush.

An outbreak of *Aroga websterii* moths caused a single project located in the Cherry Creek drainage to be canceled during the early 1960's, just as the Vale Program began. The moths defoliate portions of shrubs, and the resultant mortality often exceeds 50 percent cf stands.

Seeding

Seeding followed a variety of land treatments. All plowed land and some of the sprayed areas were seeded. Plowing prepared a seedbed as well as reduced brush, cheatgrass and other hetbaceous competitors. Seeding usually followed wildfire on appropriate sites and on sites where previous rehabilitation attempts had failed.

Decisions concerning when and how to seed were based on test plots, experience gained in previous projects and visual site evaluations. Species tested included crested wheatgrasses, pubescent wheatgrass, tall wheatgrass, western wheatgrass, Whitmar wheatgrass, Russian wildrye, nomad alfalfa, yellow sweetclover, and true clovers. Because crested wheatgrass seldom failed, and the other plant spedes seldom produced as well, the standard seeding became 7 lb/acre (8 kg/ha) pure live seed of crested wheatgrass with a rangeland drill. The seed, purchased annually in large commercial lots, consisted of mixed standard and fairway crested wheatgrasses, judging by the appearance of most stands in 1975.

In 1986 the situation was much the same; seeding on appropriate sites followed wildfires. The species was crested wheatgrass with inclusion of cereal rye for a quick soil cover to retard erosion and the seed of native species when they were available.

Alkaline soils, shallow rocky soils, and a vegetative cover of low sagebrush indicated marginal sites for seeding of crested wheatgrass. Other grass and legume species were also planted on such sites. On a mud flat or dry lake bed, for example, pubescent wheatgrass at 1.5 lb/acre (1.7 kg/ha), western wheatgrass at 2.6 lb/acre (2.9 kg/ha), tall wheatgrass at 0.75 lb/acre (0.85 kg/ha), crested wheatgrass at 2 lb/acre (2.3 kg/ha), and strawberry clover at 0.33 lb/acre (0.37 kg/ha) constituted the seed mixture. Immediately after that treatment, the seeded stand contained mainly crested wheatgrass; but it gradually became dominated by pubescent wheatgrass with only about 5 percent crested wheatgrass.

Table 2-4. Percent of respondents In each group agreeing there Is too much cover of selected species on the program area (see Chapter 7 for a descrlptlon of the groups surveyed and the survey techniques)

Species	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94
Cheatgrass	63	33	44	**96**
Sagebrush	**25**	**83**	**35**	**39**
Crested wheatgrass	**33**	**4**	**9**	**86**

During the program, nomad alfalfa was seeded on **56,340** acres **(22,800** ha) by air in the spring following fall drilling of plowed land to crested wheatgrass. The alfalfa stands were spotty and by **1975** they seldom constituted 5 percent of the vegetation; by **1986,** still fewer alfalfa plants were present. However, even a small amount of alfalfa contributes valuable feed for wildlife and livestock because it is highly nutritious and remains green all summer.

Seeding practices drew heavily on methods developed during the **1950's** at the Squaw Butte Experiment Station near Burns, Oregon, and on limited experience in range seeding on the Vale BLM District before the start of the program. One of those early combinations of plowing, seeding, and fire was the Soldier Creek project, which still has excellent seeded stands.

Crested wheatgrass has been the focus of much controversy concerning the Vale Program (Table 2-4). When asked in **1987** about the amount of cheatgrass, sagebrush, and crested wheatgrass, permittees and other local residents were most likely to respond that there was too much sagebrush cover and too little crested wheatgrass. Almost half of the permittees believed that wildlife increased following the seedings. However, **56** percent of eastern Oregon and Idaho environmentalists surveyed opposed crested wheatgrass and were concerned that seedings led to decreases in wildlife.

Flre

Historically, fires in the Vale area were a result of lightning or were set by Indians. Peter Skene Ogden mentioned fires along Bully Creek which Indians set in 1827 (Williams and others **1971).** Lakebed profiles in southeastern Oregon show charcoal associated with varying amounts of sagebrush and grass pollen for at least **10,000** years (Mehringer **1985, 1986).** Such fires did not eliminate sagebrush and perennial bunchgrasses then, nor do they now (Uresk and others **1976).** Most often they create a mosaic of big sagebrush and grass of varying proportions, densities, and ages that lasts over a long timespan.

Fire, as an ecological and historical factor, has been mentioned repeatedly in this report without discussion of its role in the land treatment operations. At the beginning of the Vale Program the budget included $314,000 for fire suppression and protection; the annual costs have increased since. The Vale BLM District fire control program became large and effective. The regional and widely used hotshot crews—the Snake River Valley Fire Fighters-are dispatched from Vale, Oregon. Planning and preparation for control take place in the winter and additional personnel are hired in the summer for fire detection and suppression. However, most people surveyed in our opinion poll believed that fire control in the program area is inadequate at the present time (Table 7-11).

During the early years of the Vale Program, prescription burning was not considered a management tool nor were areas burned by wildfire considered as opportunities for rehabilitation. In recent years, however, rehabilitation for protection of soil and other natural resources following wildfire has become an emergency project to be accomplished with haste. Seedings after wildfire amounted to 2,800 acres (1,133 ha) in 1983, 19,300 (7,811 ha) in 1985, and 9,900 (4,007 ha) in 1986.

One goal of the Vale Program stipulated that fire control would be increased in effectiveness, specifically by the replacement of highly flammable cheatgrass and sagebrush with less hazardous perennial grasses. Other fire suppression measures included more access roads and additional water sources. Stands of seeded perennial grasses have bumed in the program area, especially where forage utilization hy livestock was low. Thus, the goal of improved fire control through vegetative manipulation appear to have been met only where light fuel loads resulted from drought or livestock use. At present forage reduction by grazing is insufficient in most places to reduce fire hazard.

Comparing fire statistics for the study area since the advent of the Vale Program with those of the nearby Bums BLM District show no clear distinctions. Wildfires were larger in both districts between 1980 and 1986, with a greater percentage increase in the Bums District. The number of wildfires from 1963 to 1986 varied little between the two districts, while size of fire varied more in the study area. Reasons for these changes and variations may be due to such factors as type and continuity of fuel bad, terrain, vegetation types, and fire fighting efficiency. If the changes are due to the Vale Program the relationship is unclear.

In hindsight, the dismissal of fire from the Vale Program as a land treatment was a mistake. The district's current emphasis on fuel management in brush types and recognition of the natural role of fire in the sagebrush/grass ecosystems establish prescribed fire as a legitimate land management practice. Both prescribed and wildfire have been viewed by some in the last few years as opportunities for vegetative treatment and return to natural conditions.

Where bunchgrasses are abundant-especially where their density exceeds an average of three plants per square yard (3.6 plants per square meter)—cheatgrass is reduced or nearly eliminated, thus reducing the most hazardous fuel. Big sagebrush alone will burn and so will the bunchgrasses; but fires in vegetation without cheatgrass spread less rapidly and are easier to control. Therefore, fuel management should aim for reduction of cheatgrass, fewer monocultures of sagebrush, and an increase in perennial grasses. This reduction is in harmony with proper range management for diversity of habitats and it facilitates wildfire suppression. A well-designed management plan for large areas will have strategically placed perennial grass seedings that allow other areas to rehabilitate through natural succession to perennial grass codominance with big sagebrush.

Water Developments, Fences, and Roads

Newly constructed fences and watering points in the study area have facilitated livestock grazing and benefited other uses as well. Fencing was needed to ensure protection of seeded areas and allow their use as special pastures. Seasonal grazing systems required many separate pastures that in turn necessitated new watering points, since occurrence of free water seldom met the needs of livestock in these pastures. Location of fences depended on the characteristics of the pasture and the needs for animal management. A typical pattern utilized natural barriers and existing fences as outer allotment boundaries, and new fences as cross-fences. Usually, a large crested wheatgrass seeding would be divided in anticipation of using an alternating spring turnout rotation grazing system. Since 1934, a total of 3,436 miles (5,529 km) of fences on the program area have been built. Those constructed since the beginning of the program have been built to BLM standards which allowed antelope passage under the lowest wire (Table 2-3). Since 1971, users have maintained the fences. Six hundred miles (965 km) of fence were constructed, largely by ranchers, before the program began.

Three basic methods were used to increase the availability of water in the program area. One was development of springs; 980 have been developed on the area, nearly half of them since 1975. The second was construction of reservoirs In locations suitable to store water from runoff and springs. Since 1934, 1,162 such reservoirs have been built. Because the probability was high that they would fail to hold water throughout the grazing season, many were planned as sources of water for spring use in crested wheatgrass turnout pastures. This seasonal nature of reservoirs necessitated a third method-creation of wells, pipelines, and troughs to provide reliable year-round sources of water (Table 2-2). A typical system consisted of a well drilled in a place where gravity could be used to supply water to troughs. A propane-powered electric pump, originally maintained by the BLM, kept water in an 18,000-gallon (68,000 L) tank in each well system. From each centrally located tank, water flowed by gravity through buried plastic pipe to fill individual stock water troughs in the pastures. Many such troughs were made from discarded jet engine shipping containers. Some of the wells have been replaced with alternate water sources such as reservoirs and spring developments to furnish water to existing pipline systems. Maintenance of the water facilities is now the responsibility of the permittees. The fencing and watering points make possible a large variety of grazing schedules on all the lands of the program area.

Roads are difficult to evaluate because their utility has been neither measured nor described. If an unimproved road was graded, the access improved for only certain types of vehicles, perhaps cattle trucks; yet, large areas in the program area need no roads. Those constructed in conjunction with range improvement projects varied in permanence from quick abandonment after a project and eventual disappearance to some improved through general use. Present road construction and maintenance is on an as-needed basis.

Errors and Lack of Compliance with Contracts

An undertaking on the scale of the Vale Program cannot proceed without errors. They result from lack of knowledge, lack of experience, and lack of compliance to job specifications. A discussion of the problems encountered in the Vale Program may be useful for subsequent rehabilitation efforts.

Although contracts were carefully written, they were not always carefully followed. Sprayings in a few instances killed sagebrush in strips because of improper flagging or cheating on the contract. Some sprayings extended over areas that should not have been sprayed. Brush control through aerial spraying requires careful attention, and the desired effects were not always obtained in the Vale Program. Seedings, too, were occasionally deficient. In one case, intermediate wheatgrass was used when the contract called for crested wheatgrass.

In addition to problems, unforeseen benefits may also occur. One such benefit resulted from plowing. Because the machinery could not operate on steep slopes and rocky areas, plowing left patches of brush and irregular borders, creating a mosaic of vegetation. This provided desirable wildlife cover and edge habitats, which should be stipulated in future contracts. Aerial spraying could also be used to create habitat mosaics with the proper care, but on the study area it often covered the landscape completely.

Water developments served livestock very well, but had varying effects on wildlife and wildlife habitat. Many small springs had wet areas, small meadows, and associated fauna that were destroyed when all the water was collected into tanks and troughs. The smalter animals found watering at a trough difficult or impossible. Chukar partridge, sage grouse, and quail were able to water at properly built troughs, but food provided by the meadows was gone. A few new and fenced meadows were created with overflow water that were larger than the original meadows. Providing for the safe watering of wildlife at livestock watering troughs needs imaginative engineering. Few troughs are now satisfactorily designed for smaller animals. The design of troughs for livestock and large game animals also needs further consideration.

Few errors were made in fence design and construction. The standard fence used, a four-strand wire fence with the bottom wire 18 Inches (46 cm) and the top strand 42 inches (107 cm) above the ground, allows free movement of antelope and mule deer. A new fence should be flagged with one or two white cloths between every third post to make it obvious to antelope and wild horses. Fences surrounding study excbsures should have two additional wires and stiles substituted for gates.

Regulations Alterlng Land Management After 1975

Since **1975** the BLM and hence all users of public land have been subject to many changes in management as an outcome of Federal legislation and court decisions. Another cause, perhaps the major one, of management changes has been a gradual decrease in the effectiveness of the BLM's budget during a time of rising prices and increasing costs. Early on, the permittees paid fuel costs to operate the water systems, while the BLM maintained the pumps, tanks, troughs, and pipelines. Since **1984,** however, the maintenance and operation of these systems have been the responsibility of the users.

At present, the permittees maintain fences but the BLM replaces them. The BLM also repairs roads and cattleguards. BLM has concentrated on maintenance of the facilities developed during the program and on continued vegetational improvement through management of livestock grazing. Practices such as plowing and spraying of sagebrush have been essentially eliminated due to lack of funding and a ban on the use of herbicides and pesticides. Wildfire control has increased. Today, BLM management is aimed toward holding the gains in soil cover and erosion reduction rather than undertaking new and expanded projects to increase forage production.

Effects of Indlvldual Laws and Court Declslons

Beginning in 1964, a number of Congressional acts and court decisions directly affected land management on public lands administered by the BLM and other Federal agencies. These actions were in response to a heightened public awareness of and concern for the environment, natural resource conservation, and recreational opportunities on public lands. Their impads on management activities in the program area are exerted through altering a static or declining budget. For example, the hiring and support of personnel to locate endangered species, to protect and manage the herds of wild horses, to prepare environmental impact studies, and to survey wilderness study areas have reduced support for other activities, among which are construction of recreational facilities, repair of riparian habitat, and road maintenance. The following are some of the regulations altering resource management in the study area.

1964, The Wilderness Act: This law, and its numerous amendments, provide for establishment of a National Wilderness Preservation System on Federal lands. No wilderness areas have been established on the program area, but the Federal Land Policy and Management Act of 1976 directed the BLM to inventory and recommend roadless areas of 5,000 acres (2,025 ha) or more for possible wilderness designation. A number of these wilderness study areas have been designated in the program area, and they are currently under study (BLM 1983a). They have been controversial (see Chapter **7).** Grazing permittees object to the criteria used in their selection (i.e., their roadless nature, as opposed to unique wilderness qualities) and the fact that existing grazing patterns, even on adjacent land, are "locked in" until their status is decided. Environmentalists are inclined to believe that grazing should be disallowed while these lands are under study. The stalemate has been long lasting.

1969, Endangered Specles Consewatlon Act: This act and its amendments provide for the identification and conservation of threatened and endangered species by all feasible methods including habitat management. Because most of the endangered species in the program area presently being considered for listing are

plants growing on rocky soils, canyon walls, and talus slopes, they are difficult to survey. Other rare or unique plant species are found on unusual soils, often in areas that receive little use by livestock. Much remains to be done in identifying the species that should be included and their locations.

1969, National Environmental Policy Act: This law requires that the environmental effects and tradeoffs of any proposed project on federal lands be analyzed and evaluated before the project is begun. The stipulations of the act are met through preparation of environmental impact statements or studies, their submission to public scrutiny and their approval by government. These EIS's (BLM 1980, 1983a, 1983b), which were completed for the Vale BLM District in 1983, were prepared without an increased budget to cover the costs of inventory and writing. Although they increased the amount of paperwork and cut into field time while they were being prepared, the EIS's are valuable in the long term because the inventory and analysis of alternatives are useful in multiple-use planning.

1974, NRDC vs. MORTON: This Supreme Court decision set the pattern and schedule the BLM would follow as it prepared the Grazing EIS documents for management of the public lands. These court regulations have been met and they fulfill the requirements of the Environmental Policy Act of 1969.

1974, Wild and Free Roaming Horse and Burro Act: Through continuing effort, protection and management of these animals has been accomplished according to law and in keeping with the carrying capacity of the land. (See Chapter 5 for further detail.)

1976, Federal Land Policy and Management Act: This law requires that detailed surveys be made of Federal lands and that plans be made that evaluate and include the whole ecosystem. These surveys mean that the Secretary of the Interior must maintain an inventory of all resource values of public lands on a continuing basis so that changes in resource conditions and emerging resource values can be identified. It also calls for full protection of the environment, multiple use management, landuse planning, fair market value to be paid by users of public lands, and cooperation between Federal agencies and state and local interests. The act gives full responsibility for management of the public domain lands to the BLM, and repeals many early laws such as the homestead acts.

1977, Public Rangelands Improvement Act: This law requires the Secretary of the Interior to inventory range condition and trend on a continuing basis for a wide array of uses, and encourages land stewardship by cooperation of many types of interested users.

Since our first evaluation of the Vale Program in 1977, much information on vegetation, on wildlife and required habitats, and on the management of livestock has become available. Attitudes toward the relative values of the different uses of Federally owned natural resources have also changed, a trend that has resulted in closer cooperation among the various users. More importantly, management emphasis has moved toward whole ecosystems and multiple use, and away from single use and

single-factor analysis. While wildlife habitat management was included in the 1934 Taylor Grazing Act, it received little attention for many years. The fact that 11 proposed projects during the Vale Program in the 1960's were never started because of feared damage to wildlife habitat is a strong indication of this changing management emphasis. The recent situation may be summed in a question: What is the balanced management that will sustain production of forage for livestock and wildlife as well as yield values for all the multiple uses that are required by the interested public?

References

Bureau of Land Management. 1983a. Draft southern Malheur grazing management program environmental impact statement. District Office, Vale, Oregon. 105 pp.

Bureau of Land Management. 1983b. Final southern Malheur grazing management program. District Office, Vale, Oregon. 47 pp.

Bureau of Land Management. 1980. Draft Ironsides environmental impact statement. District Office, Vale, Oregon. 150 pp.

Bureau of Land Management. no date. The Vale Project: A 7-year program for sustained yield natural resource management. Oregon State Office. 43 pp. (Mimeogr.)

Bureau of Land Management. 1963 through 1986. BLM facts for Oregon and Washington. State Office, Portland, OR.

Heady, Harold F. and James Bartolome. 1977. The Vale rangeland rehabilitation program: The desert repaired in southeastern Oregon. USDA Forest Service Resource Bulletin PNW-70. 139 pp.

Hyder, Donald N. and Forest A. Sneva. 1955. Effect of form and rate of active ingredient, spraying season, solution volume, and type of solvent on mortality of big sagebrush ***(Artemisiatridentata).*** Oreg. Agric. Exp. Stn. Tech. Bull. 35. 16 pp.

Mehrlnger, Peter J. 1985. Late-Quaternary pollen records from the interior Pacific Northwest and northern Great Basin of the United States. In: Pollen records of Late-Quaternary North American sediments. AASP Foundation. 167-189.

Mehrlnger, Peter J. 1986. Western juniper in the Holocene. In: Proceedings of the Pinyon-juniper Conference, Reno, Nevada, Jan. 13-16. pp. 1-11. Intermountain For. and Range Expt. Station, Ogden, Utah.

Uresk, D.W., J.F. Cline and W.H. Rickard. 1976. Impact of wildlife on three perennial grasses of south-central Washington. J. Range Manage. 29:309-310.

Williams, G., D.E. Miller and D.H. Miller. 1971. Peter Skene Ogden's Snake country journals. 1827-28 and 1828-29. 201 pp. Hudson's Bay Rec. Soc., London.

Chapter 3 Changes in Vegetation

James W. Bartolome, Barbara H. **Alien and** Harold F. Heady

Vegetation has changed substantially since implementation of the Vale Program in **1962.** These changes reflect the natural variations in plant communities and the effects of management. The methods described in this chapter were designed to sample vegetation before and after land treatments and various management practices were implemented, and to sample untreated areas before and after the Vale Program to determine its impacts on vegetation. The most difficult problem was to separate the temporal and spatial variability natural in range plant communities from the effects of management.

Methods

The effects of land treatments on vegetation in the Vale Program Area were measured in **1975** shortly after the program ended (Heady and Bartolome **1977)** and again in **1986.** The sampling system emphasized widespread and rapid estimates of relative species composition based on foliar cover and estimates of plant density based on number of plants per unit area, both of which provide a measure of the effects of land treatments. Sample areas were located within and adjacent to individual land treatments. Because the treatments encompassed a wide array of variables, the objective was to inventory as many projects as possible. In **1975,** measurements were taken in **153** of the **164** land treatments and in **66** adjacent untreated areas. In **1986,** the original sample locations were relocated using maps, field notes, and photographs. Of the **153** projects sampled in **1975, 146** were sampled again in **1986. 0f** the untreated locations, 63 of the original **66** were remeasured.

Sampling large representative sections within each treatment area and in comparable untreated land placed the emphasis on comparisons among treatments rather than within them; therefore results reflect differences among land treatments or between treatments and nearby untreated areas in the same management units. Where possible, the treated and untreated samples were taken from within the same pasture. The samples do not uniformly cover or represent the whole Vale Program area, only the areas in and adjacent to land treatments.

Major plant species were tallied to obtain densities (number of plants per square meter) in five paced belt transects 18 inches wide and 200 yards long. A hand-carried T-shaped sampling fork established the transect width. Plants with more than 50 percent of their base within the belt were tallied on hand counters. Infrequent species were recorded directly. Only major categories of brush and desirable grasses were tallied. The recorded desirable grasses Included crested wheatgrass, other seeded wheatgrasses, bluebunch wheatgrass, basin wildrye, Idaho fescue, Thurber's needlegrass, and Indian ricegrass; not included were Sandberg bluegrass, squirreltail, and cheatgrass or other annuals.

After pacing the density transects, the survey team estimated botanical composition on the basis of relative foliar cover of all species present. Their notations at each site Included the presence of seedlings, dead plants, erosion, grazing use, total plant foliar cover, soil surface condition, and other characteristics. Sites were photographed. Thus, counts and reconnaissance evaluations provided the data for vegetational analysis. Where appropriate, statistical significance of differences between means was determined by t-test using a significance level of $p<.05$.

In 1986 we added several new measurements primarily directed at assessing soil erosion. At each site we estimated erosion status (1=none, 2=slight, 3=moderate, 4=strong, 5–severe); the degree of cryptogamic crust development on the soil surface (1-none or poor, 2–slight, 3=some, 4=fair, and 5=good), and the percent of bare ground not covered by vegetation.

Additional data, collected by the BLM prior to many of the range improvement treatments, provided a data set for comparison. These data included estimates of absolute cover (area of ground covered by foliage) by major species from step-point transects and estimated grazing capacity. Comparisons of relative cover (proportion of absolute cover represented by each species, totals 100 percent) among pretreatment, 1975, and 1986 data should be cautiously interpreted because of the different methods employed. For example, pretreatment composition was based on step-point estimates of absolute cover converted to relative cover, while the 1975 and 1986 composition was based on ocular estimates of relative cover. These methods result in differing amounts of error and bias.

Sampling of untreated areas comparable to nearby treated areas provided data for comparisons and evaluations of projects in the sagebrush grass vegetation type. Of the 63 samples from untreated areas, 20 occurred adjacent to sprayed areas, 26 near plowed and seeded areas, and seven next to sprayed and seeded areas; the remainder were in minor categories. Because many treated sites had insufficient representative untreated areas, fewer samples were taken in untreated areas. Most of the samples in untreated areas were in the same pasture as, but located outside of, the treated areas.

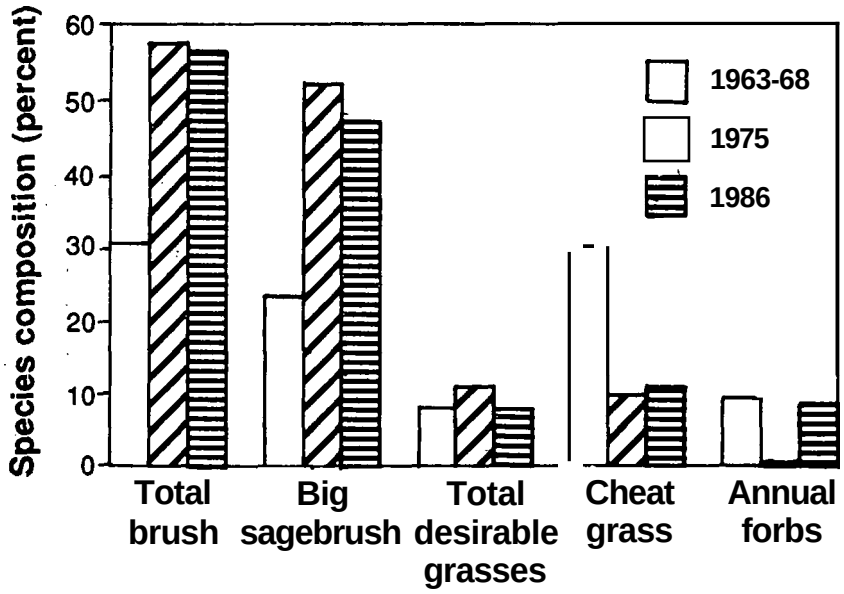


Figure 3-1. Mean relative species composition for untreated areas located adjacent to treated areas. Cover percentages for 1963-1968 were based on step-point samples, those for 1975 and 1986 were based on ocular estimates. Statistically significant differences among means ($p<.05$) and sample sizes are listed in Table 3-1.

Results

Untreated Vegetation

Relative cover of species from **1963** to **1968** in areas later treated with brush controls and seedings indicated dominance of brush (mainly big sagebrush) and cheatgrass, each at near **30** percent cover (Fig. **3-1).** Total desirable grasses were about **8** percent of plant cover. When untreated areas were resampled in **1975,** big sagebrush was estimated at 52 percent relative cover, significantly higher than in the mid-**1960's;** desirable grasses were still the same at roughly **10** percent (Table **3-1).** Relative cover of cheatgrass was significantly lower in **1975** than in the mid-1960's. This may reflect a real increase in brush or changes in the annual responses of cheatgrass. In **1986,** the relative cover percentages of big sagebrush, desirable grasses, and cheatgrass were similar to those in **1975.** The annual forb component fluctuated, with a significant low in **1975.**

Within the native perennial grass component in the untreated areas (Fig. **3-2)** relative cover of bluebunch wheatgrass declined significantly from 12 percent in **1975** to 5.5 percent in **1986;** Sandberg bluegrass increased, but not significantly, from **10** to **13.5** percent during the same period (Table **3-1).** Bluebunch wheatgrass and squirreltail peaked in **1975** and were considerably less common in **1986.** Overall, total desirable grasses in untreated areas constituted somewhat less of the plant cover in **1986** than in **1975,** but the decline is not significant.

Since **1975,** the overall density of desirable grasses on untreated areas has not changed, averaging **0.71** and **0.72** plants/m2 in **1975** and **1986,** respectively (Fig. **3-3).** Big sagebrush density also has changed little, averaging **1.49** plants/m^2 in **1975** and **1.37** plants/m^2 in **1986.**

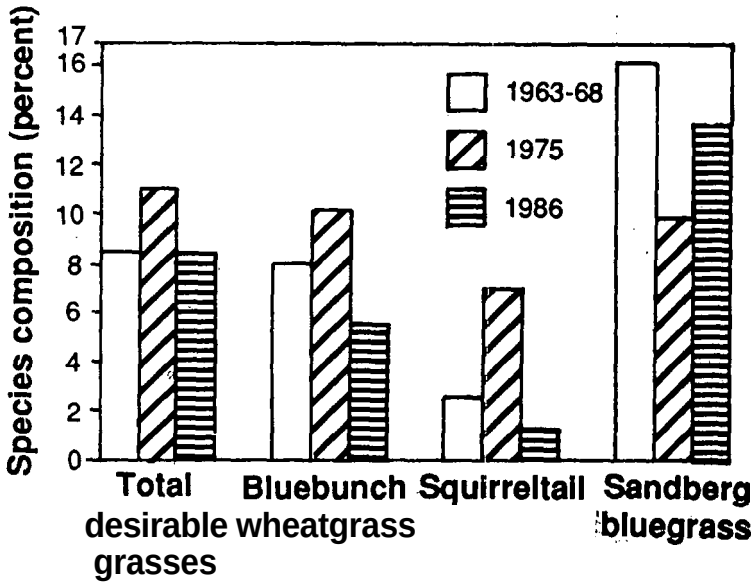


Figure 3-2. Mean relative perennial grass species composition for untreated areas adjacent to treated areas. Cover percentages for 19631968 were based on steppoint samples, those for 1975 and 1986 were based on ocular estimates. Statistically significant differences among means (p<.05) and sample sires are listed ки Table 3-1.

Table 3-1. Slgnlflcant differences (t-test, p<.05) among means for Figures 3-1 and 3-2. Sample size Is 44.

Variable	1963-68 vs 1975	1975 vs 1986	1963-63 vs 1986
Total brush	•	ns	t
Big sagebrush	t	ns	c
Desirable grasses	ns	ns	ns
Bluebunch wheatgrass	ns	t	ns
Squirreltail	t	t	ns
Sandberg bluegrass	t	ns	ns
Cheatgrass	t	ns	t
Annual forbs	c	•	ns

ns-not significant

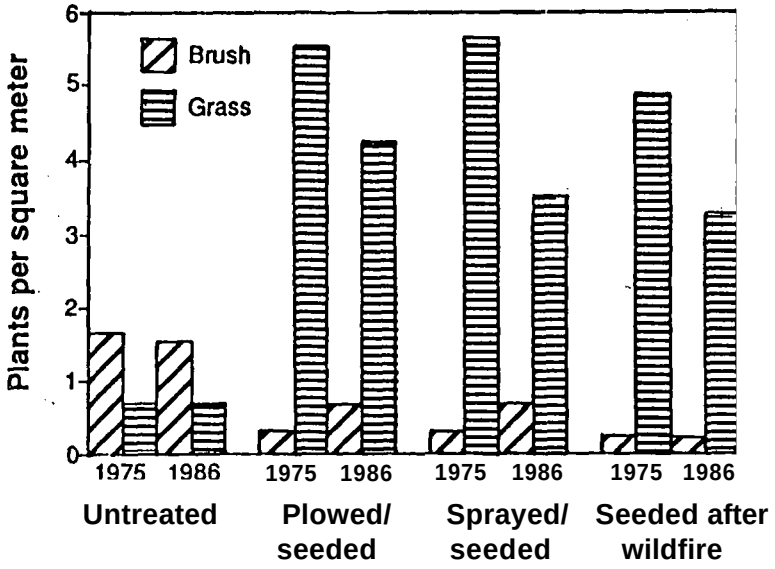


Figure 3-3. Density of brush and desirable grasses on treated areas and adjacent untreated areas. Density data were based on belt transects. Sample sizes and statistically significant (pc.05) differences between means are shown in Table 3-3.

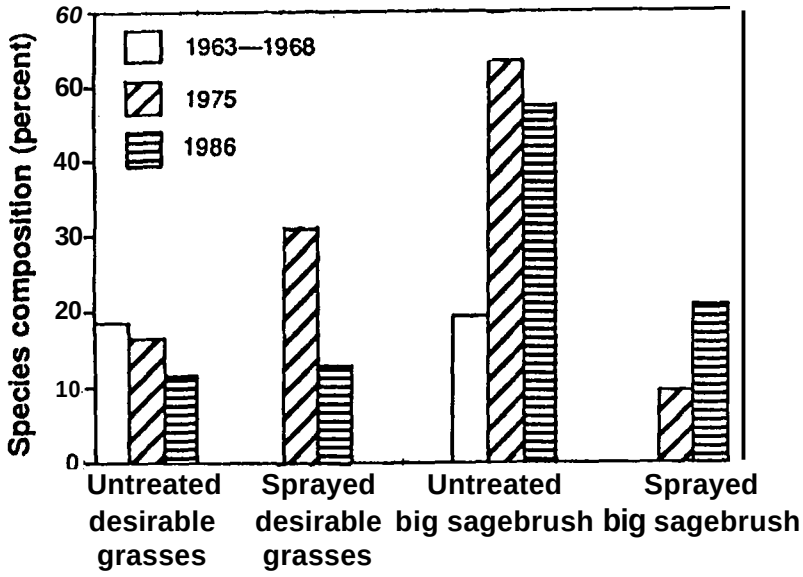


Figure 3-4. Mean *relative* sagebrush and desirable grass composition for sprayed-only areas and adjacent untreated areas. Data for 1963-1968 (pretreatment) were based on step-point samples, those for 1975 and 1986 on Ocular estimates. Sample sues and statistically significant (p<.05) differences among means are listed in Table 3-2.

Effects of Land Treatments on Composition

Sprayed Only

These areas had nearly 20 percent relative cover in desirable grasses prior to treatment (Fig. 3-4). Spraying with 2,4-D significantly increased relative cover of desirable grasses to over 30 percent in 1975, and reduced big sagebrush to less than 10 percent (Table 3-2). By 1986, however, desirable grasses had declined to nearly 13 percent—a major decrease, and statistically significant. Desirable grasses in untreated areas adjacent to sprays also declined, but not significantly, between 1975 and 1986. By 1986 desirable grass cover was similar on sprayed and unsprayed areas. Relative cover of sagebtush increased significantly on untreated areas between the mid-1960's and 1975, primarily due to the fluctuations in cheatgrass mentioned earlier.

Table 3-2. Slgnlflcant differences between palrs of means (t-test, p<.05) for figures 3-4,3-6, and *3-7.* Number of samples for palrs of means are In parentheses (,).

Land Treatment Type	Treatment and Variable	Pretreatment vs 1975	1975 vs 1986	Pretreatment vs 1986
Sprayed only				
	Sprayed TDG	* (29,40)	• (40,46)	• (29,46)
	Sprayed Sagebrush	• (29,40)	• (40,46)	ns (29,46)
	Unsprayed TDG	ns (29,12)	ns (12,14)	ns (29,14)
	Unsprayed Sagebrush	• (29,12)	ns (12,14)	• (29,14)
Plowed and seeded				
	Plow/seed TDG	• (29,46)	ns (48,53)	* (29,53)
	Plow/seed sagebrush	• (29,46)	ns (46,53)	ns (29,53)
	Unplowed TDG	ns (29,15)	ns (15,18)	• (29,18)
	Unplowed sagebrush	• (29,15)	ns (15,18)	• (29,18)
Sprayed and seeded				
	Spray/seed TDG	• (13,19)	ns (19,20)	• (13,20)
	Spray/seed Agsp	ns (13,19)	ns (19,20)	ns (13,20)
	Spray/seed sagebrush	• (13,19)	ns (19,20)	ns (13,20)
	Untreated TDG	ns (13,5)	ns (5,5)	ns (13,5)
	Untreated sagebrush	ns (13,5)	ns (5,5)	ns (13,5)
Seeded after wildfire				
	Fire/seed TDG	n/a	• (8,10)	n/a
	Fire/seed sagebrush	n/a	ns (8,10)	n/a

ns—not significant

Density changes In sprayed-only areas paralleled those for relative cover, with density of desirable grasses declining significantly between **1975** and **1986** and density of brush increasing (Fig. **3-5,** Table **3-3).**

'lowed and Seeded

Plowed and seeded areas contained the poorest relative cover of desirable grass prior to treatment, 2 percent (Fig. **3-6).** In untreated areas desirable grass cover increased slowly, reaching **7.9** percent in **1986,** significantly higher than in the mid-**1960's** (Table **3-2).** In plowed and seeded areas, relative cover of desirable grasses (nearly exclusively crested wheatgrass) remained high after treatment; sagebrush was slowly reestablishing, reaching about I 0 percent relative cover in **1975** and **15** percent in **1986.**

The density of big sagebrush **on** plowed areas increased from 0.25 to 0.50 plants/m^2 between **1975** and **1986,** a significant increase (Fig. **3-3,** Table **3-2).**

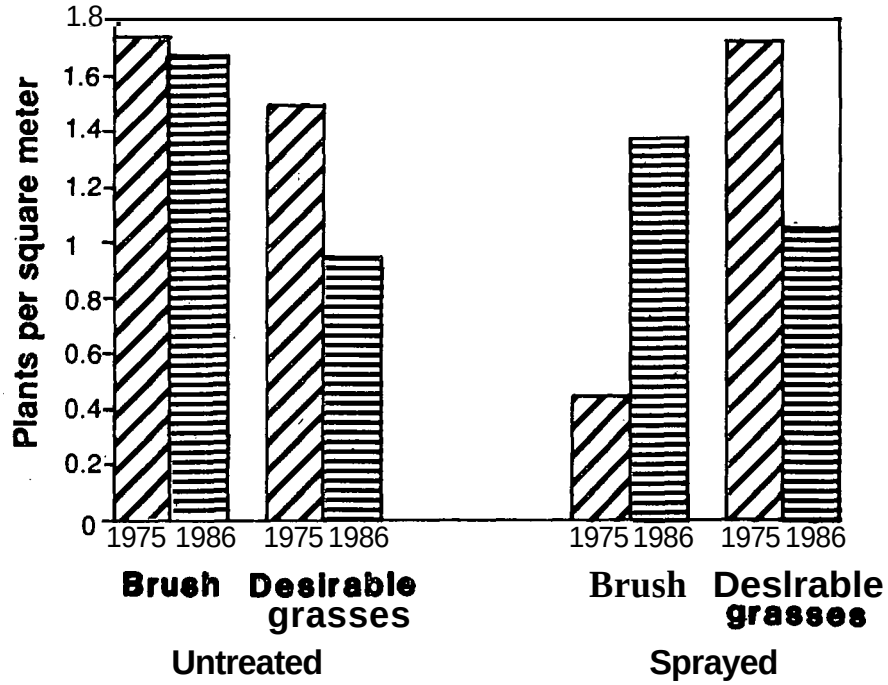


Figure 3-5. Density of brush and desirable grasses on sprayed-only and adjacent untreated areas based on belt transects. Sample sizes and statistically significant (pc.05) differences among means are shown in Table 3-3.

Table **3-3.** Slgnlflcant dlfferences (t-test, **p<.05**) between means and sample **slzes** for Figures **3-3** and **3-5.**

Treatment type and variable	Significance 1975 vs 1986	Sample size
Untreated TDG	**ns**	63
Untreated sagebrush	ns	63
Plowed and seeded TDG	*	54
Plowed and seeded sagebrush	*	54
Sprayed and seeded TDG	*	20
Sprayed and seeded sagebrush	ns	20
Sprayed only, TDG	*	49
Sprayed only, sagebrush	*	49
Wildfire and seeded TDG	*	12
Wildfire and seeded sagebrush	ns	12

ns-not significant

Sprayed and Seeded

Desirable grasses in untreated areas adjacent to sprayed and seeded areas were slightly more than 5 percent in the mid-1960's, and about the same in 1975 and 1986 **(Fig. 3-7).** Desirable grass cover on sprayed and seeded areas increased significantly after treatment, but then declined between 1975 and 1986 due to the combined loss of bluebunch wheatgrass cover and increase of big sagebrush; the declines, however, were not significant (Table 3-2).

Density changes between 1975 and 1986 show the same pattern of decline in desirable grasses and replacement by big sagebrush **(Fig.** 3-3). The decline in density of desirable grasses was significant between 1975 and 1986 (Table 3-3).

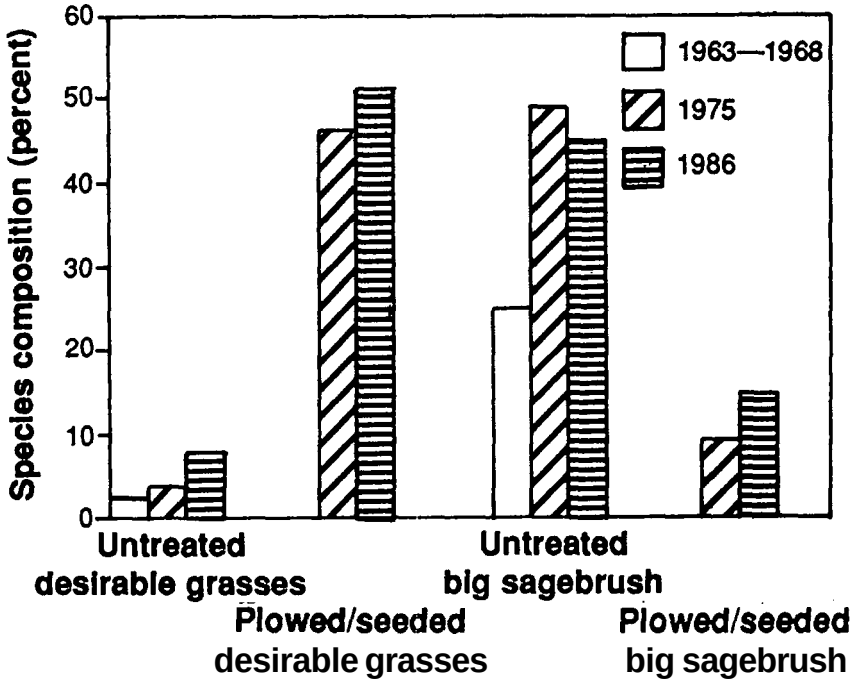


Figure 3-6. Mean relative sagebrush and desirable grass composition for plowed and seeded areas and adjacent untreated areas. Data for 1963-1968 (Pretreatment) were based on step-point samples, those for 1975 and 1986 on ocular estimates. Table 3-2 lists sample sizes and statistically significant ($p<.05$) differences among means.

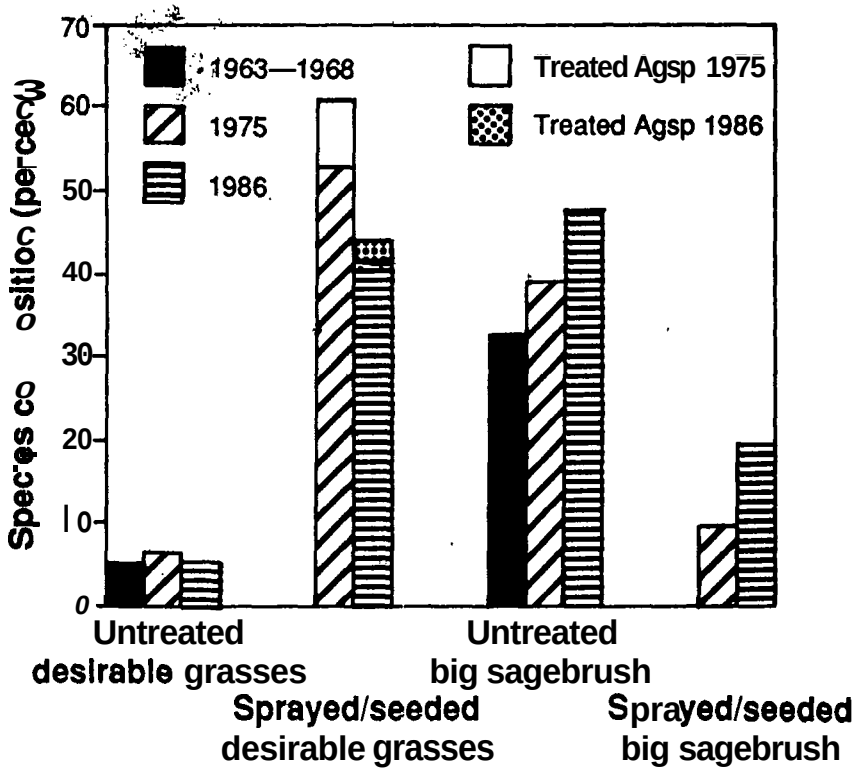


Figure 3-7. Mean relative sagebrush and desirable grass composition for sprayed and seeded areas and adacent untreated areas. Data for 1963-1968 (Pretreatment) were based on step-point samples, those for 1975 and 1986 on ocular estimates. Table 3-2 lists sample sizes and statistically significant ($p<.05$) differences among means.

Seeded After Wildfire

Eventual encroachment of shrubs into plowed and seeded areas contrasts with negligible reestablishment of brush in areas that were seeded following wildfires. Density of desirable grasses, however, declined significantly (Fig. **3-3).** The pattern was similar to that observed on sprayed and seeded areas.

Soil Surface Characteristics

Erosional status did not differ significantly among treatments (Fig. **3-8).** In general, thanks to the Vale Program, accelerated erosion is not widespread in the study area. Burned, sprayed only, and untreated sites had the highest rankings for cryptogamic crust development, while the seeded sites ranked lower (Fig. **3-9).** Treated sites did not differ significantly in amount of bare ground, although the composition of vegetation, as noted above, varied significantly among treatment types (fig. 3-10).

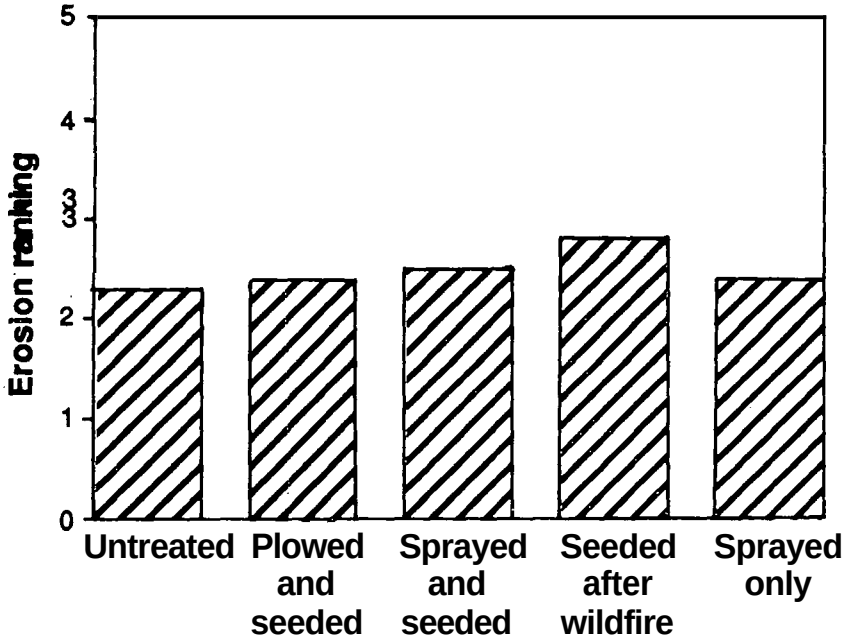


Figure 3-8. Ranking of erosional status (0=none, 5=severe) for five Land **treatment categories in the** Vale Program Area.

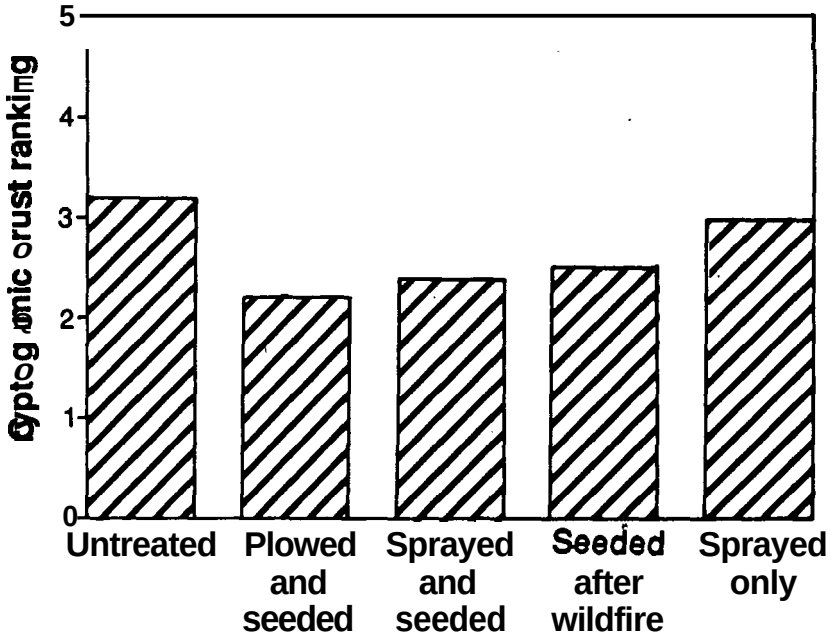


Figure 3-9. Ranking of abundance and condition of cryptogamic crust (0=none, 5=excellent) for five land treatment categories in the Vale Program Area.

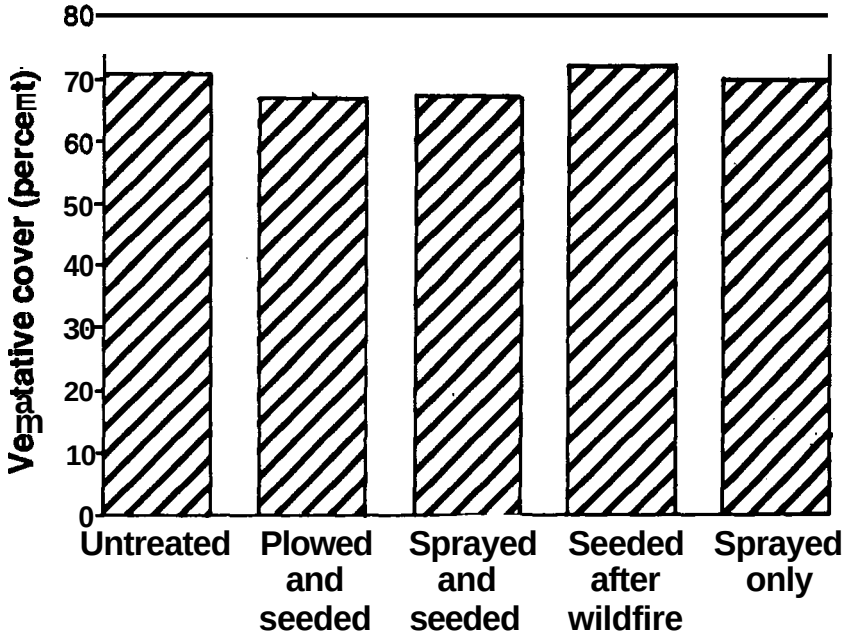


Figure 3-10. Percent vegetative coyer from ocular estimates for five hrnd treatment categories in the Vale Program Area.

Discussion

Vegetatlon

These data support the conclusion that crested wheatgrass seedings, although they have been partly repopulated by big sagebrush, continue to have good grass cover (Fig. 3-11). Density has declined moderately, reflecting larger plants, not a loss of productivity. As predicted in the previous Vale evaluation (Heady and Bartolome 1977), seedings do not appear to have a finite lifespan, even under heavy use (see Chapter 4). Our results, supported by work elsewhere (Hull and Klomp 1966), suggest that productivity of seedings will remain high for decades. Retreatment of successfully established seedings, as usually suggested in the literature (Blaisdell et al 1982), does not appear necessary to maintain crested wheatgrass forage productivity in the program area.

Up until 1975, sagebrush invading plowed and seeded areas had done so in the first few years after treatment (Bartolome and Heady 1978). But that pattern of early invasion and stabilization did not hold after 1975. Many plowed and seeded areas that had little sagebrush in 1975 subsequently developed higher sagebrush densities. The relative amounts of grass and brush changed between 1975 and 1986, long after treatment (Fig. 3-12).

In contrast to plowed and seeded areas which maintained high cover and density of desirable grasses after treatment, sprayed areas were rapidly repopulated by sagebrush. When left unseeded, sprayed areas reached pretreatment sagebrush cover and density within ten years (Fig. 3-13). This finding parallels other studies in Oregon (Sneva 1972) which suggest that, regardless of management, repeated treatments are needed to maintain increased productivity in unseeded sprays. Bluebunch wheatgrass in both seeded and unseeded sprayed areas declined in density and was replaced by big sagebrush. Crested wheatgrass, however, did not appear to be replaced by big sagebrush in sprayed and seeded areas.

Current management practices do not appear to be maintaining bluebunch wheatgrass in sprayed only areas or where it is mixed with crested wheatgrass in sprayed and seeded areas. However, in some untreated areas fenced into crested wheatgrass seedings, desirable native grasses, including bluebunch wheatgrass, have increased moderately.

Cheatgrass, although variable from year to year, was less abundant in treated areas in 1986 than in untreated areas. Squirreltail, an early successional species (Daubenmire 1970), increased along with the disturbances caused by the land treatments; it peaked in 1975, but then declined by 1986. Sandberg's bluegrass has persisted as a variable but important part of the vegetation without a clear relationship to range condition, or treatment.

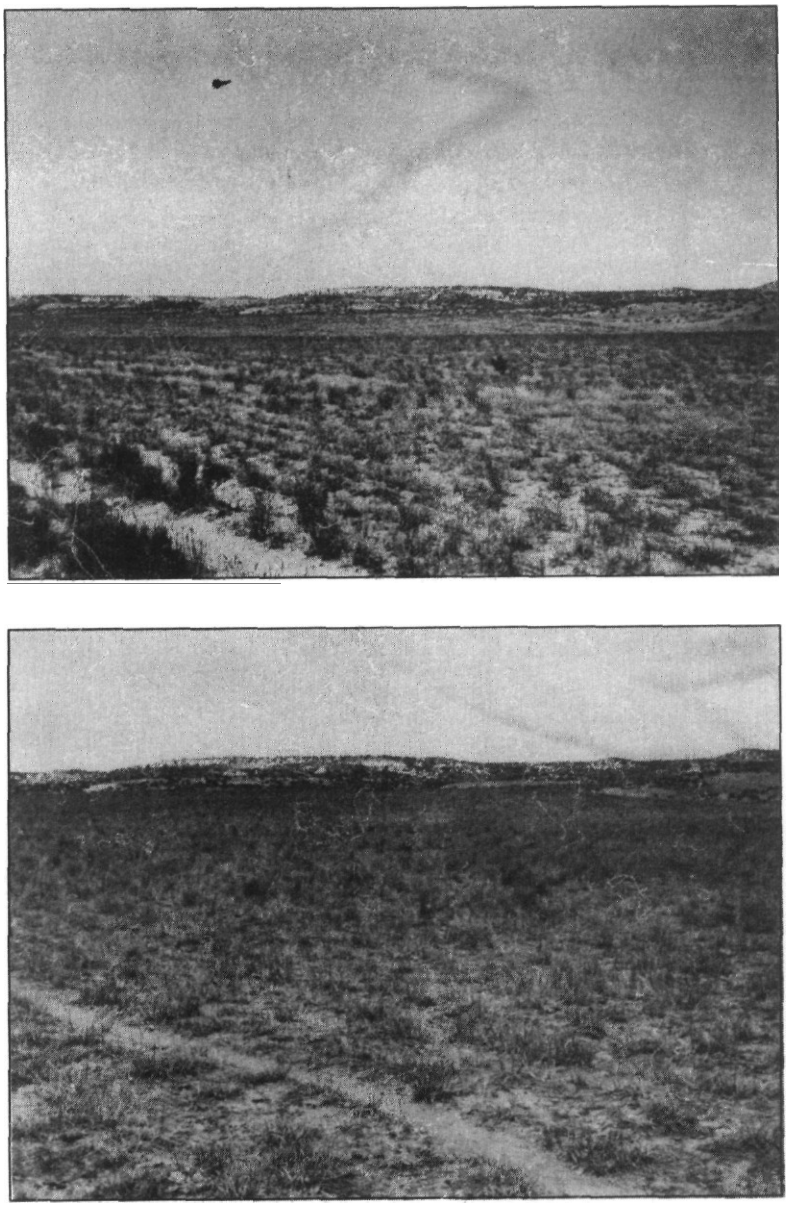


Figure 3-11. Area plowed and seeded to crested wheal rass in 1966, exhibiting negligible residual big sagebrush in 1975 (lope and slow reinvasion by 1986 (bottom).

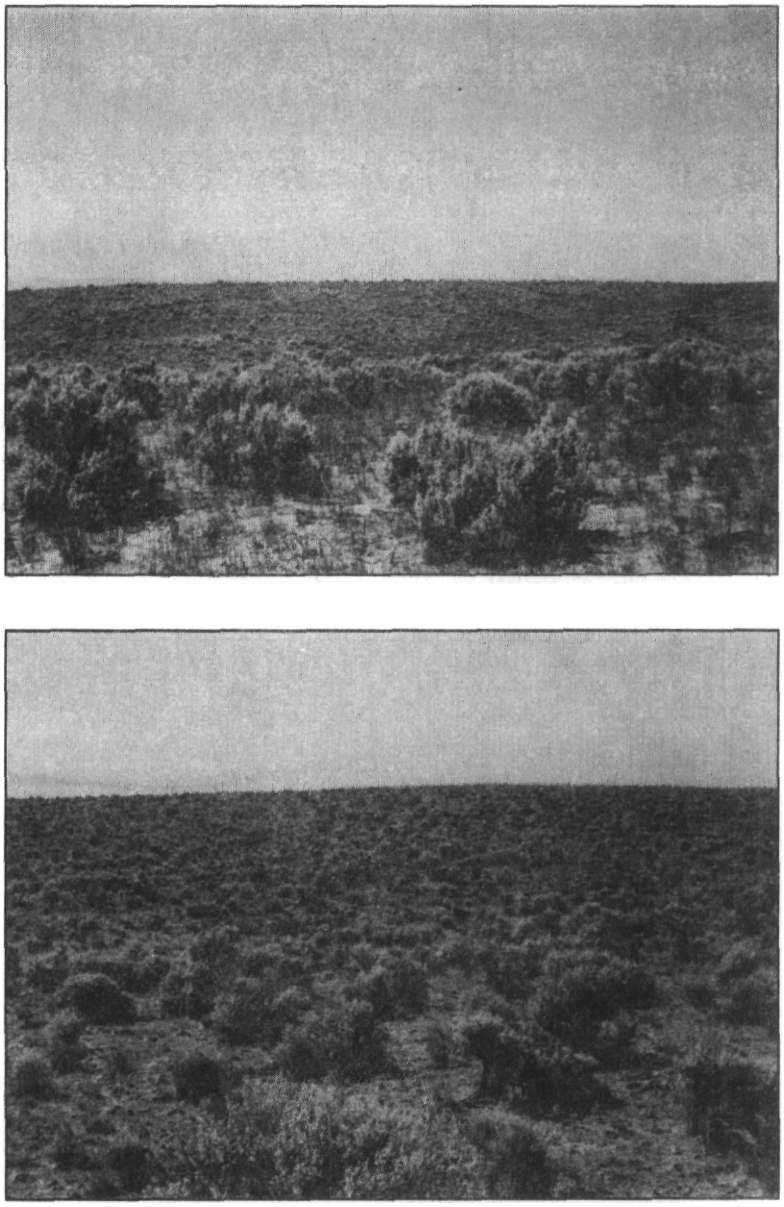


Figure 3-12. Area plowed and seeded to crested wheatgrass in 1965, with continued reinvasion of big sagebrush between 19% (top) and 1986 (bottom).

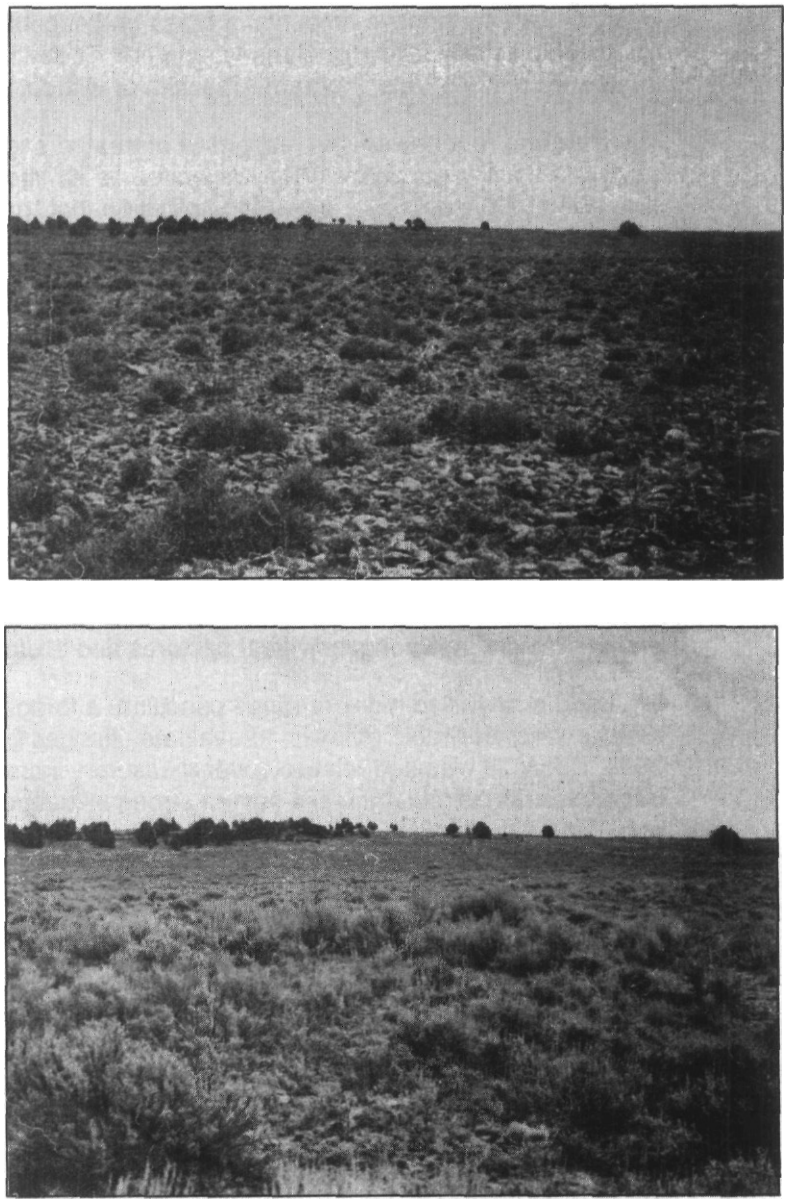


Figure 3-13. This area, sprayed with 2,4-D in 1965, changed composition from 40 percent relative cover of big sagebrush in 1975 (top) to 60 percent in 1986 (bottom). During this period Sandberg bluegrass remained at 20 percent relative cover but bluebunch wheatgrass declined from 20 to 13 percent.

Grazlng Management and Range Conditlon

Based on pollen records, sagebrush has dominated the vegetation in the Intermountain West since at least **30,000** years B.P. (Mehringer 1985). Over that period, abrupt local shifts in the relative amounts of grass and sagebrush have been brought about by volcanic activity, climatic changes, and fire. Today, sagebrush is reinvading treated sites in the Vale Program Area with or without grazing.

The literature reports variable responses of treated sagebrush/grass range to livestock use. Heavy grazing is widely accepted as a major factor speeding sagebrush reinvasion (Johnson 1969), with the implication that "proper management" will slow the process (Bartolome and Heady 1978, Blaisdell et al 1982). Yet, weather patterns (Friscknecht and Hams 1968) and initial range condition (Laycock 1987) also play important roles in determining how sagebrush and grass react to grazing.

Although grazing management is the central tool for managing rangeland and is directty tied to range condition, we found little evidence linking specific grazing practices with vegetation changes. Our results support Laycock (1987) who, after an extensive review of the literature, concluded: "Extremely heavy or abusive grazing can hasten the reinvasion and growth of sagebrush on both native and seeded ranges. However, at grazing intensities short of these extremes, the system of grazing, including complete rest from grazing, does not seem to have any influence on rate of reinvasion of sagebrush." On both treated and untreated ranges in the Vale Program Area between 1975 and 1986, changes in desirable plant cover varied considerably and unpredictably among individual pastures and allotments.

We used a simplified index of range condition, a forage value rating based on the percent cover of desirable grasses, to evaluate changes between the mid-1960's and 1986. Because we used relative cover measures, increases in sagebrush as well as decreases in desirable grasses have a strong influence on the condition index. The results require cautious interpretation because of the different methods employed in the various surveys, which had very different objectives in the 1960's, 1975 (Heady and Bartolome 1977), 1980 (BLM 1983), and 1986 (this report).

As shown in Figures **3-4,** 3-6, and 3-7, desirable grass cover varied from place to place before treatment, with the sprayedonly sites having highest percentage and the plowed and seeded the lowest. These differences in range condition guided choice of range improvement practices. Untreated areas, which were usually in the same pastures as treated areas, typically did not change significantly from the mid-1960's to 1986.

To determine the trend in range condition on the Vale Program Area and how it was affected by treatment and grazing management, we rated forage value for 42 pastures (a subset of the 95 pastures in Table **4-2)** in 1975 and again in 1986. Between surveys, **14** pastures showed an improved forage value rating, 27 showed downward trend in forage value, and one was unchanged. These forage value trends, based on relative cover of desirable grasses, differ from the picture presented in the recent EIS (BLM 1983) for the Vale BLM District. In the EIS, which considered the same 42 pastures plus 5 others for which we have no data, range trend was rated as static in **30** pastures, upward in 16, and downward in one. The values, however, are not directly comparable because the EIS used ecological condition and we used a forage value rating directly based only on desirable grass cover.

When pastures were split into two major categories of treatment, sprayed and seeded, sprayed areas showed more consistent declines in forage value rating. Twenty-three of 27 sprayed areas showed a decline in relative cover of desirable grasses between 1975 and 1986, but only 16 of 24 seeded areas. Both of these data sets reflect primarily sagebrush reestablishment, which lowers relative grass cover, but the data for sprayed areas also reflect some actual loss of desirable grasses.

No clear relationship was found between forage value trend and specific grazing management practices. Older seedings did not differ from newer seedings. When sprayed areas passed into their second decade, they typically had lost most treatment effect unless wildfire had occurred (Fig. 3-14). We found no evidence that the lifespan of sprayed only or sprayed and seeded treatments was related to seasonal grazing management as practiced in the area.

Although bluebunch wheatgrass declined on many sprayed-only and sprayed and seeded pastures, we did not detect practices that suggest a general cause or a cure for the decline. In a northern Nevada BLM allotment, Eckert and Spencer (1987) reported that abundance of bluebunch wheatgrass between 1975 and 1983 was unaffected by grazing practices in a rotational system including heavy use. The loss of bluebunch wheatgrass in the Vale Program Area was less likely to occur where the native species were not intermixed with seeded species, but within the same pasture. Different grazing management systems may help protect bluebunch wheatgrass, but the most obvious strategy would be to incorporate a prescribed burning program into management of bluebunch/big sagebrush pastures to maintain the desired mix of grass and brush.

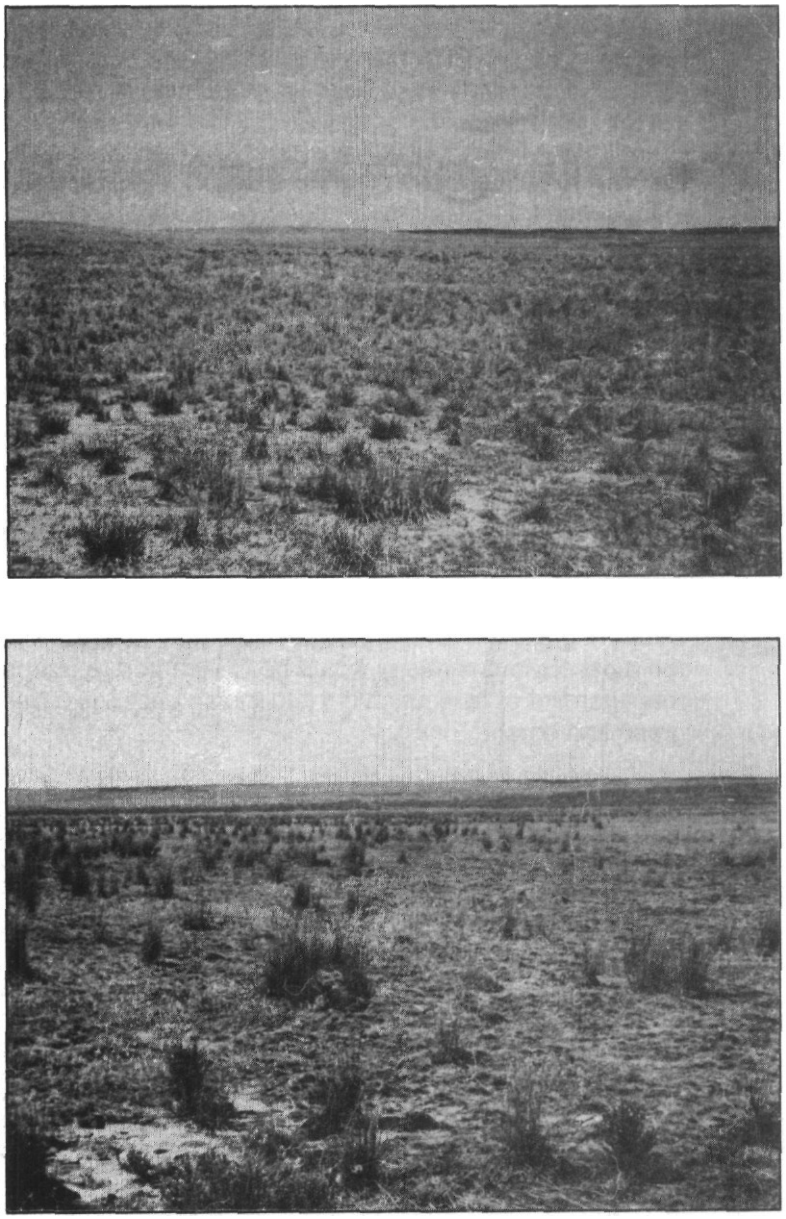


Figure 3-14. This area was sprayed with 2,4-D and seeded to crested wheatgrass in 1966, and burned in 1973. Note negligible reinvasion of big sagebrush which is typical of areas combining chemical treatments and fire.

Acknowledgments

We thank Jim Dunne, Larry Ford, and Jun Zhang for field data collection and Jim Dunne and Daphne Hatch for data management.

References

Bartolome, J.W. and H.F. Heady. **1978.** Ages of big sagebrush following brush control. J. Range Manage. 31: 403-406.

Blalsdell, J.P., R.B. Murray, and E.D. McArthur. **1982.** Managing intermountain **rangelands—sagebrush-grass** ranges. USFS Gen. Tech. Rep. INT-134. 41 p.

BLM **1983.** Southern Malheur grazing management program: Draft environmental impact statement. USDI, BLM, Vale District Office, OR. 105 p.

Daubenmlre, **R.F. 1970.** The steppe vegetation of Washington. Wash. Agric. Expt. Sta. Bull. 62. 131 p.

Eckert, R.E., Jr. and J.S. Spencer. **1987.** Growth and reproduction of grasses heavily grazed under rest-rotation management. J. Range Manage. 40: 156-159.

Frlscknecht, N.C. and L.E. Harris. **1968.** Grazing intensities and systems on crested wheatgrass in central Utah: response of vegetation and cattle. USDA Tech Bull. 1388. 47 p.

Heady, **H.F.** and J.W. Bartolome. **1977.** The Vale rangeland rehabilitation program: the desert repaired in southeastern Oregon. USFS Res. Bull. PNW-70 139 p.

Hull, **A.C.,** Jr. and G.J. **Klomp. 1966.** Longevity of crested wheatgrass in the sagebrushgrass type in southern Idaho. J. Range Manage. 19: 5-11.

Johnson, W.M. **1969.** Life expectancy of a sagebrush control in central Wyoming. J. Range Manage. 22: 177-182.

Laycock, W.A. **1987.** Grazing management systems and tactics in the sagebrush ecosystem. In: Onsager, J.A. (ed.) 1987. Integrated pest management: State-of-the-art in the sagebrush ecosystem. USDA ARS, ARS-50. 85 p.

Mehrlnger, P.J., Jr. **1985.** Late-quaternary pollen records from the interior Pacific northwest and northern Great Basin of the United States. In: Pollen records of Late-Quarternary North American sediments AASP Foundation. 167-189.

Sneva, **F.A. 1972.** Grazing **return** following sagebrush control in eastern Oregon. J. Range Manage. 25: 174-178.

Chapter 4 Grazing Management 1962 To 1986

James W. Bartolome and Harold F. Heady

Permitted Grazing Load

Before enactment of the Taylor Grazing Act in 1934, the unfenced public domain was accessible to anyone. The Taylor Grazing Act authorized the Grazing Service, established grazing districts, and eliminated free use. Grazing was regulated by (1) requiring users of public range to obtain a grazing petmit, and (2) charging fees.

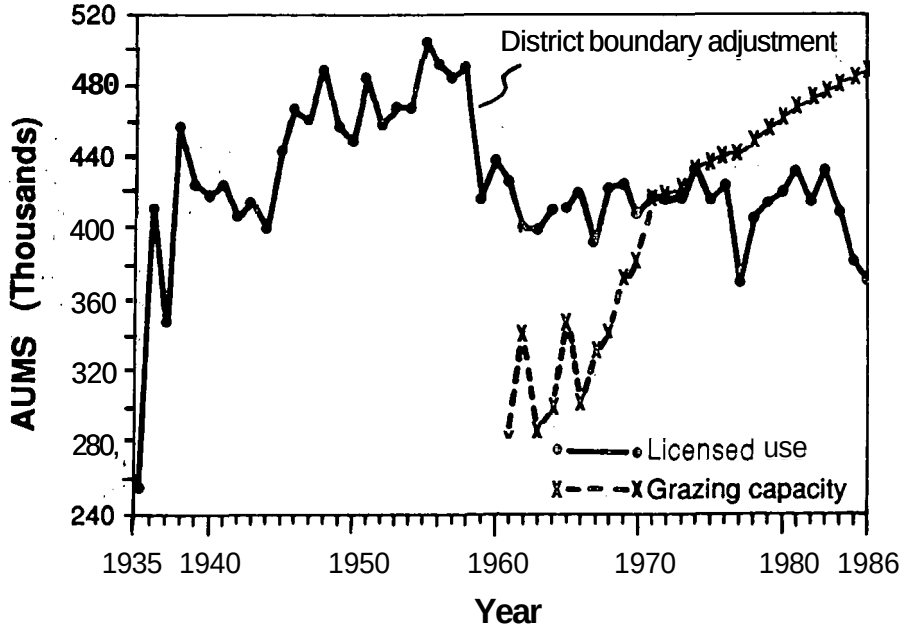
Grazing privileges were allocated based on prior use and commensurate property. Establishment of use in three of five years prior to 1934 and proof of ability to support animals off the public lands (on the Vale District, usually for 5 months in winter), resutted in the establishment of a Class I permit. Class II permits also required commensurate property but not proof of prior use.

In most Grazing Districts, the level of grazing use was dictated by the amount of prior use and commensurate property, rather than the ability of the land to sustain grazing. This was true of the Vale District, where all of the Class I and most of the Class II requests were quickly filled. By the late 1930's, permitted numbers had stabilized at approximately 400,000 AUM's and 100,000 Animal Units (Table 4-1). Permitted numbers did not accurately reflect actual use in the 1930's and 1940's.

Table 4-1. Licensed use and estimated grazlng capacity for the Vale Program Area, 1935-1986.

Year	Licensed use AUM's[a]	Licensed animal units'	Estimated capacity AUM's[b]
1935	255,900	146,193	
1936	412,618	122,322	
1937	346,980	114,113	
1938	457,360	111,972	
1939	424,231	106,662	
1940	418,594	90,638	
1941	424,070	90,446	
1942	406,649	110,091	
1943	414,718	108,595	
1944	399,903	109,110	
1945	442,454	113,070	
1946	468,121	117,678	
1947	459,751	105,891	
1948	489,718	122,717	
1949	458,294	121,032	
1950	448,895	118,854	
1951	484,800	107,439	
1952	458,124	102,969	
1953	468,728	110,416	
1954	467,111	108,474	
1955	504,024	111,695	
1956	491,311	114,249	
1957	483,539	181,673	
1958	489,971	107,708	
1959	415,737	88,811	
1960	439,013	100,920	
1961	427,476	98,559	285,000
1962	400,663	92,743	343,000
1963	399,368	86,435	285,000
1964	409,726	85,676	300,000
1965	411,285	87,024	350,000
1966	419,567	88,166	300,000
1967	392,481	75,698	331,000
1968	422,414	80,910	340,000
1969	426,024	83,829	373,000
1970	407,152	72,805	383,000
1971	418,010	72,676	414,000
1972	416,248	77,640	419,000
1973	417,207	75,504	423,000
1974	432,394	77,493	435,000
1975	415,383	75,868	438,000
1976	424,646	75,627	440,000
1977	369,334	66,358	442,000
1978	406,637	76,571	449,000
1979	414,274	73,220	457,000
1980	420,342	71,815	462,464
1981	431,141	82,357	468,000
1982	414,864	81,332	472,000
1983	431,805	86,467	477,000
1984	409,128	73,085	480,000
1985	381,093	68,693	485,000
1986	370,617	68,398	490,000
Long term			624,547

[a] Source: BLM annual records for licensed use.
[b] Estimated capacities for 1961-1975 are from annual BLM estimates. Estimated capacity for 1980 is from BLM (1983). Values for 1976-1979 are interpolated from 1975 and 1980 values. Values for 1981-1986 are extrapolated from 1961-1975 and 1980.



figum 4-1. Licensed use and estimated grazing capacity for the Vale prcgram **area for 1935 through 1986. Licensed use is from BLM records. Estimated grazing capacity represents best professional judgement summarized by allotment** for **the entire Vale District.**

Animal units remained stable during the 1940's and 1950's, but the season of use lengthened, increasing permitted AUM's (Figure 4-1). Advances in production of alternative feed on commensurate property and general prosperity in the cattle industry contributed to increased demand for forage on public land. During this period, as described in Chapter 1, local advisory boards dominated the Grazing Service and its successor the BLM, effectively regulating animal numbers. Range surveys during the late 1950's indicated that the range was being overused. Some areas needed 50 percent cuts to stop overuse at that time.

Grazing Capacity

Grazing capacity has been defined as the maximum stocking rate possible without inducing damage to vegetation or related resources (RISC 1984). This definition and common usage applies grazing capacity over the long-term as contrasted with short-term stacking rates (Heady 1975). Grazing capacity is difficult to determine because it must combine accurate measures of range condition with the amount and utilization of forage. 'Optimal grazing capacity, the most profitable stocking rate, is rarely known.

The first comprehensive range survey for the Vale District, completed in 1961, estimated grazing capacity at 285,000 AUM's, only about two-thirds of the 427,000 AUM's then being permitted (Table 4-1, Figure 4-1). At that time, cattle and horses were consuming 96 percent of the forage, and sheep only 4 percent (sheep usage has declined even further since 1961). Although the range had sustained more than 400,000 AUM's for decades, the reduced figure of 285,000 AUM's represented a level of grazing that would result in proper use and allow range condition to improve.

The principal motive behind the Vale Range Rehabilitation Program was to increase forage productivity so that grazing capacity could once again equal demand (ELM n.d.). Some permittees took "temporary non-use", in which grazing would be restored once land treatments took effect. Frequently, temporary exchanges between allotments reduced the Impacts of non-use on permittees. Even with some cutbacks in grazing in the program area, licensed use—the level of stocking permitted by the BLM based on estimates of proper use and obligated demand—continued to exceed estimated grazing capacity throughout the **1960's.** As the Vale Program developed, licensed use and estimated capacity did Increase rapidly, and by **1972** estimated grazing capacity for the whole program area exceeded licensed use for the first time (Table **4-1).** At that time forage allocation became a problem, but in a way not previousty experienced by the BLM. Forage was now available in excess of demand in several areas, especially in the Southern Resource Area which had higher rainfall, more acres treated successfully. This area also had fewer and larger allotments which limited flexibility in reallocation. Thus, equity in allocating the forage produced under improved management became an issue.

The major reductions in grazing levels in the program area, as reflected by licensed use, took place in **1967, 1977, 1984, 1985,** and **1986** (Table **4-1,** Figure **4-1).** The reduction In **1967** followed the first major drought year during the Vale Program (Table **1-1).** Although the early and mid **1970's** were all below average rainfall years, the reduction in licensed use in **1977** was probabty related to economic conditions in the range livestock industry, not available forage. The same explanation holds for **1984** through **1986.** Reduced use is associated with reductions in number of animal units rather than a shorter grazing period.

By the late **1960's** several allotments had allotment management plans (AMP's) that included specialized grazing systems and effective monitoring of forage production and utilization. The estimates of grazing capacity became more accurate and comprehensive. These AMP's, supplemented with monitoring of other allotments, **fur**nished basic information for the **two** major environmental impact statements on the District, the Ironside (ELM **1980)** and the Southern Malheur (ELM **1983).** The latter was an intensive effort to assess grazing use and grazing capacity, and it provides excellent information on a pasture-by-pasture basis for the program area.

Presently, licensed use is well below estimated grazing capacity for the program area (Table **4-1).** The BLM in Oregon has recently **(1985)** adopted a policy outlining priorities for allocating additional forage produced through improved management. These procedures will eventually be applied to the individual AMPs in the program area. Imbalances in forage production and demand are being gradually overcome by adjustments in individual allotments, but some remain.

Grazing Systems

Actual Use

Actual use by pasture and allotment reflects management decisions based on professional judgment about grazing capacity, seasonal grazing, and proper use. Because grazing management systems change, allotment boundaries change, and grazing use rarely proceeds precisely as planned, long-term evaluation of grazing plans becomes complicated.

To evaluate the effectiveness of grazing practices started during the Vale Program, we developed a database from pasture use records spanning the period from **1966**—the first year with adequate data-to **1986.** Season of use, stocking levels, and utilization records for the following three base years were used: **1966,** representing grazing management as the first range improvements reached full production; **1976,** representing grazing management following full implementation of the Vale Program; and **1986,** representing grazing management sustainable under current practices.

Records for **95** pastures in **13** allotments met criteria for **(1)** dates of actual use and (2) AUM's of actual use for at least **1976** and **1986.** If data for the preferred dates of **1966, 1976,** and **1986** were not available for a pasture in an AMP, then **1967, 1968,** and **1977** or **1978** were considered as substitutes. In a few cases, **1985** data were used In place of **1986.** While **1976** and **1986** were slightly below normal in precipitation, **1966** was a severe drought year. But because an examination of data for **1965** and **1967** showed little difference between these years and **1966** on the selected allotments, the more complete record, **1966,** was used. Estimates of forage utilization were available for all 95 pastures in **1986,** for **87** pastures in **1976,** and for **26** pastures in **1966.**

Actual use of these pastures, which in **1986** represented 85,000 AUM's, or nearly **20** percent of the program area total, changed little between **1966** and **1986** (Table 4-2). Allotments were stocked at about **9.0** acres/AUM, an average exceeding the program area permitted use average of **10.5** acres/AUM in **1975** (Heady and Bartolome 1977), and **12.9** acres per AUM in **1985.**

Separating the AMP pastures into seeded areas, sprayed areas, and native ranges provides information that describes management and reflects grazing capacity. In **1966,** the newly established seedings provided more forage than native ranges, and were stocked at an average of **6.4** acres/AUM. The increase in average stocking level to about **4.5** acres/AUM in **1976** and **1986** reflects the increased and sustained productivity of seedings (Table **4-2).** Seedings show no indication of declining grazing capacity after more than **15** years of use. Spraying initially increased grazing capacity even more initially than seeding, and sprayed areas were stocked at an average of **4.9** acres/AUM in **1966.** By **1976,** however, grazing use of sprays had declined to about **10** acres/AUM, levels of use maintained in **1986.** Based on actual use in the sampled allotments, grazing capacity on native range changed little between **1966** and **1986,** remaining at about **12** acres/AUM (Table **4-2).**

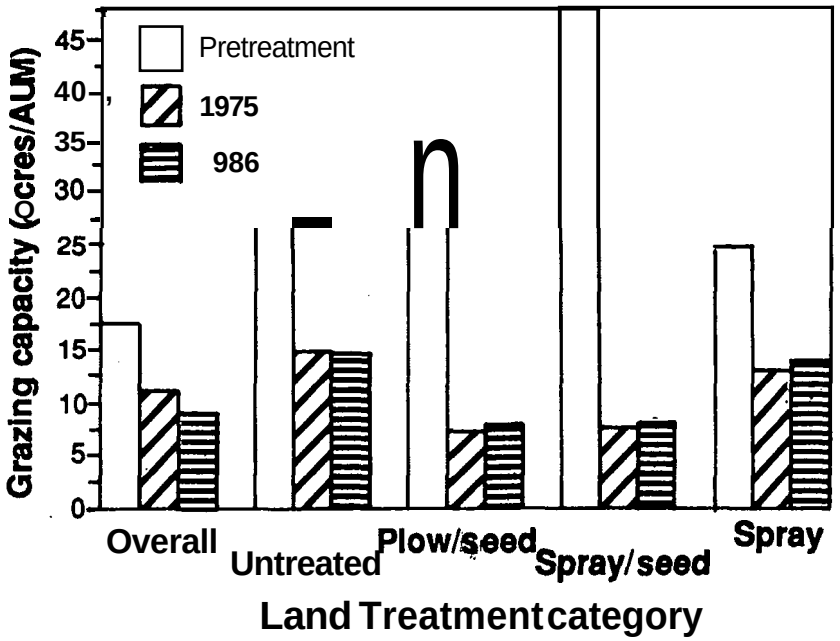
Figure 4-2 shows estimated grazing capacity before treatment, in **1975,** and in **1986** for the whole program area, not just for the **13** allotments included in Table **4-2.** Estimates for pretreatment grazing capacity in Figure **4-2** were made by BLM personnel on stte survey, while we determined the values for **1975** and **1986** during field sampling of vegetation in treated areas. The values for actual use on sprayed and on seeded ranges in the **13** allotments with AMP's correspond fairly well to values for estimated grazing capacity of the whole program area if figures are adjusted for incomplete utilization of available forage. Based on district estimates of grazing capacity in **1961,** forage production increased very rapidly between the onset of the Vale Program and **1966.**

Utlllzatlon

Native range on the **13** sampled allotments stocked **at 12.9** acres/AUM in **1986** showed **36** percent utilization of key species, generally bluebunch wheatgrass (Table **4-2).** The stocking levels to produce 50 percent utilization would total **9.3** acres/AUM, close to the average necessary for native range to produce the estimated grazing capacity over the whole program area shown in Figure **4-2.** Untreated sample areas in Figure **4-2,** which would have been the most severely deteriorated native range before the land treatments, were still estimated to produce well below the level **for** other native ranges in the program area in **1986,** about **14** acres/AUM.

Table **4-2.** Actual use and percent utlllzatlon of **key specles** on varlous land treatments on 95 pastures In allotments wlth allotment management plans. **Source:** BLM records

	1966		1976		1986	
	Stocking Acres/AUM	Percent Util.	Stocking Acres/AUM	Percent Util.	Stocking Acres/AUM	Percent Util.
Seedings **(119,000** acres)	**6.4**	**54**	**4.6**	**59**	**4.4**	**47**
Sprays **(170,000** acres)	**4.9**	**44**	**9.5**	**52**	**11.4**	**33**
Native range **(461,000** acres)	**12.9**	**52**	**11.3**	**57**	**12.9**	**36**
Overall **(750,000** acres)	**8.7**	**52**	**8.9**	**57**	**9.6**	**40**



Fi ure 4-2. Estimated grazing capacity for the Vale **program** area and **selected** treatment categories be ore **and** after treatment. The **p r o g r aam** ea capacity **is** calculated **from** permitted **use records.** The **estimates for capacities of** treated areas **are from field observations.**

Seedings on the sampled allotments were stocked at levels higher than estimated grazing capactty in 1976 and 1986 (Figure 4-2, Table 4-2). Utilization in 1986 was lighter for sprayed and seeded areas than in 1976 and stocking rates were similar, indicating that available forage was greater in 1986 (Table 4-2). Sprayed and seeded areas did not decline in forage production between 1976 and 1986 despite sagebrush reestablishment (see Chapter 3). Grazing use of native ranges changed little on sampled allotments from 1966 to 1986.

Forage utilization in the sampled allotments measured 52, 57, and 40 percent in 1966, 1976, and 1986, respectively (Table 4-2). The decline in utilization in 1986, which is statistically significant (t-test, $p<.05$), resulted from a combination of fewer AUM's of actual use and increased forage availability. The lower stocking levels alone are insufficient to explain reduced utilization without an increase in available forage. The utilization levels show that permitted stocking rates and length of grazing season were well within grazing capacity, although utilization of some pastures was heavy.

Season of Grazing Use

Most of the program area is considered spring range. The ready availability of water and green forage allow animals to put on best gains at that time. However, the permitted grazing season on sagebrush bunchgrass range on the program area extends from March 1 to November 30 at elevations below 4,000 feet and from April 15 to October 31 at elevations of 4,000 to 6,000 feet (BLM 1983). Areas at lower elevation, often salt-shrub types, have historically been used as winter range for livestock.

For nearly a century, season-long use was the rule in the program area. Animals remained free to roam or in one pasture throughout the grazing season, starting as early as possible in spring. Many unfenced pastures exceeded 10,000 acres, and the major limitation on animal use was from widely spaced distribution of water sources. As temporary water sources disappeared In summer, livestock become concentrated, so lack of water in some instances protected native ranges from season-long use. In modem terminology, this pattern was a repeated seasonal system.

Although grazing use may occur at any time within the grazing season, only 1 to 5 percent of pastures in the sample were used season long (Table 4-3). Length of the grazing period—the time during the grazing season when grazing actually takes place—averaged considerably less than the 210 days represented by a 7-month grazing season. In 1966,1976, and 1986 the length of the grazing period averaged 67, 82, and 78 days, respectively.

Once the grazing period is shortened from season-long, many combinations of grazing systems are possible (a grazing system is nothing more than a planned pattern of use). Not all grazing systems are formalized in an allotment management plan, thus there is considerable flexibility in timing, pattern, and intensity of use.

Table 4-3. Number of pastures used In different seasons **from** actual **use records** for **13 allotments.**

	Number of Pastures by Type of Use									
Year	T	Sp	Su	F	TO	Def	Res	SL	Rot	N=
1966	**23**	**16**	**23**	**5**	**7**	**9**	**6**	**1**	**39**	**50**
1976	***45***	**39**	**51**	**11**	**12**	**12**	**7**	**5**	**67**	**94**
1986	**50**	**41**	**49**	**19**	**14**	**9**	**7**	**1**	**58**	**95**

Column codes and timing of grazing period

T=Turnout 4/1-5/15 TO=Turnout only
Sp=Spring **5/15-6/15** Def=Deferment, after **7/15** only
Su=6/15-8/31 Rest=No grazing all year
F=9/1-11/30 SL=Season long (T,Sp;Su,F)
Rot=Season of use different In succeeding year
N=number of pastures, rows total more than number of pastures because some pastures were used in several seasons each year.

In the **95** sample pastures, the season of grazing use varied considerably among pastures and somewhat from year to year. The period of actual use ranged from a few weeks to season-long (Table **4-3).** A two-week leeway was allowed in determining how seasonal use was recorded; for example, if a grazing plan called for deferral of a pasture, but records showed animals were turned out on July 5 instead of the July **15 deferral** date, the pasture was still considered deferred. Likewise, **if** animals remained In a pasture for less than **two** weeks **into** a second season, grazing was considered to have been only in the first season.

Overall, seasonal use patterns have changed little since **1966** (Table **4-3).** When individual pastures are followed for the **20-** year period, minor adjustments in actual use are noted.

From **1962** to **1986** management changed considerably as a result of the Vale Program. New water developments, fences to create new and smaller pastures, sprayings to control brush, and seedings allowed the widespread institution of grazing systems different from former season-long use. Within an allotment, a typical mix would include rotation of season-long use with a variety of different seasonal grazing schedules and occasional rest.

The simplest grazing system exclusive of season-long use is repeated seasonal grazing. The grazing period **Is** shorter than the grazing season, and the pasture is grazed at the same time each year—for example, spring, late spring, after seed-ripe, fall, winter, or some combination of these periods. In **1975** about **10** percent of the pastures In allotment management plans **(15** of **144** pastures) received only repeated seasonal grazing (Heady and Bartolome **1977).** Reasons for repeated seasonal grazing centered on animal management needs, particularly water availability and proximity to the home ranch.

Rotational Systems

Rotation modifies the season of use between years, often through complex patterns and combinations of seasonal treatments. The rationale behind rotation is to avoid damage to forage through use at the same time every year and to promote better range condition. Early in the Vale Program, the AMPs emphasized deferred-rotation systems for native range.

Rotational systems often combined use of native range and crested wheatgrass seedings. The "switchback system" which was frequently mentioned in early planning, combines two crested wheatgrass pastures with one or more larger native range pastures. Each year animals are turned into a different one of the crested wheatgrass pastures for six weeks of early grazing. Then gates are opened and animals are allowed free access to both crested wheatgrass pastures until the deferred native range is grazed. Thus, the crested wheatgrass pastures are rotated for turnout and the native range may be deferred each year. With several native ranges, the system can include yearlong rest for native ranges, thus creating a deferred rest-rotation grazing system.

By 1975 it had become obvious that grazing management was evolving away from complex systems and away from deferred rest-rotation systems. Many crested wheatgrass ranges in the program area were being managed as if they were native range. Most pastures included some rotation of use; 129 of 144 pastures were so treated. Of those 129 pastures, 47 were grazed every year after seed-ripe, but rotated during the growing season (Heady and Bartolome 1977). The Southern Malheur draft EIS (BLM 1983) lists only 58 of 550 pastures as being grazed every year during spring and summer.

Because grazing systems changed continuously between 1966 and 1986, it is impractical to compare grazing management practices from year to year on most allotments. Alternatively, examining many pastures for a given year discloses the mix of seasonal practices in place. As systems changed, the mix of management practices in the sample pastures changed, offering useful comparisons between years. The following analysis gives a picture of how different practices have been applied in the Vale Program between 1966 and 1986.

To evaluate rotation of use, we checked each pasture Table 4-3, comparing use in 1966, 1976, and 1986 to the next year, or in the case of 1986, the prior year. If the season(s) of use differed, then the pastures were part of a rotational system. In 1966, 39 of 50 pastures (78 percent) were rotated; in 1976, 67 of 94 pastures (68 percent), and in 1986, 58 of 95 pastures (58 percent) were rotated (Table 4-3). Repeated seasonal use appears to be increasing on the district.

In 1966, six pastures were rested, or 12 percent (Table 4-3). This percentage is slightly above those for 1976 and 1986, in which seven pastures were rested, or about 8 percent. Deferment, or no grazing until after seed set, also decreased moderately from 18 percent in 1966 to 9 percent in 1986 (Table 4-3).

Present management emphasizes flexibility in the application of systems, in contrast to **1966** or **1976,** when turnout dates, stocking levels, and seasons of use were prescribed in written plans. In those earlier years, however, actual use often deviated from the written plans. Under the present AMP's responsibility for many aspects of management rests with the permittee; adtion is taken by the BLM to change the system if monitoring shows range condition objectives are not being met. This change in the administration of grazing management is generally for the better, given the amount of forage now available on Vale Program lands. It has also coincided with a trend toward simplification of grazing systems and less rotation of use.

Control Of Animal Distribution and Management

Distributional controls of livestock emphasize water and fencing. Secondary controls within pastures include satting and riding! Riding is used primarily to move animals to new pastures, not to move animals withih pastures to unutilized areas. Initial efforts of the Vale Program, with strong rancher support, centered on development of water distribution systems. Additional water allowed access to more forage over more of the grazing season on native range. Water developments also were integrated into seeding and brush control programs to permit use of newly available forage. New water developments on the program area opened an estimated 50,000 formerly unused acres to cattle grazing, and allowed fuller utilization of many additional acres (BLM **1965).**

The role of fencing in controlling livestock distribution is self-evident. Obviously any fenced area must have natural or developed water if it is to be used as a separate unit. Since seedings and brush-control areas were rested for 2 years following treatment, fencing was usually necessary to keep animals out and to permit later control of seasonal use and distribution.

The rapid increase In forage available for grazing under the Vale Program resulted partly from better distribution of livestock through water development and fencing.

Monitoring of Grazing

Under the AMP's, monitoring of grazing use becomes the joint responsibility of the BLM and the permittees. The BLM monitors yearly compliance with season of use and stocking levels, but changes are based primarily **on** measured levels of forage utilization and changes in range condition **on** permanent plots (BLM 1984). The permittee of the **1980's** is given much leeway in day-to-day compliance with grazing plans. The grazing systems designate periods of permitted use, but within these dates, the actual turnout and moving of animals into new pastures is the responsibility of the permittee. Now that good information is available from many years of monitoring range utilization and range condition, the BLM has been able to concentrate on these indicators for needed changes in animal management.

Conclusions

Although permitted use on the Vale Program Area has remained generally stable since accurate records were first kept in the **1930's,** grazing capacity has changed dramatically. In the late **1950's,** following several decades of heavy grazing, surveys indicated the range was being badly overused. Although the range was sustaining 400,000 AUM's, the estimated grazing capacity was only 285,000 AUM's. The Vale Program was conceived as a way to increase forage productivity so that grazing capacity could once again equal demand.

Through vegetation treatments, fencing, water development, and grazing management, the Vale Program rapidly increased grazing capacity, meeting obligated demand by about 1972. Today, estimated grazing capacity is approaching 500,000 AUM's, well above the current level of use.

Of the vegetation treatments, seedings have best sustained increased grazing capacity in the long term. Sprayed areas supported high stocking levels immediately, but rapidly declined as sagebrush reinvaded. After 10 years, they were little more productive than native range.

Native range has increased in productivity on the program area, probably for several reasons. Improved management practices, water developments, and fencing, and precipitation patterns have all played a part.

Grazing systems today emphasize seasonal use, with pastures being used for relatively short periods. Rotation of use is also common. In recent years the trend has been away from complex grazing systems.

References

Bureau of Land Management. (N.D.) The Vale Project: A 7 year program for sustained natural resource management. Ore. State Office. 43 p. (Mimeo.)

Bureau of Land Management. 1965. Vale Project Annual Report. Vale Dist. Office. 5 p. (Mimeo.)

Bureau of Land Management. 1980. Draft Ironside grazing management environmental impact statement. BLM, Oregon State Office, Portland.

Bureau of Land Management. 1983. Southern Malheur grazing management draft environmental impact statement. BLM, Vale District Office, 105 p.

Bureau of Land Management. 1984. Rangeland monitoring: utilization studies. BLM Tech. Ref. 4400-3. Denver Service, Center, BLM. 105 p.

Heady, H.F. 1975. Rangeland management. McGraw-Hill, NY

Heady, H.F. and J.W. Bartolome. 1977. The Vale rangeland rehabilitation program: the desert repaired in southeastern Oregon. USFS Res. Bull. PNW-70. 139 p.

Range inventory Standardization Committee. 1984. Guidelines and terminology for range inventories and monitoring. Soc. Range Manage. 13 p.

Chapter 5 Wildlife, Recreation, and Other Resources

Barbara H. **Allen**

Introduction

The Vale Program produced many benefits in addition to rangeland rehabilitation. Water developments, for example, improved habitat for many species of wildlife and provided new recreational opportunities. The following sections describe the current status of nonlivestock resources on the program area, and trace their changes since **1975.** Although ***some*** **of** these changes, particularly in wildlife populations, cannot be directly related to the Vale Program, improvements in range condition and water distribution have played an important role.

Wild Horses

On December **15, 1971,** all unbranded and unclaimed horses on the Vale BLM District became wild horses under the Wild and Free Roaming Wild Horse and Burro Act. Horse management areas were designated and horse numbers inventoried. The minimum viable herd size assuming no introductions of unrelated brood stock was set by the district at **75** animals.

In **1975,** wild horse grazing amounted to **28,000 AUM's** in **13** horse management areas **(HMA's)** on **914,400** acres **(370,000** ha). Because this grazing was not evenly distributed, some areas were overutilized while others were underutilized. The Sheepheads/Barren Valley **HMA** had deteriorating conditions on both winter and summer ranges and Jackies Butte had denuded winter range. Between **1975** and **1986** approximately **3,736** head were removed in order to keep numbers with the carrying capacity of the range.

In **1979,** the Sheepheads/Barren Valley **HMA** was divided into the Coyote Lake, Sheepheads, and Sand Springs **HMA's** to gain better management control through more accurate inventories and improved problem-solving ability. Overall, there was no change in acreage. However, horse population levels have been lowered and range conditions on these three **HMA's** are now considered good (Rumpel and Kindschy **1987).**

Permanent changes in herd sizes and **HMA** acreages were implemented after the Ironside (BLM **1980)** and Southern Malhuer (BLM **1983)** planning and **EIS** processes. For example, portions of the Hog Creek **HMA** were eliminated due to lack of water, problems with public access, and the small number of horses utilizing the pastures on a yearly basis. Similarly, part of the Jackies Butte **HMA** was withdrawn primarily because a grazing system was established for the allotment and fencing was changed. The Three Fingers **HMA** was reduced in size because of conflicts involving a state park, establishment of a grazing system, and confinement of horses to a small fenced area. The Lake Ridge, Pot Holes, Basque, Cottonwood Basin, Cottonwood Creek, Atturbury, Stockade and **Morgers HMAs** were eliminated because of the small number of horses within each HMB and the difficulty in maintaining a viable herd, lack of year-round water, and/or conflicts with private landholdings. As a result of these changes, today the BLM has better management of the horses.

By **1986, 997** head **(14,357 AUM's)** were grazing the **672,000** acres **(271,960** ha) in the seven remaining **HMAs,** and horse numbers were in excess of desired population levels in only **two** of them (Table **5-1).** Despite significant progress, permittees, local citizens, environmentalists, and BLM employees all believe that wild horses continue to overgraze parts of the program area (Table 5-2). Although recent changes in regulations allow for the humane disposal of excess horses, the BLM has not implemented these regulations, and still holds gathered horses for adoption. **Horse** administration funds used in the program area are administered by the Bums **BLM** District, and often are insufficient or come too late to maintain animals within targeted levels (Rumpel and Kindschy **1987).**

Table 5-1. Aerial inventories of wild horses and desired herd size by horse management area (HMA)

HMA	1974	1986 Actual	1986 Desired
Lake Ridge	5	a	
Pot Holes	19	a	
Basque	28	a	
Atturbury	18	a	
Stockade	47	a	
Morgers Allotment	154	a	
Cottonwood Basin	50	a	
Cottonwood Creek	1	a	
Hog Creek	56	67	30-50
cold springs	164	351	75-150
Jackies Butte	150	138	80-160
Three Fingers	225	85	75-150
Sheepheads/ Barren Valley [b]	1,217		
Sheepheads		182	100-200
Coyote Lake		115	125-250
Sand Springs		158	100-200
Total Numbers	2,134	1096	

[a] These horse herds were removed after completion of the Ironside and Southern Malhuer planning and EIS processes.
[b] The Sheepheads/Barren Valley horse management area was divided into the Sheepheads, Coyote Lake, and Sand Springs areas.

Table 5-2. Percent of people in each group who believe there is too much, too little or just the right amount of wild horse grazing on the Vale BLM District (see Chapter 7 for a descrlptlon of the groups surveyed and the survey techniques)

Amount of wild horse grazing	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94
Too much	46	08	65	59
Just right	54	10	32	31
Too little	0	2	3	10

Wildlife and Fisheries

The program area has **3,153,000** acres **(1,276,000** ha) of big game habitat; **4,260,000** acres **(1,724,022** ha) of small game habitat; **11,000** acres **(4,452** ha) suitable for waterfowl produdon; and 500 miles **(800** km) of fishable streams (BLM **1983).** Fluctuations in **most** wildlife populations over the past **25** years have no apparent connection with the Vale Program. Waterfowl, blacktailed jackrabbit and pronghorn are notable exceptions.

The diversity of Vale Program brush controls, seedings, and water developments has given managers much more flexibility to manage grazing use. Abundant livestock forage in many areas has allowed the establishment of new developments dedicated to wildlife. Another important factor has been improved cooperation between the BLM and the permittees. Because there is more rapport with ranchers, BLM employees have been able to try more ideas to improve wildlife and fish habitat. The allotment management plans have also given the agency a mechanism to accomplish better resource use. For example, early spring and late fall grazing of riparian pastures have been used to achieve better habitats.

wildlife habitat improvements indude brush control, seedings, fencing, water developments, tree and shrub planting in riparian areas, and grazing management. These activities have continued since the Vale Program ended at levels equivalent to other BLM districts in the Oregon/Washington region. For example, in **1985,** brush was controlled on 350 acres **(142** ha) specifically for wildlife habitat improvement, **57** acres **(23** ha) were seeded, **1** mile **(1.6** km) of fence was built, three water developments were completed, and trees and shrubs were planted in four riparian areas. In addition, vegetation was manipulated on another **4,250** acres **(1,720** ha), eight reservoirs were developed, and **3.5** miles **(5.6** km) of pipeline and **2.3** miles **(3.7** km) of fence were constructed, benefitting many wildlife species. For comparison, at the height of the Vale Program **(1966),** brush was controlled on **57,472** acres **(23,259** ha), **35,369** acres **(14,314** ha) were seeded, **281** miles (450 km) of fence were constructed, and **165** water developments were completed.

As the following descriptions of individual wildlife species indicate, populations continue to show natural fluctuations, apparently independent of the Vale Program range improvements, with the exceptions noted above. The doomsday prophecy that the Vale Program would destroy wildlife populations has not proven to be true.

Although, there is no clear relationship between numbers of most species and the Vale Program activities, many people believe that the program did affect wildlife species (Table **5-3).** In general, permittees believe that deer, antelope, sheep, birds of prey, and fish are more plentiful because of the Vale Program. Local residents and BLM employees basically agree with that perception. The statewide environmentalist group sutveyed (see Chapter **7),** on the other hand, generally believe that all species, except possibly ground squirrek, have declined because of the Vale Program. All groups agree, however, that wildlife response to the Vale Program depends on species, seeding treatment size and/or seeding location (Table **5-4).** Permittees and local residents tend to believe that BLM management of wildlife habitat is satisfactory. Just over half of BLM employees and very few environmentalists agree that BLM management of wildlife habitat is satisfactory (see Chapter 7**).**

Table 5-3. Percent of people In each group who believe that wlldllfe species have Increased In Malheur County as a result of the Vale Program (see Chapter 7 for a description of the groups surveyed and the survey techniques)

	Vale BLM N=72	Permittee N=148	Community N=82	Environ-mentalist N=94
Antebpe	83	76	41	31
Bighorn sheep	60	70	66	22
Ground squirrels	58	39	43	54
Birds of prey	35	54	58	29
Deer	43	62	35	33
Fish	58	58	36	14
Chukars[a]	40	52	32	29
Doves	43	43	22	43
Quail	36	40	30	23
Coyotes	33	40	33	21
Pheasants[a]	36	33	20	20
Other birds	31	33	24	21
Sage grouse	21	32	26	6
owls	23	27	19	8
Rabbits	23	20	9	19
Reptiles/amphiblans	13	16	4	3

[a] No significant difference among survey groups, p<.05, Chi-square.

Table 5-4. Percent of people In each group who agree that wlldllfe species response to crested wheatgrass seedings depends on the followlng factors (see Chapter 7 for a description of the groups surveyed and the survey techniques)

Factor	Vale BLM N=72	Permittee N=148	Community N=82	Environ-mentalist N=94
Depends on wildlife species'	59	48	49	66
Depends on seeding location[a]	48	43	38	35
Depends on seeding size	30	18	21	35
Wildlife decrease	25	10	28	53
Wildlife increase	20	48	16	5
No change in wildlife	11	18	22	7

[a] No significant difference among survey groups, p<.05, Chi-square.

Mule Deer

In Malheur County, 13,700 deer winter on 163,000 acres (65,967 ha), while 40,400 deer are estimated to use 2,755,600 acres (1,114,949 ha) as summer range. Table 5-5 shows the changes in mule deer numbers on the program area from 1961 through 1985. Values are missing because these data are no bnger collected by the Oregon Department of Fish and Wildlife (DFW). Population numbers and hunting pressure show no apparent trend, although hunter success has been declining. Mule deer habitat is adversely affected where riparian areas are heavily grazed. and, trampled by livestock.

Mule deer use the Rome crested wheatgrass seeding, and other seedings located adjacent to historic wintering areas, as winter range. DFW counts of mule deer use of the Rome seeding in March were:

Year	Number
1979	304
1980	392
1981	265
1982	p53
1983	739
1984	486
1985	576
1986	541
1987	779

Given fall rains and warm daytime temperatures, crested wheatgrass produces new leaves. Analysis of fecal pellets on the Rome seeding in 1984 indicated that the mule deer winter diet was approximately 90 percent crested wheatgrass. The reduced mule deer population in 1984 was due to heavy snow cover and recruitment die-off of deer due to the unavailability of green crested wheatgrass. Shrubs, for example palatable saltbushes or native sagebrush, might have reduced deer losses by providing forage above the snow cover.

Mule deer suffered population losses during the severe winter of 1983-1984, but populations have been rebuilding since. Wildfire in recent summers has caused localized habitat loss through the removal of sagebrush and browse. Area biologists (BLM and DFW) estimate that mule deer populations are stable in the program area (Calkins 1986).

Table 55. Mule deer populations, Vale BLM District, 1961-1985

Year	Estimated number[a]	Number harvested	Hunting pressure[b]	Hunter success[c]
				(%)
1961	52,700	5,660	7.1	71
1962	29,400	4,120	6.9	60
1963	45,200	3,690	6.2	59
1964	46,600	4,750	6.8	62
1965	45,000	2,810	5.2	48
1966	37,000	2,680	3.9	61
1967	37,000	2,480	3.4	47
1968	37,000	3,420	4.4	62
1969	37,000	**3,570**	6.2	48
1970	37,000	3,600	7.0	53
1971	30,000	3,440	10.3	44
1972	54,000	2,230	7.6	41
1973	**54,000**	2,420	7.8	28
1974	40,500	1,730	6.7	27
1975	38,200	1,530	4.0	26
1976	54,000	2,160	3.9	39
1977	45,600	4,090	**5.7**	53
1978	24,800	2,110	5.9	27
1979	35,800	2,950	6.0	**38**
1980	**35,800**	3,740	7.2	45
1981	—			
1983	—			
1984	26,000	—	—	—
1985	42,500	—	—	—

[a] Source: BLM Facts: Oregon and Washington, Heady end Bartolome (1977); and Oregon Dept. of Fish and Wildlife.
[b] Hunting pressure in hunter *days* per *square* mite of habitat, Vale BLM District summary of the four State game *management* units in *the* Vale District (Kindschy 1986).
Values from same four game units used in hunter days.

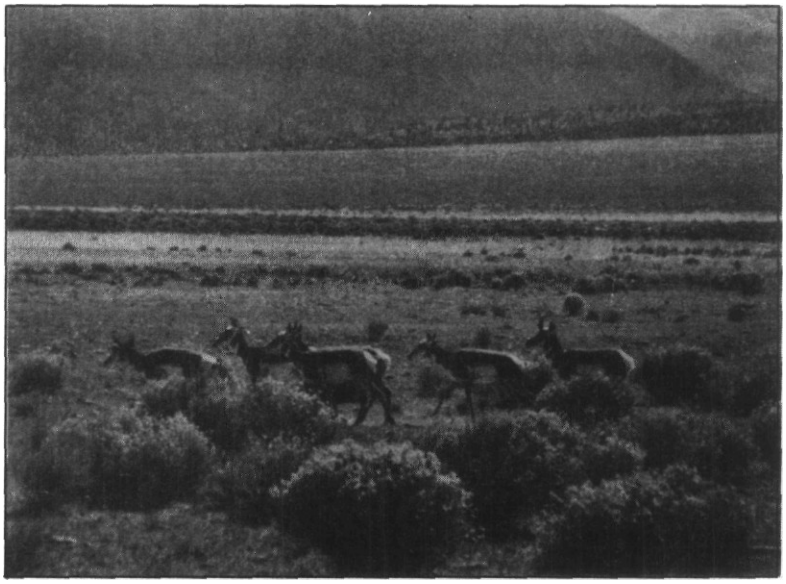


Figure 5 1 . Populations *of* antelope *are* increasing in the study a m . *Antelope* now occupy areas in t h e study area which were previously unsuitable as habitat because of brush reduction, *grass* seedings, and new water developments.

Pronghorn

Antelope (figure **5-1)** prefer low structured vegetation, especially low sagebrush and bumed areas where forbs are frequently abundant (Kindschy and others **1982).** Competition with cattle and wild horses is slight because of different forage preferences (Heady and Bartolome **1977).** In the program area, winter range covers about 600,000 acres **(242,820** ha) while summer range extends over **2,838,000** acres **(1,148,539** ha).

The consensus of BLM and DFW biologists is that antelope populations are increasing in the program area (Calkins **1986).** Hunter days have shown an increase since the early **1960's** (Table 5-6). Antelope now occupy areas which were previously unsuitable as habitat. Several factors have contributed to their expansion, including brush reduction, grass seedings, and new water developments. Nomad alfalfa, which was seeded on **56,340** acres **(22,801** ha) during the Vale Program, is highly preferred by antelope and other animals (Heady and Bartolome **1977).** Some of this alfalfa persists.

Bighorn Sheep

Seventeen bighorn sheep were transplanted to the Leslie Gulch area along the east side of the Owyhee Reservoir in November **1965,** and by **1974** the herd had grown to more than **100.** More sheep were released later along the Owyhee River canyon, and today's herd, numbering about **365** animals, shows prorrtise of continued expansion (Table **5-7).**

Hunters were allowed to draw for two permits for rams of **3/4** curl ***or*** better in **1973-74** and four permits in **1975.** Recently, six permits for **3/4** curl rams have been given out, with **100** percent hunter success (Rumpel and Kindschy **1987).**

Table 5-6. Numbers of antelope and hunter days in the Vale BLM District 1961-1986 (BLM Facts; Heady and Bartolome 1977)

Year	Number of antelope	Hunter days	Hunter success (%)
1961	947	532	56
1962	1,445	386	63
1963	1,800	374	60
1964	2,039	389	64
1965	1,500	448	65
1966	2,000	502	73
1967	2,000	494	56
1968	2,200	500	66
1969	2,200	623	70
1970	2,770	924	60
1971	3,200	1,017	62
1972	3,000	991	61
1973	2,800	1,166	59
1974	2,504	1,164	58
1975	1,523	1,104	52
1976	2,979	881	67
1977	1,300	939	78
1978	1,300	816	64
1979	1,000	657	78
1980	2,700	588	83
1981	2,400	560	81
1982	3,000	1,284	—
1983	5,100	1,195	64
1984	4,100	1,222	—
1985	3,500	1,004	—
1986	5,400	1,206	68

Rocky Mountaln Elk

Rocky Mountain elk have extended their range into isolated desert mountain ranges throughout the study area (Table 5-7), and elk populations seem to be prospering (Calkins 1986). Although the ecological reasons for this extension are not understood, a possible factor is increased year-round recreational pressure in adjacent forests, which may be causing the elk to move into new areas. Minor conflicts with ranching occur in the northern part of the program area, where winter hay stores must now be protected from elk. The BLM maintains winter feeding grounds for elk in this portion of the study area. Hunter success on the Vale District averaged 13 percent in 1982 (Oregon Wildlife 1983).

Blacktalled Jackrabbtt

Blacktalled jackrabbit numbers peaked in the study area about 1957-58, declined shortly thereafter, and never recovered, although populatlons have increased in other areas. Although these rabbits are sagebrush-dependent (figure 5-2), they did not appear to be adversely affected by brush control and seeding projects on the program area (Reeher 1969). Blacktailed jackrabbit populations have been low since 1975 and are possibly still declining. Although brush cover is Increasing again on areas treated during the Vale Program, any beneficial effects on jackrabbits are perhaps being offset by other factors, such as winter weather and sagebrush removal by wildfire (Calkins 1986).

fable 57. Bighorn sheep and elk numbers on the Vale BLY Dlstrlct from 1969-1985. (BLM Facts: Oregon and Washington)

Year	Number of Bighorn Sheep	Number of Elk[a]
1969-1970	30	900approx.
1971	50	100
1972	50	100
1973	70	100
1974	75	100
1975	75	100
1976-1978	100	100
1979	150	100
1980	160	125
1981	175	150
1982	200	5,700
1983	280	6,250
1984	330	6,100
1985	365	5,900

[a]Elk numbers for 1982 to 1985 reflect the boundary change of the Vale BLM District to include the former Baker BLM District

Figure 52. Blacktailed jackrabbit populations are low on the program area although brush cover is increasing again on treated areas. Beneficial effects of increasing shrub cover may be offset by other factors, such as harsh winter weather and sagebrush removal by wildfire.

Chukar Partridge

Chukars were introduced into soufheastem Oregon in the 1950's and reached population highs in the 1960's (Calkins 1986). An estimated 48,000 birds were harvested on the Vale study area in 1969 (Heady and Bartolome 1977). Chukar populations declined dramatically in the 1970's (Calkins 1986), but recovered gradually by the early 1980's. However, severe winter conditions of 1983-84 interrupted this increase. In 1986, localized populations were again increasing but many habitats once frequented by chukars now have no birds (Calkins 1986).

As reported in the original Vale report, it is doubtful that the rehabilitation projects markedly affected chukar populations, as they feed in the protection of rock outcrops and cliffs on insects and seeds, both of which remained plentiful after vegetation treatments. Cheatgrass is a mainstay for chukar, both seeds and green leaves (Kindschy 1987). The Vale Program had little impact on cheatgrass except where bluebunch and crested wheatgrass outcompeted it. However, new water developments, reservoirs and guzzlers, did improve chukar habitat.

Sage Grouse

The population dynamics, Ideal habitat conditions, and impacts of rangeland rehabilitation on sage grouse are not completely understood (Call and Maser 1985). Many thousands of birds inhabited the area in the 1920's and 1930's. They nearly disappeared in the 1940's and 1950's, but were increasing in 1975 as reported by Heady and Bartolome (1977). At that time, Malheur County was the only area in eastern Oregon to have an open hunting season for sage grouse. The Oregon State Game Commission reported that 1,090 sage grouse were taken during the 1969 hunting season.

Recently sage grouse have been declining, primarily because of lack of recruitment. Biologists believe the decline may be related to reduction by wildfire of suitable sagebrush habitat and to increased predation by coyotes and eagles possibly because of fewer jackrabbits (Kindschy 1986). The decline in sage grouse populations is occurring throughout eastern Oregon, and hunting is not allowed on this species at present.

Quail

California (valley) quail and mountain quail occur in the program area. California quail, which are much more abundant than mountain quail, inhabit primarily agricultural areas, while mountain quail require a heavier cover of trees and brush. Populations of both species fluctuate widely (Heady and Bartolome 1977), but both species are currently believed to be declining in the study area. Mountain quail numbers are uncommon, but their exact numbers are unknown. The severe winter of 1983-84 and recent wildfires have most likely contributed to the reduction in this spedes (Calkins 1986).

Waterfowl

Ducks, geese, and shorebirds, continue to increase on the program area (BLM 1980, 1983), taking advantage of stock ponds and improved riparian habitats. About 2,100 acres (850 ha) of wetlands associated with 47 lakes and reservoirs are periodically inundated and provide crucial nesting or feeding habitat for some 70 species of wetland birds. Important waterfowl areas on public lands include Cow Lakes, Bogus Lakes, Pothole Lakes, Jordan Craters and Antelope and Owyhee reservoirs.

Ground Squirrels

Although, ground squirrels are typically cyclic in abundance, in some of the crested wheatgrass seedings, population peaks persisted for as long as 14 years. Eventually plague or other diseases thin the numbers dramatically. Ground squirrels provide an important prey base for raptors, coyotes, and other predators. Currently, ground squirrel populations appear to be down on some of the northern part of study area, but increasing in numbers overall.

Bobcat

Bobcat numbers peaked about 1960 and rapidly declined thereafter. A concurrent reduction in jackrabbits and high numbers of coyotes may have influenced their ability to recover. Bobcat populations now appear relatively stable at levels much reduced from the highs of 1960. Bobcat pelts currently bring $300-500, and licensed trappers are allowed three tags per year. There are no estimates of current bobcat numbers (Kindschy 1987).

Eagles

Eagles, both golden and bald, are more numerous than they were a decade ago. Legislative protection from hunting, reduced losses from powerline electrocution, and improved ground squirrel populations all probably contributed to this increase. Although nesting of golden eagles in northern Malheur County appears to have declined with the downturn in jackrabbit populations, eagle numbers appear to be stable In the majority of the study area.

Flsherles

There are approximately 375 miles (600 km) of streams in the study area and about 2,814 acres (1140 ha) of riparian habitat (BLM 1983). Although, fish occupy some 253 miles (405 km) of these streams, 213 miles (341 km) are in poor or fair condition, partly because of natural factors. Of the total acres of riparian habitat, 83 percent (principally the Owyhee River) has little potential for improvement while 17 percent has medium to high improvement potential.

Streamflow varies from 195,000 acre-ft to 1,750,000 acre-ft per year in the program area. Winter and spring have the high flows, with 60 to 80 percent of the discharge in February through May. There are only four natural lakes, Upper and Lower Cow, Bogus, and Pothole, although there are hundreds of reservoirs throughout the program area. Most of these reservoirs only collect spring runoff, but the few number that are spring fed support fish year-round. There are three major irrigation reservoirs surrounded by public land: Warm Springs, Owyhee and Antelope.

Game fish, which may be found in many of the streams, lakes, and reservoirs, include Lahontan cutthroat trout, rainbow trout, Whitehorse cutthroat trout, native redband trout, brook trout, black bass, perch, bullhead catfish, bluegill, and both black and white crappie. Redband trout and Whitehorse cutthroat trout are species of special concern. The Lahontan cutthroat trout, rainbow trout, crappie, and black bass are planted in streams and reservoirs to maintain the sport fishery. Nongame fish include speckled dace, redside shiners, and squawfish.

Since livestock tend to concentrate near water, these riparian areas continue to be heavily used; the majority are in fair to poor condition for certain species of wildlife and fish. During the Vale Program, efforts were made to determine site specific potential for improving riparian vegetation. More than 80 managed riparian pastures or exclosures were constructed and are now aiding managers in improving vegetative conditions (Rumpel and Kindschy 1987).

Figure 5-3 Recreation use of the program area includes camping, fishing, hunting, rock collecting, bird watching and others. Completion of developer recreational sites has proved difficult because of water and sanitation problems, and costs of maintenance and garbage collection.

Recreation

Recreational use of the program area includes camping, fishing, hunting, rock collecting, bird watching, picnicking, swimming, rafting, and sightseeing (figure 5-3). The Vale Program originally proposed development of 55 recreation sites, but only six of these have been completed. At the completed sites, water and sanitation facilities proved to be more difficult problems than expected. The BLM pays the cost of maintenance and garbage collection at these sites; no user fees are collected, except for group reservations.

Many parts of the study area offer geologic, scenic, zoologic, archaeologic, and historic features of interest to recreationists. Examples, include the Owyhee River (a component of the National Wild and Scenic Rivers System), the Honeycombs, Leslie Gulch, Owyhee Reservoir, the McDermitt Petrified Wood Area, Jordan Craters, the Trout Creek Mountains, Cottonwood Creek, and Fifteen Mile Creek (BLM 1983).

Estimated recreational visitor days of use on the program area are:

Recreational activity	Visitor days/year
Hunting	
Big game	99,900
Small game	15,300
Waterfowl	2,100
Upland game	39,350
Fishing	
Coldwater	64,000
Warmwater	4,500
Camping	123,900
Other day use	8,250

Table 58. Percent of people in each group who believe the listed activity was benefitted by the Vale Program (see Chapter 7 for a description of the groups surveyed and the survey techniques)

	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94
Recreationalists	88	96	89	40
Hunters	88	95	80	48
Rafters	66	92	73	37
Birdwatchers	63	87	79	36
Campers	79	96	78	44
Hikers	72	90	76	35
Anglers	92	95	84	49
Off-road users	70	93	61	77

Most BLM employees, local citizens, and permittees agree that hunting, fishing, rafting, camping, and other forms of recreation benefitted from the Vale Program (Table 5-8). However, a majority of environmentalists surveyed believe that recreation did not benefit from the Vale Program, and that the area continues to have poor public facilities, too many roads, and too many fences adversely affecting recreation (see Chapter 7). More than 50 percent of the people surveyed use public lands for fishing and picnicking, but primary recreational use varies. **BLM** employees and local citizens fish, hunt, camp, picnic and pleasure ride, while permittees tend to fish, hunt and picnic. Environmentalists, on the other hand, use public lands for birdwatching and swimming as well as camping, hiking, and fishing.

Malheur County offers high quality hunting opportunities for deer, antelope, and chukars in the Owyhee Breaks, Fifteen Mile and Tmut Creek areas. Other species sought by hunters in the program area include ground squirrels, coyotes, and jackrabbits. Conflicts between recreationists and ranchers occur when gates are left open; cattleguards are used as often as possible to reduce this conflict. White-water rafting on the Owyhee River has increased tremendously during the last 10 years, causing some management problems (Rumpel and Kindschy 1987).

Wilderness Values

The Federal Land Policy and Management Act of 1976 (FLPMA) directed the BLM to inventory, study, and recommend roadless areas of 5,000 acres (2,024 ha) or more for possible wilderness designation. In the Vale District, 26 such areas totaling 812,600 acres (328,859 ha) have been identified as meriting further evaluation, out of 87 areas (totaling 1,113,580 acres (450,633 ha) initially inventoried (USDI 1980a). The Vale District has more wilderness study areas than any other BLM District in Oregon, despite mads, seedings, and developments resulting from the Vale Program (USDI 1980a).

National Heritage

Range rehabilitation projects prior to 1969 did little to protect archeological values and may have inadvertently destroyed or damaged a few sites (Heady and Bartolome 1977). Examinations since that time along the lower Owyhee River and west of Three Forks of the Owyhee River have uncovered artifacts of very early civilizations. The same springs that attracted early peoples also drew travelers, herders, soldiers, and settlers. Early trails and roads often went from one water point to the next. Therefore; many archeological sites near springs have been covered, destroyed, or damaged by development.

A detailed cultural inventory in 1979 identified 858 prehistoric sites, 86 historical sites and 58 paleontological sites in the program area. Archeological values will be considered in all future range improvements projects.

Mining

The largest mining activity in the program area involves removal of building stone and gravel. Zeolite and bentonite are mined at two sites at present. Cinnabar was mined periodically until the 1960's when competition from foreign ore ruined the market. Periodic interest in geothermal resources, oil and gas, and uranium ore has been only speculative thus far. Gold prospecting has attracted limited interest in isolated areas.

Watershed Conditions and Trends

Streamflows in the program area are extremely variable. Most of the smaller streams are intermittent, flowing only for brief periods as a result of rainfall or snowmelt (BLM 1983).

The Malheur and Owyhee Rivers are regulated by dams to deliver irrigation water to farmland during summer. The majority of this farmland is around Vale and Ontario, downstream from the program area. Other irrigation occurs near private ranches where stream water is diverted for alfalfa or grass hay production. Legal rights to water in the Malheur River drainage exceed the annual water yield (BLM 1980).

The ground water table in the Owyhee Basin is well below the surface and well yields are generally poor except in the larger basins and valleys. Although, ground water from wells does not provide a major amount of livestock water in the program area, cattle use of the large seedings in Jordan Valley depends entirely on wells due to lack of reservoir sites or springs. Many springs have been developed to divert water into stock watering troughs. In general, ground water withdrawal does not exceed the natural recharge in the Owyhee Basin (BLM 1983).

The water quality in the Malheur and Owyhee Basins in Malheur County, according to the Oregon Department of Environmental Quality is below acceptable standards, especially in areas that drain Irrigated row crop land (BLM 1983). The upper reaches of streams flowing through public land generally have good water quality. Inventories in 1979 and 1980 indicated that the minor water quality problems on public land in the program area were associated with livestock grazing. Water temperatures, suspended sediments, and fecal coliforms are occasionally above State standards throughout the program area, but on public land water quality is generally good with dissolved solids less than 1.000 milligrams per liter. Excess sodium, boron, and arsenic cause problems in some areas.

While permittees and local residents believe that water quality is no problem in the program area, environmentalists and BLM employees think there is too much water pollution in general (Table 5-9). Environmentalists also tend to see the water quality problems as being more widespread than the other groups surveyed.

Riparian Areas

Streambank stability was surveyed in 1979 and 1980 during a fisheries habitat inventory on selected streams (USDI 1983). Of the 263 miles (420 km) surveyed that were accessible to livestock, 55 miles (88 km) had heavy streambank erosion damage. Streams with the most erosion were in the Trout Creek Mountains, an area little affected by the Vale Program.

Table 5-9. Percent of people In each group who belleve water pollution Is no problem or a problem In some, many, or most areas In the Vale Program Area (see Chapter 7 for a descrlptlon of the groups surveyed and the survey technlques)

	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94
No problem	34	94	**72**	**8**
Some areas	**53**	5	**27**	**29**
Many areas	9	**1**	1	**37**
Most areas	**3**	0	0	**26**

Riparian conditions were improved during the Vale Program through construction of 50 or more exclosures. These exclosures have been monitored to provide information on how streamflow conditions, plant species composition, soils, shore slope, elevation, and water level fluctuation affect potential of various sites to support riparian vegetation (Crouse and Kindschy **1981).** Transect data continue to be taken documenting the changes In riparian conditions (Kindschy **1987a).**

The information acquired from the exclosure studies has improved our understanding of riparian systems. Based on these studies, BLM has set specific goals for riparian response under various grazing systems and has designed a method to determine if the goals are being met. In some cases, livestock are completely excluded from critical stream habitats, while in other cases, where potential for riparian vegetation is low, grazing is permitted. Some areas are left ungrazed during summer when the potentlal for damage to riparian communities **Is** greatest (Crouse and Kindschy **1981).**

Threatened and Endangered Species

The list of plants under status review as "candidate" species for possible future listing as threatened and endangered species in the study area now includes **16** species, one less than were listed in the **1977** report (Table **5-10).** This decrease in number of candidate species can be attributed to a comprehensive effort to locate the species. Eight of the **17** species in the original Vale report have been dropped from the list, while others have been added. There are no Federally listed threatened or endangered plants on the program area.

The American peregrine falconand bald eagle, which are on the Federal threatened and endangered list, winter in the study area. The snowy plover and kit fox are listed by Oregon as sensitive species. The Western sage grouse, listed as a Federal Category 2 species, Inhabit the program area. Efforts continue on the Vale District to survey potential habitats and ameliorate impacts to plant and animal species that are or may be threatened or endangered.

Natural Areas

Research natural areas (RNAs) are established and maintained primarily for research and educational purposes. Areas of critical environmental concern (ACEC's) are areas of public land where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, and other natural systems, or to protect life and safety from natural hazards.

More than 50,000 acres **(20,235** ha) have been designated as RNA's on the program area (Table 5-1**1),** and nearly **185,000** acres **(74,870** ha) have been designated as ACEC's.

Table 5-10. List of potential threatened or endangered plants in the Vale District (USDI 1985)

species	Habitat Characteristics
Amsinckia carinata	Stony soil
Astragalus mulfordiae	Sandy places near rivers, bluffs
Astragalus solitarius	Soils of valley floors and mesas
Astragulus sterilis	Dry, gravelly, and sandy clay bluffs nearly bare of other vegetation
Collomia macrocalyx	Undisturbed, dry, open, rocky slopes and ridges
Hackelia cronquistii	With sagebrush
Ivesia rhypara	Loose volcanic tuff
Lepidium davisii	Hard white clay playas
Lupinus biddlei	Sagebrush flats and drainages
Lupinus cusickii	Sagebrush flats and drainages
Mentzelia mollis	Green or gray montmorillonite soil
Mentzelia packardiae	Volcanic ash soils high in potassium
Rorippa wlumbiae	Moist areas in gravelly soil
Senecio etterae	Dry clayey ash soils
Thelypodium howellii	Alkaline, poorly drained soil
Trifolium owyheense	Slopes of loose diatomaceous talus

Table 5-11. Vale BLM District research natural areas

Research natural area	Establishment date	Site/Habitat type/ size
Established:		
Jordan Craters	1975	Owyhee uplands; ARTR/AGSP; 30,115 acres
Honeycombs	1983	Owyhee uplands: ARTR/STCO; 11,930 acres
Stockade Mtn.	1983	Owhyee Uplands; JUOC/ARTR/AGSP, ARAWAGSP; 760 acres
Mahogany Ridge	1983	Owhyee Uplands; CELE/ARAR, CELVBERE; 240 acres
Proposed:		
Palomino Lake	—	Bare Playa with 1 T/E species
Toppln Cr. Butte	—	Bull Flat Lake; ARAWFEID, ARCA/SIHY;

Valuation of Nonmarket Resources

Valuation of non-market or unpriced resources, *such* as wildlife and recreation, is filled with pitfalls and confusion due to differences in product definition, purposes, and definition of "economic benefits" (Shuster and Jones 1983). Many methods have been developed to do this, including production cost, cost of alternatives, gross expenditure, opportunity cost of livestock forage forgone, and willingness to pay (Workman 1986). Although values derived from hypothetical willingness-to-pay (WP) cannot be directly compared with market determined prices, many analysts believe it is the most appropriate method for valuing wildlife and recreation (Workman 1986). For that reason, it was chosen by BLM as the basis for establishing some nonmarket benefits of the Vale Program (Table 5-12).

So-called "RPA values", which were calculated by USDA Forest Service economists in 1985 to meet requirements of the Resources Planning Act (RPA), were adopted for the Vale analysis (Nelson 1983). These values are based on travel cost and contingent valuation models (USDA 1985).

In table 5-12, RPA values for various recreational uses are given in dollars per recreation visitor day. Values are taken from Forest Service Region 4, which is ecologically similar to the Vale Program Area. Recreational use figures for the study area were multiplied by the estimated benefits to obtain nonmarket benefits of $5,299,700. For comparison, the S. Malheur EIS values for non-market benefits, which were derived using different techniques, and include only a portion of the Program Area, was $2.9 million (BLM 1983).

The adjusted RPA values for wildlife came from several studies. Antelope (Loomis and others 1985), elk (Sorg and Nelson 1986), and deer (Donnelly and Nelson 1986) were valued using either the travel cost or contingent valuation model or both. These values were adjusted downward in RPA and lumped into the categories displayed in Table 5-12. These unadjusted study values were $73 for antelope, $51 for elk, and $40 for deer per hunting trip. Similarly, cold- and warm water fish were valued at $16.35 to $42.93 per fishing day by Sorg and others (1985).

Table 5-12. Valuation of nonmarket resources

Resource	Value[a] (dollars/day)	Quantity[b] (days)	Annual value (dollars)
Camping	3-5	123,900	495,600
Picnicking	3-5		
Hiking	5-9	8,250	41,250
Wilderness	6-12		
Big game	31	99,900	3,096,900
Resident fish	11	68,500	753,500
Other game use	19	15,300	290,700
Wildlife recreation use	12-18	41,450	**621.750**
Total			$5,299,700

[a] Values for camping, picnicking, hiking, and wilderness are in dollars per recreation visitor *day;* others are in wildlifefish *user day* (USDA 1984).
[b] From text.

Antelope numbers, recreation, hunting, camping and fishing are generally believed to have benefitted from the Vale Program (Table 5-8). Thus, the value of these nonmarket benefits should be added to the market-priced benefits of the Vale Program.

Acknowledgments

I would like to thank Bob Kindschy, Phil Rumpel and Judy Nelson of the BLM Vale District for all their help in compiling raw data for this chapter. Bob Kindschy's foresight in establishing permanent plots to monitor change in vegetation, wildlife species populations, and riparian conditions, and his continued periodic sampling of those plots have provided a valuable 25-year or more record of change. My thanks to Ruth Heady for her timety editorial advice and to David V. Diaz for his frank discussions and encouragement.

References

BLM Facts. 1985 and others. BLM Facts: Oregon and Washington, USDI Dept. of the Interior, Oregon State Office, Portland, OR.

BLM. 1986. Unpublished figures. On file, Vale District, BLM, P.O. Box 700, Vale, OR 97918.

Calkins, William. 1986. Letter in file. Bureau of Land Management, Vale District, Oregon, October 2, 1986.

Call, Mayo W.; Maser, Chris. 1985. Wildlife habitats in managed rangelands—the Great Basin of southeastern Oregon. Gen. Tech. Report PNW-187. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station; U.S. Department of the Interior, Bureau of Land Management. 30 p.

Crouse, Michael R.; Klndschy, Robert R. 1981. A method for predicting riparian vegetation potential of semiarid rangelands. Symp. on Acquisition and Utilization of Aquatic Habitat Inventory Information. Portland, OR. October 28-30.

Donnelly, Dennis M.; Nelson, Louis J. 1986. Net economic value of deer hunting in Idaho. Resource Bull. RM-13. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mtn. Forest and Range Experiment Station. 27 p.

Heady, Harold F.; Bartolome, James W. 1977. The Vale Rangeland Rehabilitation Program: the Desert Repaired in Southeastern Oregon. Resource Bull. PNW-70. Portland, OR: U.S. Department of Agricutture, Forest Service, Pacific Northwest Forest and Range Experiment Station. 139 p.

Klndschy, Robert R. 1987. Unpublished data on file. BLM, Vale District, Vale, OR.

Klndschy, Robert R. 19878. Unpublished transect data on file. BLM, Vale District, Vale, OR.

Klndschy, Robert R. 1986. Rangeland vegetative succession-implications to wildlife. Rangelands 8(4): 157-159.

Klndschy, Robert W.; Sundstrom, C.; Yoakam, J.D. 1982. Pronghorns. In: Thomas, Jack Ward; Maser, Chris, **eds.** Wildlife habitats in managed rangelands: The Great Basin of southeastern Oregon. Gen. Tech. Report PNW-145. Portland, OR: US. Department of Agriculture, Forest Service. 18 p.

Loomis, John B., Donnelly, Dennls M.; Sorg, Cindy F.; Oidenberg, Lloyd. 1985. **Net** economic value of hunting unique species in Idaho: bighorn sheep, mountain goat, moose and antelope. Resource Bull. RM-10. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 16 p.

Nelson, Judy E. 1983. Range economics In the Bureau of Land Management. In: Wagstaff, Fred J. (comp.).Proc. Range Economics Symposium and Workshop, August 31-September 2, 1982, Salt Lake City, Utah. Gen. Tech. Report INT-149. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 38-42.

Oregon Wildlife. 1983 and others. Publ. Oregon Department Fish & Wildlife.

Reeher, J.A. 1969. The **effect** of large **scale** livestock range rehabilitation on game species. Oregon State Game Comm. Rep. 46 p. (Mimeogr.)

Rumpel, Phil; Klndschy, Robert R. 1987. Phone conversation. U.S. Department of the Interior, Bureau of Land Management, Vale District, OR. August 3, 1987.

Schuster, E.G.; Jones, J.G. 1983. Extramarket valuation for resource allocation: a critique. In: Wagstaff, Fred J. (comp.). Proc. Range Economics Symposium and Workshop, August 31-September 2,1982, Salt Lake City, Utah. Gen. Tech. Report INT-149. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 63-72.

Sorg, Clndy F.; Nelson, Louis J. 1986. Net economic value of elk hunting in Idaho. Resource Bull. RM-12. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 21 p.

Sorg, Clndy F.; Loomis, John B.; Donnelly, Dennis M.; and others. 1986. Net economic value of cold and warm water fishing in Idaho. Resource Bull. RM-11. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 25 p.

Thomas, Jack W.; Maser, Chris. (eds.)1986. Wildlife habitats in Managed Rangelands-The Great Basin of Southeastern Oregon. Washington, D.C. U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management, March.

United States Department of Agriculture. 1984. Draft Environmental Impact Statement: 1985-2030 Resources Planning Act Program. Washington, D.C.: U.S. Department of Agriculture, Forest Service. 250+ p.

United States Department of the Interior. 1980. Ironside Draft Grazing Management Environmental Impact Statement. Portland, OR: Bureau of Land Management. 150+ p.

United States Department of the Interior. 1980a. Wilderness Inventory, Oregon and Washington. Final Intensive Inventory Decisions. Portland, OR: Bureau of Land Management. November. 469 p.

Untted States Department of the Interior. 1983. Draft Southern Malheur Grazing Management Program Environmental Impact Statement. Portland, OR: Bureau of Land Management. **105** p.

United States Department of the Interior. 50 cfr, Part **17, Vol.** 50, **No. 188, 9/27/85,** Proposed Rules Endangered and Threatened Wildlife and Plants; Review of Plant Taxa for Listing as Endangered or Threatened Species; Notice of Review. Fish and Wildlife Service.

Workman, John P. 1986. Range Economics. MacMillan Publishing Co., New **York. 217** p.

Chapter 6 Costs and Benefits of the Vale Program

E. Thomas Bartlett, James **W.** Bartolome, **and** Thomas **M. Quigley**

Economic evaluation of the Vale Program involves both direct and indirect benefits and **costs.** Direct benefits include increased grazing of livestock, increases in some wildlife populations, decreased erosion, increased range condition and plant diversity, and greater recreational opportunities. Direct costs include treatment, construction, maintenance, and administration costs.

A major investment program like the Vale Program has direct and indirect economic impacts on the local economy. By avoiding grazing reductions through range rehabilitation, the livestock sector avoided economic losses which in turn helped other **sec-** tors of the local economy avoid losses. The large public expenditure for the program increased the level of activity in the local economy. Finally, increases or decreases in other uses of the program area had impacts on the local economy.

The Vale Program also has **served** as a model for large-scale range rehabilitation, although it was never designated as a demonstration project. **Many** regional, national, and international groups have visited Vale and toured the program area. Visitors have learned from both the successes and failures that have evolved over the years.

This chapter describes two economic analyses for the Vale Program. First, a benefit-cost analysis examines the overall economic efficiency of the program with respect to forage production for livestock. Second, an economic impact analysis using existing input-output models estimates effects on the local economy.

Benefit-Cost Analysis

Was the Vale Program an efficient use of public funds? This question can be answered only partially because many benefits of the program and levels of pre-program values have never been quantified scientifically. Two Ph.D. dissertations have considered livestock production and use of forage for a few years, but only on a portion of the area (Nielsen **1965,** Godfrey **1971).** Other studies (Nielsen and others **1966;** Stevens and Godfrey **1972, 1976)** have also addressed the economics of rangeland rehabilitation on the Vale District.

Three inherent rangeland situations and their implications alter the analysis of benefits and costs. First, the benefits accruing from a project do not depend on independent production functions; for example, forage removal by livestock affects subsequent forage productivity. On the program area, forage production increased on untreated pastures because of redirected use from untreated areas to treated areas. Native pastures also improved in response to better livestock management, even in areas without direct capital investment in rehabilitation practices. One result of the Vale Program could have been to speed the rate of recovery on both treated and untreated areas.

A second assumption or condition is that the Vale Program was conceived, justified, and established as a coordinated set of practices for increasing forage production over the entire district. For example, a proposed project in the north may not have been on as favorable a site as one in the south; yet the northern site was selected to spread the benefits throughout the district. Thus, benefit-cost analysis of an individual project may not truly indicate its worth within the whole program. This point is important because livestock use has been shifted from one part of the program area to another.

Third, the results from the whole program area form the basis of analysis. A benefit-cost analysis of a range practice on Federal land may be used in studying a ranch business or a district program, but conclusions reached in the two situations may be different because the benefits occur in different systems. For example, benefits of water development on Federal land have different values in the context of ranch and district; one does not measure the other.

Our evaluation of the Vale Program's effectiveness as an investment of public funds is based on a simple economic analysis; we estimated and compared benefits and costs with and without the program.

Benefits

The low grazing capacity of rangeland in poor condition provided the original incentive for the Vale Program. Had the Program not been undertaken, proper range use would have required substantial grazing reductions, an action unpopular with lessees. This would probably have resulted in slow improvement of the range, but capacity would have remained low for many years. Based on discussions with BLM personnel and other members of the study team, we devised two scenarios for estimating

grazing capacity in the absence of the Vale Program. In the first, we assumed a maximum grazing capacity of 350,000 AUM's by 1973 as a result of permit reductions and proper management (Table 6-1). In the second, we assumed a constant grazing capacity at the 1962 level (285,000 AUM's).

Table 6-1. Licensed use (use actually paid for each year) and estimated grazing capacities with and without the Vale Program, 1961-1985

Year	Licensed use AUM's	Estimated capacity (available AUM's)	
		With the program[a]	Without the program[b]
1961	427,476	285,000	285,000
1962	400,663	343,000	285,000
1963	399,386	285,000	285,000
1964	409,726	300,000	285,000
1965	411,285	350,000	285,000
1966	419,567	300,000	285,000
1967	392,481	331,000	296,000
1968	422,414	340,000	304,000
1969	426,024	373,000	312,000
1970	407,152	383,000	326,000
1971	418,010	414,000	336,000
1972	416,248	419,000	346,000
1973	417,207	423,000	350,000
1974	432,394	435,000	350,000
1975	415,383	438,000	350,000
1976	424,646	440,000	350,000
1977	369,334	442,000	350,000
1978	406,637	449,000	350,000
1979	414,274	457,000	350,000
1980	420,342	462,464	350,000
1981	431,141	468,000	350,000
1982	414,864	472,000	350,000
1983	431,805	477,000	350,000
1984	409,128	480,000	350,000
1985	381,093	485,000	350,000

[a] All AUM's not available for use due to lack of available livestock water.
[b] Based on actual use records of pastures without improvements which could have responded partially because of the Vale Program increasing production on other pastures.

Actual grazing capacities as a result of the Vale Program were based on estimates by BLM personnel and field measurements by the study team. This included estimates on project areas before and after treatment, and estimates on untreated areas on an ongoing basis.

Many methods have been used for determining the value of livestock forage on public land (Wagstaff and Pope 1987). In this analysis we based our estimates of grazing value on two indicators: the 1969 Grazing Fee System and the average private lease rate. The 1969 Grazing Fee System multiplies a base forage value times

the Forage Value Index (FVI), which Is derived from private grazing lease rates In the 11 Western States (USDA and USDI 1986). The base value of $1.23 per AUM, obtained from the 1966 Western Livestock Grazing Survey (USDA 1977), was adjusted for maintenance costs, because the BLM supplied most of the maintenance in the study area. The resulting base averaged $1.25 for the period of 1964-68. We used the average private lease rates used in determining the FVI as a second estimate of AUM value. Grazing values were then adjusted to 1967 constant dollars with the consumer price index (Table 6-2). The resulting AUM values declined during the late 1970's and early 1980's, with the low value occurring in 1985.

The two methods of determining forage value are meant to provide a high and a low estimate of Vale Program benefits. Figures based on the 1969 formula are conservative values for Federal grazing, while the private lease rates ignore the nonfee costs of grazing on public lands.

Table 6-2. Forage values

Year	Private lease rate	FVI[a]	AUM value	CPI[b]	Private lease rate adjusted to 1967'	AUM value adjusted to 1967'
1963	3.51	96	1.20	92	3.82	1.30
1964	3.51	96	1.20	93	3.77	1.29
1965	3.58	98	1.23	95	3.77	1.29
1966	3.75	102	1.28	97	.87	1.31
1967	3.75	102	1.28	100	3.75	1.28
1968	3.75	102	1.28	104	3.61	1.23
1969	3.82	105	1.29	110	3.47	1.17
1970	4.05	111	1.37	116	3.49	1.18
1971	4.06	111	1.37	121	3.36	1.13
1972	4.17	114	1.40	125	3.34	1.12
1973	4.57	125	1.54	133	3.44	1.16
1974	5.82	159	1.96	148	3.93	1.32
1975	5.75	158	1.93	161	3.57	1.20
1976	6.37	175	2.15	171	3.73	1.26
1977	7.06	193	2.37	181	3.90	1.31
1978	7.11	195	2.40	194	3.66	1.24
1979	7.53	206	2.53	215	3.50	1.18
1980	7.88	216	2.66	245	3.22	1.09
1981	8.83	242	2.98	270	3.27	1.10
1982	8.36	229	2.82	288	2.90	0.98
1983	8.85	242	2.98	298	2.97	1.00
1984	8.86	243	2.99	311	2.85	0.96.
1985	8.40	230	2.93	322	2.61	0.91

[a] Forage Value Index based on private grazing lease rate (1964-1868) base of $3.65. The Index for 1963 was estimated from rental rates in Mountain and Pacific States as FVI was not available for 1963.
[b] Consumer Price Index (1967 = 100).
[c] AUM values adjusted with CPI to 1067 dollars.

Table 6-3. Benefits of the Vale Program assuming that benefits are the difference between licensed use and without-the-program estimated grazing capacity, and that without-the-program capacity increases to 350,000 AUM's in 1973 and remains constant thereafter

Year	Benefit (AUM's)	Value of benefit[a] ($)	Value in 1967 dollars	Value discounted to 1962 (1967 dollars) 4%	7%	10%
1963	114,386	137,260	149,200	143,460	139,440	135,640
1964	124,726	149,670	160,940	148,800	140,570	133,010
1965	126,285	154,700	162,840	144,770	132,930	122,350
1966	134,567	171,570	176,880	151,200	134,940	120,810
1967	96,481	123,010	123,010	101,110	87,710	76,380
1968	118,414	150,980	145,170	114,730	96,730	81,950
1969	114,024	147,090	133,720	101,620	83,270	68,620
1970	81,152	111,180	95,840	70,030	55,780	44,710
1971	82,010	112,350	92,850	65,240	50,510	39,380
1972	70,248	98,350	78,680	53,150	40,000	30,330
1973	67,207	103,500	77,820	50,550	36,970	27,280
1974	82,394	161,490	109,120	68,150	48,450	34,770
1975	65,383	126,190	78,380	47,070	32,520	22,700
1976	74,646	160,490	93,850	54,200	36,400	24,710
1977	19,334	45,820	25,320	14,060	9,180	6,060
1978	56,637	135,930	70,070	37,410	23,730	15,250
1979	64,274	162,610	75.630	38,830	23,940	14,960
1980	70,342	187,110	76,370	37,700	22,600	13,740
1981	81,141	241,800	89,560	42,510	24,760	14,640
1982	64,864	182,920	63,510	28,990	16,410	9,440
1983	81,805	243,780	81,810	35,900	19,760	11,050
1984	59,128	176,790	56,850	23,990	12,830	6,980
1985	31,093	91,100	28,290	11,480	5,970	3,160
Total	1,880,541	3,375,700	2,245,700	1,584,920	1,275,400	1,057,920

[a] Value based on the 1969 grazing fee formula.

Past Lhrestock Benefits—The number of AUM's that resulted from the Vale Program were multiplied by AUM values in 1967 constant dollars and discounted to 1962 at discount rates of 4, 7, and 10 percent. The AUM benefits were calculated by subtracting estimated grazing capacities without the program from licensed use in the years 1963 through 1985.

Based on a without-the-program maximum grazing capacity of 350,000 AUM's, the total accumulated increase in AUM's from 1963 to 1985 was 1.9 million (Table 6-3). The unadjusted value of the forage increase without discounting was almost $3.4 million based on the 1969 Grazing Fee System. The forage increase values (adjusted to 1967 constant dollars and discounted to 1962) were $1.58 million, $1.28 million, and $1.06 million, discounted at 4, 7, and 10 percent, respectively.

Estimates of benefits were greater when licensed use was compared with a constant without-the-program capacity of 285,000 AUM's (Table 6-4). Total accumulated increase was 2.9 million AUM's from 1963 through 1985, with an undiscounted value of almost $6 million using the 1969 formula.

Table 6-4. Benefits the of Vale Program assuming that benefits are the difference between licensed use and without-the-program estimated grazing capacity, and that without-the-program capactty will remain constant at 285,000 AUM's

Year	Benefit (AUM's)	Value of benefit[a] ($)	Value in 1967 dollars	Value discounted to 1962 (1967 dollars) 4%	7%	10%
1963	114,386	137,260	149,200	143,460	139,440	135,640
1964	124,726	149,670	160,940	148,800	140,570	133,010
1965	126,285	154,700	162,840	144,770	132,930	122,350
1966	134,567	171,580	176,880	151,200	134,940	120,810
1967	107,481	137,040	137,040	112,640	97,710	85,090
1968	137,414	175,200	168,460	133,140	112,260	95,090
1969	141,024	181,920	165,380	125,680	102,990	84,870
1970	122,152	167,350	144,270	105,410	83,960	67,300
1971	133,010	182,220	150,600	105,810	81,920	63,870
1972	131,248	183,750	147,000	99,310	74,730	56,670
1973	132,207	203,600	153,080	99,440	72,730	53,650
1974	147,394	288,890	195,200	121,920	86,670	62,200
1975	130,383	251,640	156,300	93,870	64,860	45,270
1976	139,646	300,240	175,580	101,390	68,090	46,240
1977	84,334	199,870	110,430	61,320	40,020	26,440
1978	121,637	291,930	150,480	80,340	50,970	32,750
1979	129,274	327,060	152,120	78,100	48,160	30,100
1980	135,342	360,010	146,940	72,540	43,480	26,430
1981	146,141	435,500	161,300	76,560	44,600	26,370
1982	129,864	366,220	127,160	58,030	32,860	18,900
1983	146,805	437,480	146,810	64,420	35,460	19,840
1984	124,128	371,140	119,340	50,360	26,940	14,660
1985	96,093	281,550	87,440	35,480	18,450	9,770
Total	2,935,541	5,755,820	3,444,770	2,263,950	1,734,710	1,377,300

[a] Value based on the 1969 grazing fee formula.

The estimates of undiscounted benefits based on the private lease rate values were $9.97 million for the 350,000 AUM maximum without-the-program capacity and $17.02 million for the 285,000 AUM without-the-program capacity. Based on the former grazing capacity, the benefits discounted to 1962 and adjusted for inflation were $4.67 million, $3.76 million, and $3.11 million at 4, 7, and 10 percent, respectively; based on the latter grazing capacity, the discounted benefits were $6.68 million, $5.12 million, and $4.06 million.

Future livestock benefits—Livestock benefits from the Vale Program did not stop in 1985 but will continue into the future. Heady and Bartoiome (1977) assumed benefits would continue until 2020, and we adopted this year for our analysis. While exact period length can be argued, the seedings show no signs of deteriorating to preprogram levels, and benefits will continue to accrue.

Several assumptions were made with respect to future livestock benefits. First, we assumed that without-the-program AUM capacity would remain at either the 350,000 AUM level or the 285,000 AUM level. Second, we assumed that either the level of use will remain approximately the same as in the past or that unused capacities will be marketed to the current permittees or other livestock producers in the future. We made calculations based on the four possibilities using the 1969 formula values and the private lease rate values (Table 6-5).

Table 65. Future livestock benefits under different scenarios from the Vale Program, 1986 to 2020

Market increased capacity	Maximum without program	Forage value	Value discounted to 1962 (1967 dollars)			
			0%[a]	4%	7%	10%
	(AUM's)		($1,000's)			
No	350,000	1969 Formula	1,921.4	615.4	295.0	153.4
	285,000	1969 Formula	3,991.6	1,278.4	612.8	318.6
	350,000	Private rate	5,510.8	1,765.0	846.0	439.9
	285,000	Private rate	11,448.6	3,666.6	1,757.5	913.8
Yes	350,000	1969 Formula	4,299.8	1,377.1	660.1	343.2
	285,000	1969 Formula	6,370.0	2,040.1	977.9	508.4
	350,000	Private rate	12,332.3	3,949.7	1,893.1	984.3
	285,000	Private rate	18,270.0	5,851.4	2,804.6	1,458.2

[a] Discount rate.

We assumed that the use from 1986 through 2020 would approximate a level calculated from the average licensed use from 1976 to 1985. This was 410,326 AUM's per year, which is an annual increase of 60,326 AUM's above the without-the-program level of 350,000 AUM's. This increase is worth $54,897 in 1967 constant dollars using the 1969 Grazing Fee System values. Discounted to 1962, this value was $615,370 at 4 percent, $294,950 at 7 percent and $153,360 at 10 percent (Table 6-5). These values approximately doubled at a maximum capacity of 285,000 AUM's.

We then assumed that the unused capacities could be marketed and that capacities would remain at the **1985** level of **485,000** AUM's (Table 6-1) until **2020.** Based on the 350,000 AUM maximum capacity, the increase was **135,000** AUM's annually, which would be worth **$122,850 in 1967** constant dollars using **1969** formula values. This annual return for 35 years would be worth **$1.4** million at **4** percent, $660,000 at **7** percent, and **$343,000** at **10** percent, all discounted to **1962** using the **1969** Grazing Fee System values. Based on the **285,000** AUM maximum capacity, benefits were approximately 50 percent higher.

Future benefits in ail scenarios increased when the private lease rate was used to estimate forage value. At the 4 percent discount rate, future grazing benefits ranged from **$1.8** million to **$5.9** million depending on the scenario. Relationships among scenarios were similar to those based on the **1969** formula values. Total benefits from **1963** through **2020** are shown below in the net benefit section.

Nonllvestock **Benefits—The** Vale Program has affected many uses in addition to livestock grazing. But determining the degree to which the program has influenced these uses is confounded by fluctuating use levels, changes in management policies and emphasis, and initiation of new resource programs.

The program undoubtedly provided the potential for increases or improvements in some resource areas. By providing permanent water for wildlife, the Vale water developments increased the area of usable wildlife habitat. Seedings provided winter and spring forage for species such as mule deer and antelope. Roads built during the program allowed better access by hunters and other recreationists.

Another important benefit has been reduced erosion and related improvements in water quality as a result of range improvement. This was a primary objective of the Vale Program, which went hand in hand with increasing livestock forage. Other perceived benefits are listed in greater detail in Chapters 5 and 7, and should be considered in any evaluation of the Vale Program.

Vale Program Costs

The total cost of the Vale Program is difficult to determine. The original proposal requested **$12,392,280** for land treatment, **$2,019,080** for administration, and **$1,819,100** for miscellaneous expenses, for a total of **$16,230,460** (BLM n.d.). Another $7,775,000 was later added for roads and recreational development, probably giving rise to the commonly held belief that the Vale Program cost $20 million. However, the program was never fully funded.

Regardless of the exact figure, costs go beyond those of initial rehabilitation and administration. Maintaining the Improvements continues to be an expense. Thus, any benefit-cost evaluation of the program on a long-term basis must include continuing costs. Unfortunately, separate maintenance records for the Vale Program improvements are not available. Further complicating the cost picture is the fact that BLM accounting procedures have not separated the costs of Vale Program rehabilitation projects and their maintenance from other district operating expenses.

To get a better idea of Vale Program costs, we compared funding for the Vale BLM District with that of two other nearby districts, the Burns District and the Lakeview District. Because the latter two districts are somewhat smaller than the Vale District, we adjusted for differences in area size. Vale budgets were compared with Burns budgets for fiscal years 1963 through 1972, at which time funds were also invested in range improvements on the Bums District. From 1973 through 1985, Vale budgets were compared with Lakeview budgets, because the latter had no special range improvement program.

This analysis showed total costs of the Vale Program from 1963 to 1985 to be almost $19 million (Table 6-6). The costs in 1967 constant dollars discounted to 1962 were $9.2 million, $7.6 million, and $6.4 million at discount rates of 4, 7, and 10 percent, respectively.

Table 6-6. Estimated costs of the Vale Program, fiscal years 1963-1985

Year	Program funds for Vale	Program funds (1967 dollars)	Value discounted to 1962 (1967 dollars)		
			4%	7%	10%
		($1,000's)			
1963	763.5	829.88	797.96	775.59	754.44
1964	912.9	981.59	907.54	857.36	811.23
1965	908.3	956.06	849.93	780.43	718.30
1966	1,037.5	1,069.60	914.30	815.99	730.55
1967	1,121.9	1,121.90	922.12	799.90	696.61
1968	1,073.5	1,032.18	815.75	687.79	582.64
1969	861.3	782.98	595.00	487.60	401.79
1970	838.8	723.06	528.33	420.83	337.31
1971	533.3	440.77	309.68	239.75	186.93
1972	572.2	457.75	309.24	232.70	176.48
1973	588.9	442.78	287.62	210.36	155.19
1974	4414.2	300.14	187.47	133.27	95.63
1975	588.4	365.47	219.49	151.66	105.86
1976	901.3	527.08	304.38	204.41	138.80
1977	740.2	408.95	227.08	148.22	97.90
1978	774.6	399.28	213.18	135.25	86.89
1979	593.5	276.05	141.72	87.39	54.62
1980	601.4	245.47	121.17	72.63	44.15
1981	783.5	290.19	137.74	80.24	47.45
1982	855.1	296.91	135.51	76.73	44.13
1983	895.0	300.34	131.80	72.54	40.59
1984	727.7	233.99	98.73	52.81	28.74
1985	578.1	179.53	72.84	37.87	20.05
Total	17,695.1	'12,661.95	9,228.56	7,561.30	6,356.30

We assumed that maintenance and administration costs will continue at a constant amount through the year 2020 and that the maintenance and reconstruction costs would be the average of cost estimates for 1985, 1986, and 1987 ($524,000). The 1962 value of annual expenditures from 1986 until 2020 is $1.79 million at 4 percent, $858,000 at 7 percent, and $446,000 at 10 percent in 1967 dollars. Estimated total costs from 1962 until 2020 discounted to 1962 are $11.02 million, $8.42 million, and $6.80 million at 4, 7, and 10 percent, respectively.

Net Livestock Benefit

Net livestock benefit was calculated as the value of benefits from increases in AUM's minus the costs of the Vale Program. Benefits and costs were adjusted to 1967 values and discounted to 1962 for the period 1963 through 2020.

Again, we calculated benefits based on two levels of grazing capacity without the program (285,000 and 350,000 AUM's) and on two forage values (1969 Grazing Fee System and private lease rates for grazing). In addition, we compared net benefits with and without excess capacity over present level of use being valued. In Table 6-7, we assumed that AUM's of capacity would only be valued for livestock grazing if used, and that grazing use would not increase in the future. In Table 6-8, all of the capacity was valued from 1986 through 2020, assuming that this would be marketed to existing permittees or to other livestock producers.

In the calculations assuming that grazing would not increase in the future, only one scenario--285,000 AUM grazing capacity, private lease rate, and zero discount rate--produced a positive net benefit. The other scenarios resulted in negative net benefits from livestock grazing, with losses ranging from $3 million to $14 million. The benefit-cost ratios for a maximum capacity of 350,000 AUM's without the program using private lease rates for forage value were 0.5 or higher, depending on the discount rate.

Benefits and net benefits increased if the total grazing capadty of the program area was valued (Table 6-8). Benefitcost ratios generally remained under 0.5 for all scenarios using 1969 formula forage values. Using private lease rates, the ratio was above 1.0 (a positive net benefit) in three cases.

The greatest costs of the program occurred during the early years of the analysis period, while the benefits were more evenly distributed over time. This penalized the benefits because the values were adjusted for inflation. The dollar was strongest during the years when costs were highest. As the discount rate increases, the benefit:cost ratio decreases, which reflects the value of the dollar over time and the high costs early in the program (Tables 6-7 and 6-8).

Table 67. Total benefits, total costs, net benefits, and benefit-cost ratios for the Vale Program assuming that future grazing levels will not Increase

Scenario		Discount rate 0%	4%	7%	10%
		($1,000's)			
Max 350,000 1969 formula	Benefit	4,167.1	2,200.3	1,570.3	1,211.3
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	(14,083.6)	(8,818.2)	(6,848.9)	(5,591.1)
	B:C ratio	0.228	0.200	0.187	0.178
Max 285,000 1969 formula	Benefit	7,436.4	3,542.4	2,347.5	1,695.9
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	(10,814.3)	(7,476.1)	(6,071.8)	(5,106.5)
	B:C ratio	0.407	0.321	0.279	0.249
Max 350,000 Private lease rate	Benefit	12,138.3	6,437.2	4,602.8	3,553.7
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	(6,112.5)	(4,581.3)	(3,816.5)	(3,248.6)
	B:C ratio	0.665	0.584	0.547	0.522
Max 285,000 Private lease rate	Benefit	21,627.9	10,351.1	6,875.6	4,974.4
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	3,377.2	(667.3)	(1,543.6)	(1,828.0)
	B:C ratio	1.185	0.939	0.817	0.731

Finally, all costs were subtracted from the benefits, which accrued only from increases in livestock grazing. Obviously, there were other benefits that have gone unmeasured or unvalued. Any increases (or decrease) in wildlife-related recreation have not been documented, and thus, have been ignored in the analysis. The same holds for other forms of outdoor recreation, changes in water quality or quantity, sedimentation, etc. Although the rangeland has been improved, this benefit has not been quantitatively valued. The value of these nonlivestock uses would have to exceed $2.4 million for the program to break even under the scenario of excess capacity valued, a maximum without-the-program capacity of 350,000 AUM's, private lease rates, and a 4 percent discount rate.

Our analysis considered all costs of the program, not individual rehabilitation projects alone. Some of the seedings and many of the brush sprayings were not successful, while others were. All were included as part of the total program in this analysis. Undoubtedly, some practices were economically efficient; others were not.

Table 68. Total benefits, total costs, net benefits, and benefit-cost ratios for the Vale Program assuming that future grazing levels will increase to estimated capacity

Scenario		Discount rate 0%	4%	7%	10%
		($1,000's)			
Max 350,000 1969 formula	Benefit	6,545.5	2,962.0	1,935.4	1,401.1
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	(11,705.3)	(8,056.5)	(6,483.8)	(5,401.3)
	B:C ratio	0.359	0.269	0.230	0.206
Max 285,000 1969 formula	Benefit	9,814.8	4,304.1	2,712.6	1,885.7
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	(8,436.0)	(6,714.4)	(5,706.7)	(4,916.6)
	B:C ratio	0.538	0.391	0.322	0.277
Max 350,000 Private lease rate	Benefit	18,959.7	8,621.9	5,649.9	4,098.2
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	709.0	(2,396.5)	(2,769.3)	(2,704.2)
	B:C ratio	1.039	0.782	0.671	0.602
Max 285,000 Private lease rate	Benefit	28,449.4	12,535.9	7,922.8	5,518.8
	cost	18,250.7	11,018.5	8,419.2	6,802.4
	Net benefit	10,198.6	1,517.4	(496.5)	(1,283.6)
	B:C ratio	1.559	1.138	0.941	0.811

Economic efficiency was also influenced by the way the Vale Program was managed at its inception. Because Congress provided funding contingent upon immediate action, the BLM was forced to spend funds quickly with a minimum of planning and knowledge. Therefore, the rate of failure and mistakes was higher than would be expected from a "normal" project, and some practices may not have been cost efficient during the early years of the program. In the early 1960's, management practices were not subjected to economic analysis within the BLM.

Economic Impacts

The Vale Program had direct and indirect impacts on the economy of Malheur County. Not only did the expenditure of large amounts of money for range rehabilitation generate economic activity, but the program prevented negative impacts by helping the county's livestock industry avoid losses. In addition, increases in uses besides livestock grazing on BLM lands had positive impacts.

The differences between actual grazing use and estimated capacities had the program not been implemented were discussed earlier (Table 6-1). In this section, we have assumed a maximum capacity of 350,000 AUM's without the program.

The benefit to the county's economy arises from the gross value of livestock produced from Federal forage. In this case, it was the gross value of livestock production saved by avoiding livestock reductions. The value of livestock produced from an AUM of Federal forage was estimated for the period 1976-1981 in a draft environmental impact statement (BLM 1983). We used an average of these values adjusted to the Beef Cattle Price Index. Adjusting this average to the 1964-1968 base period gave a figure of $9.45 per AUM of BLM forage. This means that for each AUM grazed, the livestock sector produced goods worth $9.45. This average was multiplied by the AUM's saved each year from 1963 to 1985 to obtain an estimate of the total value of livestock sales retained in the county because of the Vale Program (Table 6-9).

Table 6-9. Economic losses avoided due to the Vale Program from 1963-1985

Year	Benefit AUM's[a]	Gross livestock value[b]	Gross livestock value discounted to 1962			Multi-plier[c]	Economic Impact[d]	Economic impact discounted to 1962		
			4%	7%	10%			4%	7%	10%
		($1,000's)						($1,000's)		
1963	114,386	1,080.9	1,039.4	1010.2	982.7	2.37	2,561.8	2.463.3	2,394.2	2.329.0
1964	124,726	1,178.7	1,089.7	1,029.5	974.1	2.37	2,793.4	2,582.7	2,439.9	2,308.6
1965	126,285	1,193.4	1,060.9	974.2	896.6	2.37	2.828.3	2,514.4	2,308.8	2,125.0
1966	134.567	1,271.7	1,087.0	970.1	868.6	2.37	3,013.8	2,576.2	2,299.2	2,058.5
1967	96,481	911.7	749.4	650.1	566.1	2.37	2,160.8	1,776.1	1,540.6	1,341.7
1968	118,414	1,119.0	884.4	745.6	631.7	2.37	2,652.1	2,096.0	1,767.2	1,497.0
1969	114,024	1,077.5	818.8	671.0	552.9	2.37	2,553.7	1,940.6	1,590.3	1,310.5
1970	81,152	766.9	560.4	446.3	357.8	2.37	1,817.5	1,328.0	1,057.8	847.9
1971	82,010	775.0	544.5	421.6	328.7	2.37	1,836.7	1,290.5	999.1	779.0
1972	70,248	663.8	448.5	337.5	255.9	2.37	1,573.3	1,062.9	799.8	606.6
1973	67,207	635.1	412.6	301.7	222.6	2.37	1,505.2	977.8	715.6	527.6
1974	82,394	778.6	486.3	345.7	248.1	2.37	1,845.3	1,152.6	819.4	588.0
1975	65,383	617.9	371.1	256.4	179.0	2.39	1,476.7	886.9	612.8	427.8
1976	74,646	705.4	407.4	273.6	185.8	2.39	1,685.9	973.6	653.8	444.0
1977	19,334	182.7	101.5	66.2	43.7	2.39	436.7	242.5	158.3	104.5
1978	56,637	535.2	285.8	181.3	116.5	2.39	1,279.2	683.0	433.3	278.4
1979	64,274	607.4	311.8	192.3	120.2	2.30	1,397.0	717.2	442.3	276.4
1980	70,342	664.7	328.1	196.7	119.6	2.30	1,528.9	754.7	452.3	275.0
1981	81,141	766.8	363.9	212.0	,125.4	2.30	1,763.6	837.1	487.7	288.4
1982	64,864	613.0	279.7	158.4	91.1	2.30	1,409.8	643.4	364.3	209.6
1983	81,805	773.1	339.2	186.7	104.5	2.30	1,778.0	780.3	429.4	240.3
1984	59,128	558.8	235.8	126.1	68.6	2.30	1,285.1	542.3	290.1	157.9
1985	31,093	293.8	119.2	62.0	32.8	2.30	675.8	274.2	142.6	75.5
Total		17,771.1	12,325.4	9,815.2	8,072.8		41,858.9	29,096.0	23,198.2	19,096.7

[a] Licensed use minus estimated without-the-program capadty, and maximum without-the program capacity assumed to be 350,000 AUM's.
[b] Based on the value of cattle produced per AUM, 1976-1981 (BLM 1983), adjusted to 1964-1968 base for Beef Cattle Price Index.
[c] From studies in Grant County, Oregon.
[d] Type II business multipliers times increase in gross livestock sales; includes gross livestock sales.

Table 6-10. Economic multipliers for selected economic sectors

Sector	Multiplier		
	1962-74[a]	1975-78[a]	1979-1985[b]
Ranching	2.37	2.39	2.30
Lodging	2.26	2.35	2.24
Cafes and taverns	2.51	2.41	2.33
Federal government	1.94	1.94	1.88

[a] Haroldsen and Youmans 1972.
[b] Obermiller 1982.

Livestock sales also result in activity in other economic sectors; input-output studies showing the relationships among economic sectors have been done in nearby Grant County. We have assumed that Malheur County responded to the Vale Program in ways similar to Grant County's response to changes in government activity in gradng (Bromley and others 1968). The original study has been updated and modified over the years by Haroldsen and Youmans (1972) and Obermiller (1982). Stevens and Godfrey (1972) also used the Grant County input-output models and believed that they approximated income effects due to the Vale Program.

Economic multipliers used to estimate impacts on the economy of Malheur County included the household sector and are shown in Table 6-10. We assumed that the structure of the economy did not change substantially between 1962 and 1974, between 1975 and 1978, and between 1979 and 1985.

The undiscounted losses to Malheur County that were avoided by the Vale Program totaled more than $40 million dollars from 1963 through 1985. This amount includes the livestock sales saved by the program. For example, if livestock production in the ranching sector increased by $1 in 1985, economic activity in the other sectors and household income increased by $1.30. Thus, an additional $34.1 million loss of economic activity and household income was avoided. The total losses in economic activity that were avoided were $29.1 million discounted at 4 percent, $23.2 million discounted at 7 percent, and $19.1 million discounted at 10 percent It must be remembered that these amounts estimate losses avoided in the economy, and cannot be compared directly with the benefits and casts presented earlier.

The expenditures for rehabilitation and other costs of the Vale Program also had an impact on the economic activity in Malheur County. The total costs from Table 6-6 were multiplied by the appropriate factors in Table 6-10 to estimate the economic impacts. Total impacts (including the government sector) were $24.5 million from 1963-1985 (Table 6-11).

Table 6 11. Economlc Impact of government spending associated wlth the Vale Program, 1963-1985

Year	Funds for Vale Program	Program funds in 1967 dollars	Multi-plier	Economic Impact discounted to 1962 dollars			
				0%	4%	7%	10%
				($1,000's)			
1963	763.5	829.88	1.94	1,609.97	1,548.05	1,504.64	1,463.61
1964	912.9	981.59	1.94	1,904.28	1,760.62	1,663.28	1,573.79
1965	908.3	956.06	1.94	1,854.76	1,648.87	1,514.03	1,393.61
1966	1,037.5	1,069.60	1.94	2,075.02	1,773.74	1,583.03	1,417.27
1967	1,121.9	1,121.90	1.94	2,176.49	1,788.91	1,551.80	1,351.43
1968	1,073.5	1,032.18	1.94	2,002.43	1,582.55	1,334.30	1,130.32
1969	861.3	782.98	1.94	1,518.98	1,154.30	945.95	779.48
1970	838.8	723.06	1.94	1,402.74	1,024.97	816.41	654.39
1971	533.3	440.77	1.94	855.09	600.78	465.11	362.64
1972	572.2	457.75	1.94	888.04	599.92	451.43	342.38
1973	588.9	442.78	1.94	858.99	557.99	408.10	301.07
1974	444.2	300.14	1.94	582.27	363.69	258.54	185.53
1975	588.4	365.47	1.94	709.01	425.81	294.21	205.38
1976	901.3	527.08	1.94	1,022.54	590.49	396.56	269.27
1977	740.2	408.95	1.94	793.36	440.53	287.55	189.92
1978	774.6	399.28	1.94	774.60	413.57	262.38	168.58
1979	593.5	276.05	1.88	518.97	266.43	164.29	102.68
1980	601.4	245.47	1.88	461.48	227.80	136.54	83.00
1981	783.5	290.19	1.88	545.56	258.94	150.85	89.20
1982	855.1	296.91	1.88	558.19	254.75	144.25	82.97
1983	895.0	300.34	1.88	564.64	247.78	136.37	76.30
1984	727.7	233.99	1.88	439.90	185.62	99.29	54.04
1985	578.1	179.53	1.88	337.52	136.94	71.20	37.69
Total	17,695.1	12,661.95		24,454.83	17,853.04	14,640.11	12,314.43

The Vale Program has attracted many visitors to Malheur County to see the results of range rehabilitation. No comprehensive records have been kept, but Robert Kindschy of the Vale BLM District has kept partial records. From 1964 through 1984, 860 people participated in tours in Malheur County that involved Kindschy. The length of stay averaged two days. If we assume that visitors spent $40 per trip ($25 for food, etc. and $15 for lodging) a total of $57,300 was spent in Malheur County during that period. Using the multipliers in Table 6-10, an additional $48,000 was generated In the cafe and taverns sector, and $17,000 in the lodging sector.

Conclusions

Based on this analysis, livestock benefits alone were not sufficient to justify the Vale Program under most scenarios. But the program affected many resource values, such as wildlife, recreation, water quality, and range condition, and sometimes the benefits are difficutt to quantify. The program also avoided losses to the economy of Malheur County that would have resulted from grazing reductions, and generated positive economic impacts through government spending and increased visitation to the area.

The question of whether programs like this are the best way for Government to stimulate local economies is beyond the scope of this study. We do believe, however, that the improved condition of the resource base, the value of the program for demonstration purposes, and the positive impact on the local economy are all major benefits that should be considered in addition to the impacts on livestock grazing.

References

Bromley, D. W., G. E. Blanch, and H. H. Stoevener. 1968. Effects of selected changes in Federal land use of a rural economy. Agr. Exp. Sta. Oregon State Univ. Sta. Bull. 604. 27 p.

Bureau of Land Management. 1983. Southern Malheur Grazing Management Program, Draft Environmental fmpact Statement. Vale District Office, Vale, Oregon. **105 p.**

Bureau of Land Management. [n.d.] The Vale Project: A 7-year program for sustained yield natural resource management. Oregon State Office. 43 p. (mimeo)

Godfrey, E. B. 1971. An economic evaluation of range improvements administered by the Bureau of Land Management in the Vale District of Oregon. Ph.D. Diss., Oregon State Univ., Cowallis. **147** p.

Haroldsen, Ancel and Russell Ywmans. 1972. Grant County, Oregon: structure of the county economy. **Ext.** Sew., Oregon State Univ. ***Spec.*** Rep. 358. 12 p.

Heady, Harold F. and James Bartolome. 1977. The Vale Rangeland Rehabilitation Program: the desert repaired in southeastern Oregon. USDA For. Serv. Pac. NW For. & Range Exp. Sta. Res. Bull. PNW-70. **139 p.**

Nlelsen, D. B. 1965. Economics of Federal range use and improvement. Ph.D. Diss., Oregon State Univ., Corvallis. **165 p.**

Nlelsen, D. B., W. G. Brown, D. H. Gates, and T. R. Bunch. 1966. Economics of Federal range use and improvement for livestock production. Oregon Agr. Exp. Sta. **Bull. 92.** 40 p.

Obermlller, F. W. 1982. Final **report:** supplement number **182** to the **master** memorandum of understanding between the **Forest** Service and Oregon State University. Final Report, Cowallis. **150** p.

Stevens, J. B. and E. B. Godfrey. 1972. Use rates, resource flows, and efficiency of public investment in range improvements. Amer. J. Agr. Econ. (Nov.) **:611-621.**

Stewens, J. B. and E. B. Godfrey. 1976. An economic analysis of public range investments in the Vale Project, 1960-1969. Agr. Exp. Sta., Oregon State **Univ.** Circ. Inf. 653. 18 p.

U. S. Department of Agrlcutture and U. S. Department of the Interior. 1986. Grazing fee review and evaluation, final report, 1979-1985. A report from the Secretary of Agriculture and the Secretary of the Interior, Washington, DC. 99 **p.**

U. S. Department of Agrlculture, Forest Service. 1977. Study of fees for grazing livestock on Federal lands. A report from the Secretary of the Interior and the Secretary of Agricutture, Washington, DC.

Wagstaff, Fred J. and C. Arden Pope 111. 1987. Finding the appropriate forage value for analyzing the feasibility of public range improvements. USDA For. Serv. Res. Paper INT-378. 4 p.

Chapter 7 Perceptions of the Vale Program

Lynn Huntsinger and Harold F. Heady

The public's changing objectives for public lands have influenced perceptions of the Vale Program. The demands now being placed on eastern Oregon rangelands are both more varied and more intense than in **1963** when the program began. Beliefs about the appropriate use and management of these lands differ greatly among individual users, resource user groups, and the public at large, as does the level of knowledge about rangelands. These differences and controversies have grown in the last decade.

Twenty-four years ago the initiators of the Vale Program pledged benefits for all rangeland users and betterment of the varied resources of these lands, but the emphasis was on forage production and support of the livestock industry. In today's social, economic, and political setting, some of those early objectives might be considered naive. This chapter examines how today's users and managers of Malheur County BLM lands evaluate the Vale Program's impact on public resources and the Vale community.

Methods

Survey Questionnaire and Interviews

In any discussion of public land management involving livestock grazing, several key groups appear: livestock producers, local residents, agency people, and the environmentally concerned. The attitudes of each group are shaped by personal preference, depth of knowledge, and social and economic pressures. The opinions of members of each of these groups concerning the Vale Program were sampled both through a mail survey and in-depth personal interviews in the spring of **1987.**

Table 7-1—Number of responses to questionnaire survey for each respondent group.

Respondent group	No response	Not delivered[a]	Returned		Response rate (percent)[c]
			Completed	Not completed[b]	

[a]Bad address, no forwarding address, or deceased.
[b]Wrote back that they did not know anything *about* the Vale *Program* or Malheur County rangelands. The BLM "don't knows" were from the Burns BLM District.
[c]Percent of eligible responses--those returning the questionnaire.

A pretested 16-page questionnaire (Appendix 2) was mailed to all BLM employees in the Vale office, to all Malheur County livestock permittees, to a random sample of Malheur County residents without grazing permits, and to a list of Oregon and Idaho environmentalists active in desert issues, provided by the Idaho Wilderness Society and the Oregon Natural Resources Council.

Return rates were lowest for the groups least acquainted with the Vale Program, as indicated by the number of individuals who wrote back saying they did not know enough about Malheur County to fill out the questionnaire (Table 7-1). Three mailed reminders were sent to those who did not return the questionnaire, in accordance with procedures described by Dillman (1979). Responses of the four groups were analyzed by Chi-square test. Tables include a final column of mean percentages to facilitate comparison. Each table is also referenced to the question number in the questionnaire (Appendix 2).

In-depth interviews lasting from one to several hours were conducted with 13 people. Interviewees were selected because they were considered leaders in one of the four groups, including two BLM employees, three community leaders, two permittees, and two environmentalists. Or they were interviewed because they were part of groups that, although small, might have particularly strong opinions about the Vale Program, notably two Malheur County ranchers with little or no public land access and two owners of local nonlivestock businesses. The combination of a broad-scale survey with good return rates and indepth interviews with selected individuals gave a well-rounded portrait of various viewpoints of the Vale Program.

The characteristics of the four respondent groups, and of different segments within the BLM and permittee groups, are described below. This is followed by a discussion of opinions about major issues, including the condition and use of program rangelands, program costs and benefits, BLM management of Malheur County public rangelands, and who respondents believed should have the most voice in deciding how to manage public lands.

Respondent Characteristics

Income, Education, and Residence

All Vale BLM employees reported their BLM employment as their major income source; most permittees reported that they earned the majority of their income from ranching or farming (Table 7-2). Employment among members of the local community was almost evenly distributed among ranchers or farmers, retirees, professionals, or business people. Blue-collar professions and government service other than BLM were also common major sources of income. Environmentalists were predominantly professionals and business people.

Education level varied among the four groups. Environmentalists had the highest proportion of respondents with some postgraduate education: the permittees and local community members had the greatest proportion of those who had not completed high school (Table 7-3). Among respondents who had attended college, the BLM had the largest number of range or ranch management majors, while permittees and environmentalists had more majors in some aspect of biological science.

The most permanent population was permittees, almost half of whom had resided in the same county for more than 40 years (Fig. 7-1). The majority of environmentalists and BLM employees had lived in the same county 20 years or less (moving is often a requirement of BLM employment). The vast majority of BLM employees, permittees, and local community members lived in Malheur County. Most of the environmentalists lived in other Oregon counties or Idaho.

The difference in residency contributes to controversy between environmentalists and the other groups, according to most intewiewees. One local community leader summed up: "Local environmentalists are more practical and have more constructive input at hearings than those that live elsewhere. Hearings at Salem [the capital] are wild. I hate to go to Salem—those people [western Oregonians] don't have to live out here every day."

Table 7-2—Major source of income of respondents in each group.[a] (In percent)

Income source	Respondent group: ValeBLM N=72	Permittee. N=136	Community N=74	Environmentalist N=86
BLM	100	0	0	2
Ranching/farming	0	98	25	5
White-collar	0	1	19	71
Blue-collar	0	0	15	2
Resource-industry	0	0	11	0
Local-government	0	1	7	7
Retired	0	0	23	13

Significant differences ($p<.05$, Chi-square) were found among responses to each question, unless otherwise noted.

[a]Question 36, *Appendix* 2.

Table 7-3—Last grade the respondents In each group completed in school.*

(In percent)

Education level	Respondent group: Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	M
No formal education	1	3	3	0	
Between K-12	14	43	49	0	2
Some college or J.C.	29	29	27	5	2:
Graduate of 4 yr. college	31	19	9	27	2
Post-graduate work	25	6	12	68	2t

Significant differences (p<.05, Chi-square) wexe found among respondent groups, unless otherwise noted.

[a]Question 38, *Appendix* 2.

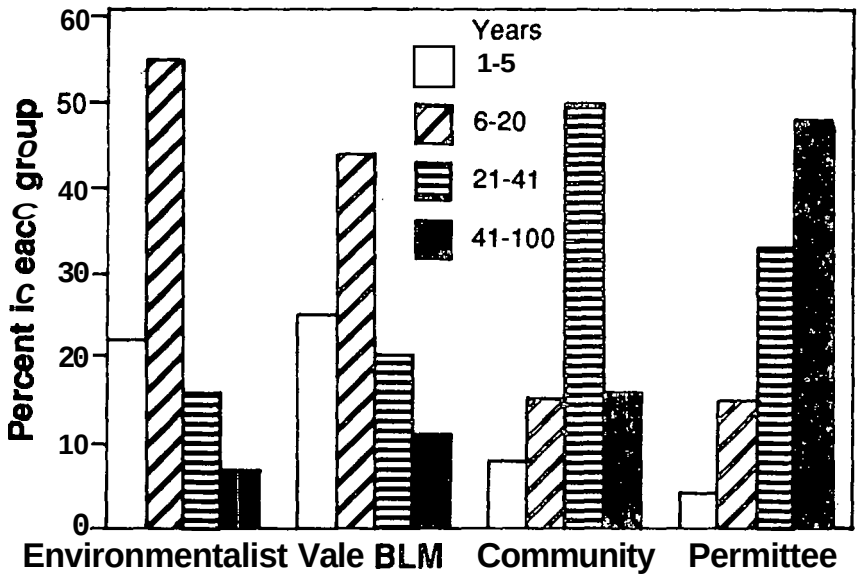


Figure 7-l—Respondents in each group remaining at *the* same address for different lengths of time.

More than 85 percent of the permittees and local community members had personally used Vale BLM District lands for longer than 11 years, compared with about half of the environmentalisls and BLM employees. The most common nonlivestock uses of public lands in Malheur County among BLM employees, permittees, and members of the local community were picnicking, hunting, and fishing (Table 7-4). Environmentalists used these lands most often for birdwatching, hiking, and camping.

Table 7-4—Activities of respondents in each group on Malheur County BLM lands.[a]

(In percent)

Activity	Respondent group: Vale BLM N=72	Permittee N-148	Community N=82	Environmentalist N=94	Mean
Picnicking	76	59	80	73	72
Fishing	79	67	85	49	70
Camping	72	42	74	86	68
Hunting	71	80	83	21	64
Pleasure riding	61	42	77	50	57
Hiking	62	24	44	88	39
Birdwatching	33	16	20	88	39
swimming	39	20	35	53	37
Offroad use	37	38	54	12	27
Rockhounding[b]	26	21	34	26	27
Rafting	31	4	17	39	23
Mining	3	3	10	0	4

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]Question 32, *Appendix* 2.

[b]No significant difference, $p<.05$, Chi-square

Interviewed permittees and local community members generally did not understand the appeal of desert rangelands for camping. One permittee took a dim view of camping in general: "I used to think camping was a fun idea, until I saw the conditions under which they have to live. Every rock is a toilet spot. It takes a huge crew to pick up trash around heavily used camps." One of the environmentalists summed up group feeling with a different opinion about "trash," saying, "It would be great to camp without cow pies."

Polltical Actlvtty and Community Involvement

Involvement in political activity, as measured by writing letters about government policy and attending public meetings, was greatest among the environmentalists (Table 7-5). A surprisingly large number of the local community members had attended a BLM forum or advisory board meeting. Environmentalists chose to write letters and go to public hearings to maintain public involvement; permittees attended public hearings and school board meetings more than other activities; BLM employees most often went to public hearings and advisory board meetings, perhaps as part of work-related responsibilities.

Table 7-5—Respondent participation in government and political activities, percent in each group.[a]

Activity	Respondent group				
	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Public hearing	63	68	47	90	67
Advisory board mtg.	54	30	75	56	54
BLM Forum	39	36	83	34	48
Wrote letter to govt.	23	38	12	94	42
School bard	16	50	42	17	31
City council mtg.	32	12	33	46	31
Planning commission	22	29	17	46	28

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.
[a]Question 35, *Appendix* 2.

Fermittees seemed to rely on a more personal network of connections to Washington, D.C., than did members of other groups. One permittee mentioned a conflict over grasshoppers as an example of the limitations of BLM decisionmaking: "There was nothing they could hurt by spraying, but they weren't allowed to, so the grasshoppers got onto other range and agricultural lands. I pulled rank and went over their [the local BLM] heads and got it sprayed because of the danger to other areas." A community leader commented: "The permittees have political influence. The new administration, including Burford, has helped somewhat. Ranchers at times go to Washington [D.C.] for help. They are politically active and effective."

Respondent groups joined conspicuously different kinds of organizations (Table 7-6). Permittees overwhelmingly belonged to a livestock association and the Farm Bureau; BLM employees and local community members preferred a community service group; and all but 4 percent of the environmentalists belonged to an environmental group. One-third of the permittees belonged to a community service group, but few of them belonged to a hunting or fishing club, wildlife association, or outdoor recreation club. All groups participated about equally in local government and Chamber of Commerce.

Groups varied in their familiarity with the Vale Program and Malheur County rangelands. Eighteen percent of local community members and 12 percent of envlronmentalists responded either that they could not fill out the questionnaire or that they were unfamiliar with the Vale Program, compared with 1 percent.of the permittees and 10 percent of the BLM employees. Environmentalistswere most likely to have found out about the Vale Program through books, magazines, organizations, and news reports. Permittees knew of the program from use of the land and from meetings, while most local community members had seen the individual projects or other eviderice.

Table 7-6—Membership of respondents in each group in organizations.[a]

(In percent)

Organization	Respondent group: ValeBLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Community service group	66	35	40	52	48
Other conservation group	28	12	9	93	36
Wildlife association	28	8	18	73	32
Outdoor recreation club	25	6	25	64	30
Livestock association	10	80	18	9	29
Environmental group	10	3	4	96	28
Hunting/fishing club	36	9	27	36	27
Farm bureau/organization	10	50	25	13	24
Local government[b]	16	17	20	17	18
Chamber of commerce[b]	12	8	18	9	12

Significant differences ($p<.05$, chi-square) were found among respondent *groups,* unless otherwise noted.

[a]Question 40, Appendix 2.

[b]No significant difference, $p<.05$, chi-square

Environmentalist and local community interviewees agreed there were many people in each group who did not know about the program. One community leader commented, "Most Malheur County people are not well informed about it. Newer people are even less well informed. I think the local people need to know more, including why it was done. The Bureau needs more visibility. Uvestock production is a big industry here, and we should take advantage of the news media and give tours." However, some interviewees indicated that most people didn't need to know more about the program. The environmentalist interviewees disagreed with each other; one commented that range rehabilitation issues are not a high priority in Oregon right now, while the other felt that people need to be better informed about the Vale Program.

BLM Employees: New and Long-term at Vale

Interviews and comments on questionnaires indicated that substantial differences of opinion might exist between new and long-term BLM employees. To test this, responses of BLM employees with 9 years or less experience managing Vale lands were compared with those of longer term employees. Although similarities were more notable than differences among the newer and long-term BLM employees at Vale, some disagreement was observed.

Table 7-7—Comparison ob responses of BEM employees who have worked on the Vale District 9 years or less and 10 years or more.”

(In percent)

Question	9 years or less N=33	10 years or more N=35
Q40: Member wildlife association	40	16
Q40: Member hunting/fishing club	29	44
Q2: Too much hunting	20	53
Q2: Too much fishing	4	11
Q14: BLM wildlife habitat mgmt. needs imp.	58	39
Q1: Loss of game is a problem	24	21
Q20: Bighorn sheep have increased	33	79
Q32: Hunt at least 6 times a year	27	43
Q40: Member environmental group	18	3
Q2: Too much wilderness designation	52	78
Q18: Recreationists did not benefit	22	7
Q18: Miners did not benefit	73	25
Q18: Campers did not benefit	35	10
Q18: Rafters did not benefit	57	10
Q18: Hikers did not benefit	46	11
Q14: BLM recreation mgmt. needs imp.	67	34
Q7: Too much crested on district	30	36
Q6: Too much sage on district	23	27
Q8: Too much cheatgrass on district	77	44
Q1: Too much water pollution	90	60
421: Stream veg. maintained post-1973	27	72
Q15: Grazing is best use of public range	9	49
Q14: BLM livestock mgmt. needs imp.	58	35
Q15: Should raise grazing fees	86	66
412: More advisory board use is positive	47	74
Q2: There'smmuchgrazing	55	42
Q1: Overgrazing is a problem	26	33
Q38: Post-graduate education	40	11

[a]All Vale District BLM employees were surveyed so statistical analysis is superfluous.

Differences were mostly related to issues of recreation, wilderness, wildlife, and grazing (Table 7-7). Newer employees more often believed BLM wildlife management needs improvement. They were more supportive of hunting, and more often members of wildlife associations. Long-term employees joined hunting clubs or fishing clubs in larger numbers, but responded that there was too much hunting and fishing. New employees disagreed that bighorn sheep numbers had increased due to the Vale Program, but agreed with long-term employees that the program benefited most other wildlife species (Table 5-3).

New employees were less likely to think too much wilderness study area is designated in Malheur County. They were more likely to believe that miners, campers, rafters, hikers, and recreationists have failed to benefit from the Vale Program, and were twice as likely to believe that BLM recreation management needs improvement. It appears that longer-term Vale employees believe the program was more broadly beneficial than the newcomers, and also that present emphasis on recreation management is Sufficient.

Newer BLM employees were less positive about the condition of Malheur County riparian zones than longer-term employees. Streambank vegetation, they responded, had not been adequately maintained, and there was too much water pollution. A majority of new employees believed too much cheatgrass grew on the district, an attitude shared by less than half of the longer-term employees. One long-term employee suggested that this was because oldtimers remember conditions so bad that cheatgrass was considered an improvement.

Newer BLM employees were much less likely than longer-term employees (9 vs. 49 percent) to agree that livestock grazing is the best use of public lands. More favored raising grazing fees, and fewer agreed more use should be made of advisory boards. On the other hand, the two groups did not differ much in their opinions about the amount of grazing in Malheur County today. A third or fewer of the employees in each group believed that overgrazing was a problem in many areas.

People interviewed from other groups thought new and long-term employees took different approaches to use of public lands. "There is a new cadre of more interdisciplinary, bright managers who are well trained. We need to support the new BLMers who are striving for real multiple value management," stated one environmentalist. "The new people are generally as interested as ever in livestock, but most are highly receptive to other uses. They consult with wildlife, archeology, and recreation specialists," was the analysis of a senior BLM employee.

Bureau interviewees believed both old and new employees to be supportive of the Vale Program, and proud of it. "The younger people don't like the large monocultural seedings, and they feel that range programs take money away from other programs," was the view of a newer employee. However, he noted, "New people tend to change after they are here and involved and are forced to look at all sides, especially if they become managers. Multiple use makes our job more interesting."

BLM-wide jealousies about the Vale Program were mentioned by several interviewees, and the comment that it took money away from other projects was frequently found on questionnaires. This is partially true. Congress allocated funds as a special addition to the regular BLM budget, but additional monies came from redistribution of normal BLM funding.

Program Area Permittees

The majority of permittees raised a mixture of cow-caff, stocker, and/or feedlot cattle:

Type of Operation	Number of permittees (N=148)	Valid percent
Cow-calf	52	39
Stocker	9	7
Mixed cattle	69	53
Sheep	1	4
No answer	16	

Most permittees reported that a quarter to one-half of their forage supply came from their own land and the remainder from BLM rangelands (see Chapter 2). Long-standing ownership was the rule; most permittees reported that their ranch had been in the family for 16 years or longer:

Ranch in Family	Valid percent permittees (N=148)
70 years or more	22
41 to 69 years	28
16 to 40 years	33
15 years or less	47

More than half of the respondents reported the Vale Program changed their use of Malheur County rangelands, increased rangeland productivity, benefited other users, and helped the community (Table 7-8). The number of permittees who agreed that the Vale Program increased the productivity of their own ranch corresponds closely with the number of permittees who had developments on their allotments. Regardless of whether or not they benefited personally, Malheur County ranchers overwhelmingly support the Vale Program. Only 3 percent of all permittees responded that the program was a mistake.

One interviewed permittee said, "More people should know about the Vale Program—the program could be used more to educate people. Newer residents don7 understand how much things have improved. Younger people may not realize how much they have benefited; they take things for granted." The non-permittee ranchers interviewed agreed that conditions on Malheur rangelands had improved for both wildlife and livestock as a result of the program, and said that the money was well spent. They questioned whether it could ever happen again based on today's low cattle prices, because they believed strongly that such programs should be economically justifiable.

Table 7-8—Permittees agreeing with the following statements about the Vale Program.*

(In percent)

The Vale Program... N= 148	Agree	Neutral	Disagree
Increased range productivity	82	15	3
Benefited other users	74	22	3
Helped the community	63	31	6
Needs more funds	40	36	24
Increased ranch productivity[b]	39	32	29
Increased fire hazard	34	34	31
Was too expensive	29	38	33
Has wasted forage	29	33	38
Wasamistake	3	28	69

[a]Question 28, Appendix 2.
[b]On respondent's own ranch

Permittees believe that water developments were the most helpful type of project in improving use of Vale BLM lands, with most agreeing that water developments are very helpful to them (Question 31, Appendix 2):

Project	Percent permittees agreeing the development is very helpful
Water development	81
Brush control	70
Crested wheatgrass	62
Cooperative management agreements	53
Fencing	31

The approval of fencing is surprisingly low, but may reflect controversy stemming from the division of community allotments carried out as part of the program.

Issues

The responses of permittees, BLM employees, environmentalists, and local community members differed significantly on nearly all questions. Commonly responses form a spectrum with the permittees at one end and environmentalists at the other. The BLM and local community members were most frequently in the middle, but local community Views tended to be closer to those of the permittees. Only when asked if uses of Malheur County BLM lands had changed since 1973 was there a convergence of opinion. A majority of the respondents In every group agreed that hunting, fishing, rafting, offroading, camping, picnicking, mining, rockhounding, birdwatching, and pleasure riding had Increased.

There were some differences of opinion about increased uses. A majority of BLM employees, local community members, and environmentalists thought that livestock grazing had increased, but only 35 percent of permittees thought it had. Compared with about hatf of the respondents in other groups, 9 out of 10 environmentalists believed that birdwatching had increased since 1973. Birdwatching and hiking are the major uses of Malheur lands as reported by environmentalists (Table 7-6).

Percelved CondItIons and ActIvItIes on Program Area Rangelands

The environmentalists consistently perceived ecological conditions on Malheur rangelands as poor, a majority citing as widespread problems overgrazing, streambank erosion, wildlife loss, soil loss, water pollution, and loss of riparian vegetation (Table 7-9). A scale made up of responses to these six questions reveals the typical distribution of viewpoints among the four groups (Fig.7-2). A score of 100 would indicate that all respondents in the group believed that overgrazing, streambank erosion, wildlife loss, soil loss, water pollution, and loss of riparian vegetation were important problems on most Malheur county rangelands. Permittees believe most strongly that erosion, overgrazing, and wildlife loss are not widespread problems today. Scoring was highly consistent, as indicated by Cronbach's Alpha Test of scale reliability (alpha=.92) (Cronbach 1951).

Environmentalist responses about fencing varied (Table 7-9). Environmentalist interviewees pointed out that they support fences that exclude cattle, but not fences that facilitate grazing. Sixty-three percent of environmentalists believed water pollution to be a widespread problem on the district, in contrast to less than 15 percent of respondents from other groups. Environmentalists attributed water pollution problems to livestock grazing. On the other hand, one local community member mentioned that recently there had been concern in the county about water pollution resulting from agricultural chemicals used on cropland.

Commonly reported as major problems by BLM employees were budget cutbacks, loss of streambank vegetation, and poor roads and public facilities. Permittees were most concerned with factors that limited their access to forage: restrictions on use, agricultural pests, and wild horses. Local community members believed most strongly that wildlife losses, overgrazing, poor public facilities, and agricultural pests were big problems, while environmentalists were most concerned with biological factors, reporting overgrazing, loss of streambank vegetation, and soil loss as important problems.

An environmentalist interviewee stated, "The negative impact of grazing on native range is evident in the fact that only rocky, inaccessible areas are still in good condition, with lots of native bunchgrasses. The flat areas are degraded. Grazed creek banks are cut ten feet deep. The evidence is everywhere you look." Another commented, "Some district rangelands are in pretty good condition, and some are in poor shape." Both agreed that the program did improve degraded areas, although they would have used different methods. "There is a need to rehabilitate severely beat up lands," said one environmentalist, "and the first step is to remove cows." Another comment was: "The environmental community would accept restoration more if they didn't feel there was a hidden [livestock-oriented] agenda."

Table 7-9–Respondents in eacb group agreeing that the following factors affect many or most Malheur County BLM lands.[a]

(In percent)

Factor	Respondent group: Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Biological:					
Overgrazing	30	4	30	91	39
Stream veg. loss	52	4	16	79	39
Wildlife loss	22	10	38	76	36
Stream erosion	42	4	22	76	36
soil loss	21	5	12	81	30
Agricultural pests	22	37	37	7	26
Wild horses	15	35	25	19	24
Water pollution	13	1	1	63	19
Air pollution[b]	2	0	1	4	2
Administrative:					
BLM budget cutbacks	71	29	17	56	43
Poor public facilities	45	8	30	25	27
Poor roads	46	18	24	14	26
Restrictions on use	22	42	29	8	25
Too much fence	8	14	19	50	23
Too many roads	5	22	2	42	18
Forage underuse	12	19	12	5	12
Too little fence	9	9	3	26	12
Poor fire control[b]	6	12	10	8	9
Too few roads[b]	6	4	10	1	5

Significant differences (p<.05, Chi-square) were found among respondent groups. unless otherwise noted.

[a]Question 1, Appendix 2.

[b]No significant difference, p<.05, Chi-square

Local community leaders, ranchers, and business people uniformly believed that Malheur rangelands were in good shape. "We have enough forage now to carry us through the dry years," commented a community leader, and "riparian problems are limited in extent." "There are no real big problems today," said one local businessman. A permittee stated, "Rangeland conditions here are good and still improving."

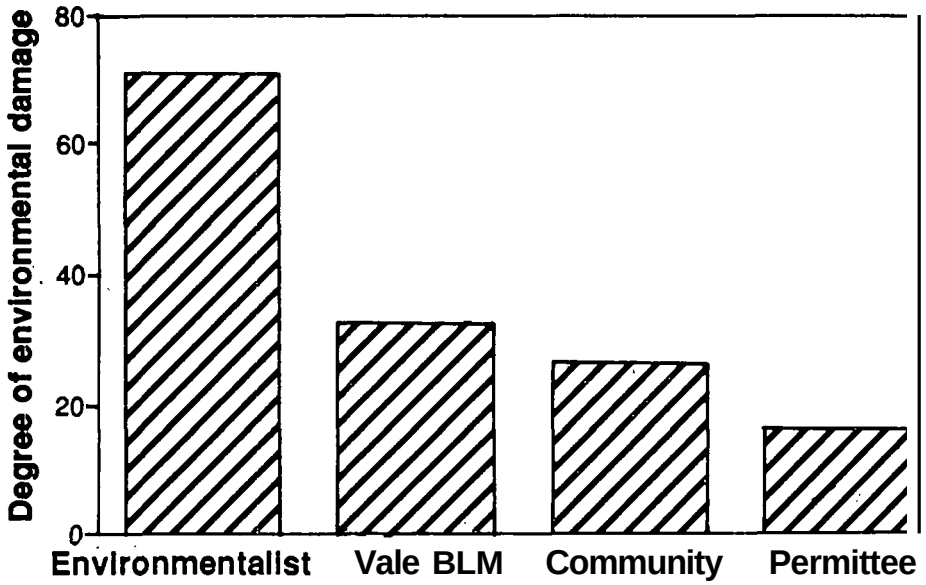


Figure 7-2—Extent of environmental problems perceived on Malheur County rangelands. Problems indude loss of soil, streambank vegetation, and wildlife.

"The large supply of forage that resulted from the program gives us opportunities to take pressure off riparian areas and to better manage native range," was the opinion of one **BLM** interviewee. Another commented: "The program significantly improved conditions on Malheur rangelands, and today they are pretty good. Our problem is overuse of riparian areas, and that is confined to relativety few areas."

A majority of permittee, **BLM,** and local community respondents believed that there was too much **BLM** land in Malheur county designated as wilderness study area (WSA), but none of the environmentalists did (Table 7-10). The interviewees had strong feelings on the subject. "They have been studying wilderness areas for so long—most of us just want them to get it over with. We have so many **WSAs** out here because of a lack of roads, not because the land is so special. I agree that certain areas need protection, but not pastures, and not so much dry open rangeland," said one local community leader. "A few WSA's are OK but it is asinine to take open range, just because an area is unroaded," commented a permittee. "Our main problem with WSA's is an inability to change grazing practices on them," was the opinion of one **BLM** employee. "All requests for changes on WSA's have been turned down."

A majority of respondents in all groups except the local community believed there was too much offroad vehicle use (Table 7-10). Local community members were also most likely to do offroad driving on **BLM** lands (Table 7-6). The **BLM** was the only group in which a majority did not agree there was too much wild horse grazing. Permittees were the only group in which a majority of respondents believed there was too much protection of endangered specles, while the environmentalists were unanimous in believing there was not enough. Environmentalists were the only group that nearly unanimously agreed there was too much water development and vegetation conversion on Malheur County **BLM** lands.

Table 7-10—Respondents in each group agreeing that too much of the following activities takes place on Malheur County BLM lands.[1]

(In percent)

Activity	Respondent group				
	ValeBLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Offroad vehicle use	64	75	49	88	69
Wild horse grazing	45	88	65	59	65
Wilderness designation	65	90	61	0	54
Water contamination	77	10	24	100	53
Grazing	48	3	25	98	43
Vegetation conversion	31	8	11	94	36
Road development	15	27	19	76	34
Hunting	39	45	19	17	30
Water development	10	7	7	71	24
Species protection	16	52	20	0	22
Rafting	7	27	9	14	14
Fishing	7	16	8	2	8
Camping	5	21	6	0	8
Wildlife habitat improvement	3	14	5	1	6
Backpacking	0	15	2	0	4
Hiking	0	14	0	0	4

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless *otherwise* noted

[a]Question 2, Appendix 2.

In general, environmentalists were the most strongly opposed to what they see as grazing-related activities. Strong majorities responded that there was too much water contamination, grazing, vegetation conversion, road development, and water development. Permittees were the only group that had any significant number of Individuals report too much recreation-related activity, although in most cases this was the view of less than 30 percent of the group. An exception is hunting: nearly half of the permittees believed there was too much. One respondent wrote that hunters sometimes put locks on gates to keep people out of favored hunting areas, creating access problems for livestock producers. Others commented that cattle ate occasionally shot or harassed.

The BLM was in the middle on most issues, except for road development, rafting, and wild horse grazing. BLM employees were less likely to feel there was too much of these than those in other groups.

No interviewees wholeheartedly supported wild horses. The environmentalists did not consider them a part of the natural ecosystem, but instead a feral species that could easily get out of control. Local community members, permittees, and BLM employees were dismayed at the cost of the wild horse adoption program. One community leader explained: "The facilities for those horses are fabulous. The BLM spends three dollars a day on each horse. The costs of management are ridiculous." Most believed the unadoptable horses should be sold. However, all accepted the political reality of wild horses, and that the support of some distant public meant they would be a permanent part of public range.

"A lot of the horses once belonged to people. They used to turn out good studs and gather the colts. A lot of horses were raised here for cavalry remounts, and after 1945 they were turned out," explained a community leader. Or, as one local business community member put it, "I can't tell the wild from the domestic horses myself, although they are both nice to look at." Another community leader summed up the wild horse situation from the local perspective: "Many ranchers didn't claim their horses when they had the chance, because they were wonied about the red tape and the trespass charges. The horses just aren't wild. It's a big joke on us but it's an expensive one."

Permittees brought yet another perspective to the wild horse question. "The corralling method is inhumane. When roped or restrained the animal is convinced it is fighting for its life," was the comment of one permittee. Permittees agreed that small numbers of wild horses were all right, but there are too many on the range today. On the other hand, BLM interviewees believed that wild horse numbers were under control. A BLM interviewee summed up the Bureau's concerns: "Wild horses are continually increasing, and we need adequate funding to keep them in line. Most BLM people believe they are a legitimate resource to manage, but there is a problem with the glut at adoption. Good horses are easy to adopt out, but we need to be able to dispose of the horses that remain after a good-faith adoption effort."

Vale Program Costs and Benefits

A majority of permittees, BLM employees, and local community members stated that all groups benefited from the Vale Program (Table 7-11). Less than half of the environmentalists conceded that recreationists, hikers, anglers, rafters, campers, hunters, and birdwatchers benefited. These are the activities most commonly undertaken by environmentalist respondents (Table 7-6). In fact the two most common environmentalist uses, birdwatching and hiking, are also those that the fewest environmentalists believed had benefited from the Vale Program (Table 7-11). About half of the environmentalists responded that hikers and birdwatchers actually lost benefits as a result of the program.

A strong majority in all groups believed that livestock permittees, politicians, BLM employees, local businesses, and offroad vehicle users benefited from the program. The BLM employees and the local community members were generally between the other two groups. Some permittees indicated that they did not benefit as much as they could have, stating that the "program stopped too soon, before it got to my place."

Table 7-11—Respondents in each group agreeing that specific groups benefited from the Vale Program.[a]

(In percent)

Group	Respondent group: ValeBLM N=72	'Permittee N=148	Community N=82	Environmentalist N=94	Mean
County recreationists	88	96	89	40	78
Local business	98	97	80	77	88
Offroad drivers	70	93	61	77	75
Anglers	92	95	84	49	80
Hunters	88	95	80	48	78
Rafters	66	92	73	37	67
Politicians[b]	93	95	93	96	95
Miners[b]	52	66	52	62	58
campers	79	96	78	44	74
Hikers	72	90	76	35	68
BLM employees	89	100	91	89	93
Birdwatchers	63	87	79	36	66
Permittees	100	91	82	100	93

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]Question 18. *Appendix* 2.

[b]No significant difference, $p<.05$, Chi-square.

Interviews resulted in much the same consensus as did questionnaire responses. One aspect of interest is the value that the local community places on employment and business opportunities arising from expansion in the Vale BLM offices; BLM personnel need places to eat, shop, and live, and to maintain the Vale Program they must purchase equipment and pay for maintenance and repairs. Community leaders and local business people believed that the program helped stimulate tourism, and wanted more effort put into encouraging recreation uses.

One local businessman stated: "The BLM should encourage more use by campers and hunters; they should employ more part time people to upgrade campsites...I think the BLM should contract out more of its projects to private enterprise. They would get more value for the dollar." A community leader commented, "Rafters, sportsmen, wilderness people, all are getting benefits. Before the program this area was a vast unknown. Now there are maps. All those that actually use the land have gotten benefits."

"We would be in big trouble without the local office," stated one businessman." The Vale Program means dollars pumped into the economy. We really need the industry. Some campgrounds have dosed and the **BLM** needs more volunteers. **BLM** has done a good job developing some campgrounds and they are heavily used. Places that are properly developed help prevent conflicts. A good strategy would be to concentrate on special areas like those around the lakes. There is so much land here that uses shouldn't conflict with each other."

The environmentalist interviewees believed recreation developments were inadequate. "Why hasn't the **BLM** put in any recreation exclosures? Even 5 acres would be great. In fact, recreation programs such as campground maintenance hawe been dropped because of money problems." **BLM** interviewees agreed that they have problems accommodating the demand for recreation: "The local people want us to attract more tourists, and to develop more water-based recreation. The county needs to diversify, to get away from a strictly agricultural economy. Nationwide, as baby boomers retire, expectations will be different. They expect an active retirement. This will be our single biggest demographic blip. People are taking care of themselves, they have a strong environmental ethic, and will want to recreate on private and public lands. **BLM** will have **to** meet the needs of this kind of use, and we can't keep up now."

The environmentalist interviewees generally commented that the program benefited the livestock industry to the detriment, or at least to the neglect of, other uses. "When is discussion of other uses in public agencies going to get beyond mitigation?" was one comment. According to the interviewees, this overemphasis on liwestock remains a part of current **BLM** management, and is reflected in funding allocations and the unwillingness of **BLM** personnel to contact nonlivestock interests about management decisions.

Permittees and ranchers felt strongly that the Vale Program not only benefited the livestock industry, but a variety of other users as well. They believed seedings and water developments benefited wildlife, and that wildlife populations had increased since the program was completed (Table 5-3), but wildlife was a subject of contention. While all groups approved of increasing wildlife populations and enjoyed wildlife, both permittee and nonpermittee ranchers believed they support wildlife primarily for the enjoyment of outsiders and then are accused by these same people of not caring enough about wildlife. An interviewed permittee said: "The livestock industty pays fees to use **BLM** lands. If wildlifers and environmentalists paid fees they would have more influence. Wildlife wreck our fences, browse our crops. We suffered about a thousand dollars worth of damage this year. I'm donating **AUM's** to wildlife interests."

Ironically, the same charge about fees was leveled against permittees by other groups. "If the ranchers were paying a fair share it would be easier to justify large-scale range rehabilitation projects," a nonpemittee rancher observed. A **BLM** employee commented, "If fees were raised it would give ranchers more credibility and give us **lots** more money. We could do more projects, and more general improvements, which would in turn help them." Some permittees also indicated that fees were too low, but attributed this to low cattle prices. "If fees were higher, it would mean cattle prices were higher, and this would be fine with us," was one comment.

The forage generated by the Vale Program was viewed as a source of contention by some interviewees, especially on WSA's. As one permittee explained, "The Owyhee River runs all around us. Anyplace it touches a pasture, you can't increase grazing, so the de facto WSA is much larger than the actual. I have no objection to the Canyon being wilderness, but 38,000 AUM's are being held back by WSA's . Some excess forage should go to livestock, and some to wildlife. If possible, it should be given to the people whose good management resulted in the excess." Some local community leaders and business people stated that any "truly excess" forage should *go* to livestock, because otherwise it would be wasted. Others were suspicious of the concept, seeing excess forage as insurance for drought years. "I think that some excess forage should be allocated, especially in the WSA's , but some should be carried over. Wildlife doesn't need that forage, as there is little direct competition here between wildlife and livestock," stated one community leader.

Environmentalist interviewees basically denied that there was any such thing as excess forage. One interviewee commented, "Plants grow and things happen to them. Why should we spend money to defoliate plants? Let nature take its course....only voodoo economics can make the projed or allocation of forage financially worthwhile." "Excess forage should be left for wildlife, and for drought years when it is needed," was the suggestion of another environmentalist.

Everyone interviewed agreed that if the Vale Program were starting today its objectives would be different. Emphasis would be more on other uses, and less on livestock. Permittees and some local community members did not look on this change with enthusiasm, but saw it as inevitable on public lands. The BLM personnel interviewed believed that a multiple use focus is both an opportunity and a challenge, although they could not please everyone. "Today the objectives of a program like the Vale Program would be similar, but multiple-use values would play a larger part than they did then. The original program was too livestock-oriented, but it fit the political climate of the times," commented a BLM employee. "To be solely dedicated to livestock is the kiss of death," stated another BLM employee, "things are much more complex now. There would be more emphasis on riparian management, soils, and other uses. More emphasis would be put into native range management and grazing management, and less on large seedings."

"The objectives were appropriate to the times," stated a local businesswoman. "There is no question that it was oriented toward the livestock industry, but 75 percent of this county is dedicated to livestock production. What else can you do with these lands?" Permittees agreed that the program today would be more multiple-use oriented, but they supported a livestock focus, at least for Malheur County: "These programs should be done where economically feasible, where they are going to pay. The benefit to the economy is worthwhile. I would emphasize benefiting native range, although in some areas plowing and seeding would still be appropriate," commented a permittee.

Environmentalists questioned the ultimate benefit of developing rangelands to support the livestock industry: "There are only a few ranchers who truly benefited from the project, and why should these people be treated differently than other business people? Stabilizing the livestock industry is not a good enough objective. The industry isn't paying for its use. These are not good grazing lands, they are submarginal. We need to consider where a prudent person could raise livestock and make a living. It is not right to take money from people in New York to support a few ranchers. There was a problem with range condition in Vale but the methods used were not the right way to solve it. People argue that crested wheat deflected use of native range, but just removing the cows altogether would have been cheaper."

BLM Management of Malheur County Public Rangelands

The environmentalist group was most critical of BLM management; less than 40 percent responded that management of recreation, mining, wild horses, wildlife habitat, and livestock grazing is satisfactory or good (Table 7-12). Environmentalists were least critical of BLM wild horse management, and most critical of wildlife habitat and livestock grazing management. A majority of the respondents in all the other groups regarded BLM management as satisfactory or good, with the exception of wild horses. Only about one-third of permittees and environmentalists rated BLM management of wild horses as satisfactory.

Most of the respondents in each group reported that more cooperation between users and BLM would have a positive effect on BLM management of Malheur public rangelands (Table 7-13). Most also agreed that more emphasis on multiple-use management would be an improvement, although permittees were least likely to agree with this. Only 32 percent of the permittees believed that more public input would improve BLM management, compared with more than two-thirds of the respondents in other groups. Permittees were most likely, and environmentalists least likely, to believe that more use of advisory boards would improve BLM management.

Table 7-12 — Respondents in each group agreeing that BLM management of specified activities is satisfactory or good.[a]

(In percent)

Activity	Respondent group: Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Recreation	51	85	64	25	56
Mining	52	70	81	22	56
Wild horses	71	39	66	35	53
Wildlife habitat	53	88	54	7	50
Livestock grazing	54	69	66	8	50

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]Question 14, *Appendix* 2.

Table 7-13—Respondents in each group who believe that the following changes would have a positive effect on BLM management.[a]

(In percent)

Change	Respondent group				
	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
More user coop. with BLM[b]	98	86	84	91	90
More BLM coop. with users[b]	78	91	87	85	85
More multipleuse	91	64	70	82	77
More public input	76	32	83	95	72
More advisory board activity	60	87	67	44	65

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]Question 12, *Appendix* 2.

[b]No significant difference, $p<.05$, Chi-square

These differences reflect each group's opinions about the orientation of advisory boards, the awareness the public has of BLM activities, and the meaning of multiple-use, as revealed in interviews. Environmentalist interviewees stated that the Grazing Advisory Board had too much influence already, and that the effectiveness of the Multiple-Use Advisory Council was inhibited by the oftentimes capricious political appointments to membership. Permittees interviewed believed that multiple use was often interpreted as "nonlivestock use," and this made them suspicious of the concept. Permittees felt misunderstood by an increasingly urban public, and generally believed that those who know the land best, the locals and the permittees, know best how to manage it.

One environmentalist had the following comments about the Multiple Use Advisory Council: "The district manager and staff determine the agenda, and the deasions they want council opinion on. The purpose is really to find out how it will play in Peoria. But most of those on the council are political appointees, and don't really represent all sectors of the public. Some appointees are a joke, but Vale is better than most. This council has had pro-wilderness votes, unheard of on other districts. More often these councils are biased to the extractive industries." Coming from the other side, one permittee stated, "There are two environmentalists on the council, but only one rancher." Local community members were generally satisfied with the council; as one expressed it, "The council is 'show and tell' for the district. They are effective in representing a variety of views, and genuinely seek rancher input."

Table 7-14—Respondents in each group agreeing that maintenance has been adequate or improved since 1973.[a]

(In percent)

Project	Respondent group				
	Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Grass seedings	81	75	92	58	77
Fences	64	86	98	58	76
Forage	71	88	94	49	75
Roads	54	84	80	76	73
Sagebrush control	93	49	76	68	72
Water developments[b]	54	66	79	60	65
Stream vegetation	51	93	88	16	62

Significant *differences* ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]Question 12, *Appendix* 2.

[b]No significant difference, $p<.05$, Chi-square.

Maintenance of the various kinds of Vale Program projects is a major task for BLM. Much of the responsibility for maintenance has been turned over to permittees, a majority of whom reported that maintenance of seedings, fences, forage, roads, water developments, and streambank vegetation was adequate. Less than half responded that sagebrush control has been adequately maintained since 1973 (Table 7-44). Livestock permittees were also less satisfied with maintenance of water developments than with the maintenance of other projects. The BLM employees were least satisfied with road, water development, and streambank vegetation maintenance; environmentalists with forage, streambank vegetation, and water developments; and local community members with sagebrush control and water developments. Yet, 49 percent or more of the members of all groups responded that maintenance of each project type has been adequate or improved since 1973, except for environmentalists with respect to streambank vegetation. Overall, BLM employees and environmentalists were most critical of projed maintenance.

The problem of maintenance of water developments was of concern to interviewees from all groups. All ranchers agreed that the BLM should enforce more strongly the maintenance of improvements. One permittee stated: "The maintenance of water developments should not really be a BLM problem. A lot of people would love to have these systems. Perhaps people here are a bit spoiled. On the other hand, the government can't abandon these systems altogether." "Maintenance is our single biggest problem," was the opinion of one senior BLM employee. One community

leader stated, "Handing the maintenance over to the permittees was almost criminal: the developments are just too sophisticated. Now our capital investment is in serious trouble." "The maintenance should never have been turned over to the cattlemen—they are just patching things together and not really fixing them. The government will just get the stuff back and have to repair it," was the comment of one environmentalist interviewee. A nonpermittee rancher with his own water developments had the following to say: "Maintenance of water developments is expensive. Our pipes freeze regularly and I have to keep up with things all the time. I think permittees squawk too much. We have to compete with them, and we do our own maintenance.*

Besides the complexity and expense of maintaining the systems, several additional explanations of why maintenance is such a problem were advanced during interviews. One permittee explained some of the conflict over maintenance this way: When community allotments were broken up, some people got the natural springs, some got complicated water developments. Some pipelines create a tremendous burden on the person maintaining them. It's not fair that they have one and their neighbor does not. "Ranchers just didn't realize how hard it was," commented a local business leader. "Some ranchers have just failed to take responsibility,"was the opinion of another.

Confusion over the respective responsibilities of BLM and permittees is seen as another source of the problem with maintenance. A BLM employee outlined it best: "There is confusion about whose responsibility begins and ends where. Multiple-use type projects lose the most. When they were installed there were no firm agreements about maintenance for wildlife. We get those agreements today." Permittees commented that the rules had changed many times in recent years and that it was difficult to keep up. "The maintenance that occurs is single resource-oriented now," commented an environmentalist. "At the wells I visited recently, the wildlife escape ramps were smashed flat. Water is shut off when the cows aren't there." When asked to comment on these charges one permittee responded, "Why should ranchers maintain developments for wildlife? Ranches already contribute to wildlife, why should we always bear the burden? Recreationists make no mntribution. We build reservoirs and plant crops, but they think we should supply game for hunters too."

Although opinions about BLM management vary, more than 90 percent of the respondents in each group except the local community had acquired information about natural resources from the BLM (Table 7-15), and in all cases it was the most commonly contacted agency. The second most commonly contacted source for permittees was agricultural extension, while for environmentalists, BLM; and local community members it was the department of fish and game. Permittees, BLM employees, and local community members most often reported that the BLM is a good source of natural resource information, while the environmentalists most frequently preferred information from conservation groups (Table 7-16). However, 80 percent of environmentalists still believed BLM was a ***good*** source.

Table 7-15—Respondents in each group who have contacted the following agencies for information about natural resources.[a]

(In percent)

Agency	Respondent group: Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
BLM	95	93	59	98	87
Dept. of fish and game	76	59	57	91	71
U.S. Forest Service	70	31	44	89	58
Agricultural extension	53	73	47	50	56

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]Question 10, Appendix 2.

Table 7-16—Respondents in each group agreeing that the following are good sources of information about natural resources.[a]

(In percent)

Source	Respondent group: Vale BLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
BLM	91	76	49	80	74
Dept. of fish and game	65	40	47	83	59
U.S. Forest Service	67	23	38	74	50
Agricultural extension	45	64	35	31	44
Newspapers	33	40	37	46	39
Conservation groups	29	19	7	93	37
Magazines	26	36	28	57	37
Advisory board	45	71	18	13	37
Livestock association	37	70	29	9	36
Television[b]	20	21	28	24	23
chamber of commerce[b]	6	5	5	10	7
Mining bureau[b]	11	4	5	6	6

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.

[a]question 10, appendix 2.

[b]No Significant difference, $p<.05$, Chi-square

Table 7-17—Respondents in each group familiar with the following programs."

(In percent)

Program	Respondent group: ValeBLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Livestock management	86	99	68	82	84
Wildlife habitat	83	88	63	83	79
Recreation management	86	64	73	82	76
Wild horse and burro	78	87	75	65	76
Wildfire control	83	85	75	59	76
Wilderness study areas	75	79	51	86	72
Erosion control	83	88	54	61	72
Riparian	77	79	37	82	69
Research natural areas	61	35	32	74	50
Cadastral survey	54	25	24	17	30

Significant *differences* ($p<.05$, Chi-square) were found *among* respondent groups. unless otherwise noted.

[a]Question 4, *Appendix* 2.

The sources most often reported as good by permittees were BLM, the advisory board, the livestock association, and agricultural extension. Environmentalists most often responded that BLM, the Department of Fish and Game, conservation groups, and the U.S. Forest Service are good sources of information. Local community members favored BLM, Department of Fish and Game, the U.S. Forest Service, newspapers, and agricultural extension. The BLM employees ranked their own agency most highly, with the Department of Fish and Game and the U.S. Forest Service also reported as good sources.

The amount of knowledge each group had about BLM programs varied (Table 7-17). More environmentalists reported familiarity with the research natural area program than did BLM employees, and in fact the lack of familiarity of BLM employees with many programs was surprising. Local community members were least familiar with most program. Two-thirds or more of all other groups reported familiarity with the wilderness study area program, reflecting the controversy over wilderness designation. A majority of people in the permittee, BLM, and environmentalist groups were familiar with the livestock, wildlife habitat, recreation, wild horse and burro, wildfire control, erosion control, and riparian programs. The research natural area program and cadastral survey were less frequently known.

Two problems the BLM has managing rangelands were acknowledged by all interviewees: budget cutbacks and red tape. One BLM employee summed up the situation as follows: "We are underfunded and overworked. Priority and political shifts in Washington can catch you by surprise. We are a true multiple use agency but have too few resources to do the job and then we get criticized. Threats to turn our lands over to other agencies are common. We are just as capable but need the tools. We could manage wild and scenic rivers, but instead have lost some prime resources because of the perception that BLM can't manage them."

"The BLM needs to give more time to on-site management, and less on book work," commented a permittee. "So many people are employed at Vale, and most of them spend all their time writing reports. Every time you scratch the land surface you hawe to have an archaeologist. It's hard to stay on schedule." One nonpermittee rancher stated, "The BLM has been pretty much satisfied with my management of their little piece of land, I tried to get them to come up and see it, but they were too busy." "The tragedy is that the agency is full of good, well-meaning people writing piles of reports and resisting change," was the opinion of one environmentalist.

Who Should Decide How To Manage?

The attitudes of each group toward the government's role in resource management differed (Table 7-18). A majority of respondents in all groups agreed that the govemment has a responsibility to protect natural resources. In general, permittees and local community members had the least favorable opinion about government intervention in resource management. About two-thirds of those two groups agreed that government regulations lead to a loss of essential liberties and freedoms, and less than half agreed that the government has the right to determine the appropriate use of public lands. Environmentalistswere most willing to accept government regulations, with more than half agreeing that the government has a right to regulate resource management on private lands. Ten percent or less of the respondents in any other group agreed. Interestingly, fewer BLM employees than environmentalists agreed that the government has the right to manage public lands.

Livestock permittees differed sharply from other groups on livestock-related questions. More than three-fourths of the permittees thought that livestock producers get no government subsidy, but few of the respondents in any other group agreed. Only 8 percent of livestock permittees but 90 percent of the environmentalsts believed that grazing fees should be raised. The vast majority of permittees believed that livestock grazing is the best use of public rangelands, while almost none of the environmentalists agreed. Local community members were closer to permittees in their views on the last two statements than to the other two groups.

Interviewees from the environmentalist community stated that low grazing fees were basically a subsidy of the livestock industry, a misuse of public funds, and a useless investment. Rangeland grazing was to them a thing of the past. The BLM employees and local community members who responded that grazing fees should be raised believed that higher fees would enable better management, and would also give the livestock producers more credibility and power. One item agreed upon by permittees and environmentalists is that all recreation users should pay to use BLM lands.

Table 7-18—Respondents in each group agreeing with the following statements.[a] (In percent)

Statement	Respondent group: ValeBLM N=72	Permittee N=148	Community N=82	Environmentalist N=94	Mean
Protecting water is a government responsibility	86	48	69	98	75
Government has a responsibility to protect natural resources	97	68	78	100	86
Government regulations mean loss of liberties and freedoms	27	70	65	9	43
Livestock producers are not subsidized	19	76	31	7	33
Government has the right to regulate private land use	9	9	10	54	20
Government has the right to manage public lands	68	47	36	83	58
Grazing is the best use of public rangelands	28	86	53	2	42
Government consults well with citizens	37	32	15	13	24
Government listens to city people	23	63	53	8	37
Grazing fees should be raised	75	8	26	90	49
All recreational BLM land users should pay	34	67	22	52	44

Significant differences ($p<.05$, Chi-square) were found among respondent groups, unless otherwise noted.
[a]Question 10, Appendix 2.

A majority of permittees and local community members believed that the government is "more responsive to people who live In cities." Interviewees pointed out that conflicts over resource management are often seen as conflicts between the urban public of western Oregon and the rural residents of eastern Oregon. Not too surprisingly, local residents (including permittees), and environmentalists, strongly differed in their views about who should have the most say in the management of BLM lands.

One rancher summed up his feelings about the situation as follows: "I think if outsiders understood what was really going on out here it would be better, but those people mostly operate on half-truths. I don't think they represent the public in general. Hunters use the roads, they make roads, and they drive the best vehicles in the county, but we have to foot the bill for the roads in our local taxes. Ranchers don't have enough say and their say is declining." Another commented, "Ranchers could have enough voice, but we have been meetinged to death; we have the opportunity but are losing heart."

One nonpermittee rancher stated, "I'd rather western Oregon people stayed in western Oregon, but they do have some voice because they pay taxes. I think the locals should pay more fees and then they would have more power." Another commented that "BLM should listen to both sides, but local people should be listened to more. Most locals are working to improve rangelands and make things better."

"Cattlemen still have the most influence, but now BLM listens to environmentalists more than before," commented a local businessman. "BLM should listen mainly to people that use the lands, wherever they are from, but the rancher should have the larger voice. A livelihood is more important than recreation," said another. "Local people live here; they should have more influence on decisions because they care about the lands more. Outsiders cut fences and leave gates open," stated a community leader. Another added, "We live here through the winters, and we should have more say. I feel violated by vandalism, shooting, gates left open, and so on."

The BLM employees acknowledged that it was difficult to balance the concerns of different user groups, and of eastern and western Oregonians: "In general, the locals do have the most voice. A lot of outside interests from metropolitan Portland just don't understand some things about this country. The ranchers live here and nobody knows the land better. But we look at all comments on issues, and do not just do vote counting. If there is a wilderness issue we notify outside groups ahead of time, involving everyone in Oregon and Boise. How we weight responses depends on the issue."

Environmentalists believed that their group and western Oregonians in general should and will have more voice in BLM decisionmaking. One environmentalist commented: "The only problem we have is a lack of knowledge by outsiders. We need to balance the informed and uninformed. Locals may know more, but they also have a vested interest. We need a balance." Another summed up the situation as follows: "Since nonlocal money is supporting these BLM lands, and the land is being degraded, nonlocal people should have the most influence. Oregon environmental organizations have got the livestock industry surrounded. We can and will stop their livestock-oriented agenda. The livestock industry's strength is based on political connections rather than dollars like the timber industry. We have a lot more power in Oregon than ranchers, especially with the media."

At least one permittee agreed with the environmentalists, commenting, "I'm afraid grazing on public lands may be a thing of the past. They are after us, and we are outgunned." However, another made the following statements: "The livestock industry will continue to be a strong force here. I think there will be an end to the dislike of livestock on range. In western Oregon, for example, they are advertising for sheep to graze clearcuts. The public will realize they need livestock. Things will get worse, then better. They will have a hard time running the cowboys out of the country."

Interviewees from the environmentalist community believed there was little hope of any common points of interest leading to cooperation between their group and livestock interests. Such cooperation is more common in the Rocky Mountain States, where livestock and environmental interests mutually oppose mining and development Interests.

Conclusions

The Middle Ground

The Vale Program changed the relationship of the BLM with the ranching community from one of suspicion to one with a foundation in trust. Regardless of whether or not ranchers and BLM employees agree or disagree on particular questions, there is now a mutual belief that compromise is attainable. In the words of one permittee, "Today the BLM people are different. BLM and rancher relations years ago were completely adversarial; prior to the program they wouldn't sit at a table together. Now people have come together, both sides have been educated." A senior BLM employee commented, "We gain ranchers' trust by association. Sometimes they do hammer on us in public, and outsiders see this, but at other times we share coffee and cookies."

Perhaps the most striking evidence of how things have changed within the ranching community was the general acceptance by the permittees of the legitimacy of some form of multiple-use management. In spite of the strong feelings among Malheur County residents, permittees, and BLM employees about wilderness, "Our Grazing Advisory Board actually did recommend some areas for wilderness," stated a BLM employee. "I think the objectives of the Vale Program today would be more multiple-use oriented," commented one permittee, "and I support multiple use. But I don't think other groups do. They only support recreation in its various forms." Permittees and nonpermittee ranchers both strongly believed that the Vale Program improved conditions for livestock grazing, but also for a variety of uses, most notably wildlife.

Permittees, BLM, and local community members all applauded the educational value of the Vale Program. One local community member pointed out, "As a result of the seedings, people are now doing them on private lands and improving them." He continued, "Tours and publicity should be targeted to specific groups, with education about both good and bad practices. They could bring out the things they would have done differently." Those who commented on the tours felt that each should be a balanced look at both problems and positive things about Malheur rangelands.

"This is a perfect area to train new range conservationists," commented one retired **BLM** employee. "They could spend the first year at Vale, and hit the ground with some experience." A permittee described the educational value of the program as follows: "Most Vale ranchers are resource-oriented, they would not tear up an area. I think the Vale Program contributed to that education, to good rangeland management, and that it is still an active educational process. For example, the Grazing Advisory Board suggested allocating excess forage on a temporary basis and monitoring to make sure allocations are not just based on production in a good year. The board is resource-conservative, and this is the only place I've seen this."

There are several major issues upon which the viewpoints of the different groups diverge sharply, and which will need resolution in coming years. The maintenance of water developments and other projects, both for livestock and for wildlife, is of critical concern right now. The rehabilitation and management of riparian areas is well recognized as a major concern. Wilderness area designations are problematic, with the **BLM** unable to make management changes it feels are necessary, and nearly unqualified support for **WSA's** from environmentalists.

Most environmentalists were strongly opposed to crested wheatgrass seedings, and were certain they had detrimental effects on wildlife. But **BLM** employees maintain that supplies of seed for alternative species remain difficult to obtain and expensive, although they are used when possible. Local community members and permittees are both willing to concede that huge seedings are not necessarily appropriate, but believe that crested wheatgrass stands up to grazing best and should continue to be used for rehabilitation of degraded range.

Both local community members and environmentalists would like to see an increased emphasis on recreation management, but **BLM** has, for budgetary or other reasons, been unable to keep up with demand. The appropriate amount of emphasis that **BLM** should place on rare and endangered species, and on wildlife in general, is also a subject of debate.

Underlying many of the conflicts is the difference in perceptions between locals and environmentalists. Environmentalists are perceived as outsiders by local groups, people who drive fancy rigs and take advantage of the bounty that the locals believe they have brought about through good management. Environmentalists see the locals as motivated by personal interest, and indeed, the viewpoints of those in the local community and of permittees are tempered by the experience of making a living in Malheur County, one of the most economically depressed counties in the state.

The current economic condition of the livestock industry is believed by many to be a source of some problems. "If ranchers were making more money, they would be able to maintain these expensive improvements," was the comment of one local community member. It was frequently pointed out that if permittees could afford to pay higher fees, they would have more influence.

All the groups support the idea of rangeland rehabilitation, and believe that the Vale Program benefited the rangelands of Malheur County, but differ on the appropriate methods and objectives. Environmentalist criticisms of the program are linked to a disapproval of grazing on public lands in general, and can't really be separated from that view. The viewpoints of local community members, ranchers, and BLM employees are based on a sincere belief that livestock grazing can be a part of successful multiple-resource management. They believe that they can have wildlife, wilderness, recreation, and livestock in plenty on Malheur County rangelands under the right management. At present these two points of view seem irreconcilable.

It is largely for this reason that the permittees and environmentalists are always on opposite ends of the spectrum of responses. The BLM's successful fulfillment of the role of arbitrator among the various interests is demonstrated by its position squarely in the middle. It also provides insight into some of the frustrations experienced by BLM employees. The BLM simply cannot please every constituency with every decision. A proportion of every group agreed with BLM on every issue, and BLM was relied upon as a good source of information by a majority of respondents in each group, but it is clear that BLM has not been co-opted by any one group. The BLM is succeeding as an independent, professional organization in Malheur County.

The Vale Program can take some credit for this. It demonstrated to the community and to permittees that the Federal government was willing to invest in the improvement of rangelands and in the local economy. At the same time, the increase in rangeland productivity brought about by the program has given the BLM the flexibility in management to respond to wildlife and environmental interests. There is enough forage available to adjust grazing to provide for wildlife habitat and riparian rehabilitation. With a productive, healthy rangeland base, there is much greater potential for compromise.

References

Cronbach, L.J. 1951. "Coefficient alpha and the internal structure of tests," Psychometrika 16:279-334.

Dillman, D.A. 1979. Mail and Telephone Surveys: The Total Design Method (New York: Wiley).

Acknowledgments

First and foremost we would like to acknowledge Ruth Heady and Paul Starrs, for their editorial advice and much needed support. Paul made most of the graphs and figures in this chapter. Both Judy Nelson of the Vale District and Mike Howell of Malheur Agricuttural extension were extremely helpful to us during field expeditions to Malheur County. Without the conscientious efforts of Michael Hite and Daphne Hatch, there would have been no data set in the computer to analyze. The Department of Forestry and Resource Management's office staff did a temfic job of typing hundreds of addresses for us, sometimes several times. Tom Piazza provided us with helpful advice on statistical methods. Louise Fottmann's review of the draft questionnaire proved invaluable, as did the efforts of the entire Multiple Use Advisory Council when they graciously helped us pre-test the questionnaire during one of their meetings. We would also like to renew our thanks to the interviewees, for their time and thoughtful comments. Finally, thanks to all those questionnaire respondents who so candidly and vividly expressed their opinions.

Chapter 8 Fulfillment of Objectives

Harold F. Heady

"How well did the Vale Program meet the objectives proposed by the BLM in 1961 and endorsed by Congress in 1962?" was one objective of this study. The following conclusions are based on data collected on range, wildlife, water, and recreation resources, economic analyses, and opinion surveys. Because few quantitative data were available when the program began, trends in uses and resource conditions have been difficult to assess. But it is clear that the Vale Program has resulted in improved range condition, less erosion, enhanced recreational opportunities, and some economic benefits.

Objectives of the Original Vale Rehabilitation Proposal

1. To correct erosion and accompanying downstream sedimentation — and prevent further soil losses.

Many long-term residents in Malheur County remember large areas of bare soil and severe erosion by wind and water. A few recall when cheatgrass came, covered the bare areas, and gave a small measure of soil protection. Our estimates of vegetative cover and cryptogamic crust in the soil surface indicate that accelerated erosion does not exist over wide areas and that sedimentation is of little consequence in both treated and untreated areas. Offroad vehicles cause erosion in local areas, and riparian habitat along a few small streams still needs attention. Relatively few BLM

employees and local residents (including permittees) today believe that soil loss or stream erosion are important problems, although most environmentalists believe that current soil loss is serious. The major erosion problems today are in the riparian type and they are being surveyed and solved. Although no scientific and statistically sound measurements of erosion and sedimentation have been taken, the majority opinion holds that the objective has been accomplished.

2. To increase the forage supply for livestock and wildlife.

Beyond any doubt the forage supply for livestock has increased as a result of the Vale Program. Replacement of sagebrush with grasses, improved distribution of livestock grazing through water development and fencing, management systems that defer grazing and rest pastures, and less intensive forage utilization have been the principal factors responsible for forage increases. The supply of forage has exceeded the demand since 1972 and the excess now approaches 100,000 **AUM's.** The Vale Program however, is not the only reason for the additional forage. Since 1963 the BLM has improved its overall management of rangeland, and forage production has increased in many locales.

Due to the fluctuating nature of wildlife populations and the scarcity of quantitative data, it is difficult to determine the effects of the Vale Program on Wildlife. Deer and antelope numbers seem to have increased in response to the reduction of tall brush and the increase of winter forage made available by fall growth of crested wheatgrass. Perennial grass areas support fairly stable populations of ground squirrels and probably their predators. Other species, such as blacktail jackrabbits, may be adversely affected because of less sagebrush, but the evidence is largely circumstantial. It appears that the Vale Program did not greatly help or harm wildlife. More widely distributed water, an increase in ground cover in both treated and untreated areas, and reduced erosion probably have resulted in improved wildlife habitat overall.

3. To stabilize the livestock industry at the present or an increased level of production.

The phrase "stabilize the livestock industry" in this original objective makes it impossible to achieve because the livestock industry is influenced by many factors outside the Vale Program. However, the program resulted in increased forage within a short time after it began; so, in a restricted sense, stabilization was achieved for local ranchers because range improvement was achieved without cutting livestock numbers grazing on public land. Further, the monies spent on the program and its maintenance, the continued health of the ranching industry, and the District office being located in Vale have helped to maintain the viability of the local community.

4. To facilitate fire control by replacing high-hazard cheatgrass and sagebrush with low-hazard perennial grasses, and to improve detection and suppression facilities.

The evidence indicates that this objective of the Program has not been fulfilled. Data on number of fires and area burned in the Vale and Burns BLM Districts suggest that wildfires are fewer but larger in recent years on both Districts. It appears that perennial grasses are highly flammable and, unless livestock grazing has removed the standing and dry herbage, they burn as readily as cheatgrass stands. The increasing size of fires may be related to increased plant growth due to record levels of precipitation in five of the last nine years and decreased forage utilization.

Wildfire detection and suppression have certainly improved on the study area in recent years, but this has been a nationwide trend and cannot be attributed to the Vale Program.

5. To prevent the encroachment and spread of noxious and poisonous weeds.

The important noxious and poisonous weeds on the program area are halogeton, larkspur, poison hemlock, and medusahead. Halogeton is no longer a serious pest because it has given way to palatable grasses as a result of normal plant succession and improved range condition. Medusahead is a recent arrival and will probably be limited to certain soil types with little overall consequence. Poisonous species have become less troublesome as plant succession has reduced their abundance in relation to more palatable forage. Few are eaten when forage utilization is moderate or light. This objective has been attained through the Vale Program and overall good management.

6. To accomplish necessary land tenure adjustments.

Since the program began, land tenure adjustments have been made through alteration of allotment boundaries, land exchanges (especially with the State of Oregon), and adjudication of permits with commensurate property. This has resulted from good management as well as from a decreasing differential between forage demanded and produced. Land tenure problems today are minor in the program area.

7. To safeguard public lands from improper recreational use.

Improper recreational uses include offroad motorcycle and four-wheel drive traffic in some areas, unsanitary camping, and vandalism of developed campgrounds and signs. Manners of the recreational users of the Vale area haven't changed much. Two-thirds or more of BLM employees, permittees, and environmentalists (but less than half of the local residents) believe that offroad vehicle use is too great. Reduced budgets have resulted in fewer developed campgrounds than originally planned in the program. About a quarter of the people surveyed believed that poor public facilities, poor roads, restrictions on use, and fencing were problems. Over two-thirds of all respondents were familiar with the BLM's recreational program and were generally satisfied with it. Although work toward accomplishing this objective was begun with the Vale Program, most of the progress has been made since the program ended. Today, recreational facilities in the study area are serving the users reasonably well with little damage to the resources.

8. To provide for the development of access roads and service roads in the vast areas of untapped recreational potential.

Many roads were built during the Vale Program to accommodate brush control operations, seedings, fence construction, water developments, and land management activities. **After 1973,** some of these roads disappeared through lack of use and maintenance. Presently, the BLM maintains roads on an "as needed" basis. The opinion survey showed that less than one-fifth of all respondents believe there are too many roads, and only 5 percent wanted more; there is general satisfaction with the road system in the program area, indicating that this objective has been accomplished.

Objectives of This Study

Because of numerous legislative, economic, societal, and managerial changes that have taken place since the Vale Program ended in **1973,** it seemed appropriate in **1986** to reassess the long-term impacts on vegetation, other resources, human values, and economic health of the region. The following paragraphs enumerate the objectives of the **1986** study and briefly summarize the findings.

1. To evaluate the responses of vegetation and other resources to land treatments and grazing management since the baseline descriptions in **1975.**

The vegetation in the program area has changed since **1962** in response to the variations in weather, land treatments, wildfire, and grazing management. Sagebrush has increased on untreated areas since **1962,** and on both the plowed and sprayed areas, except where fires have occurred. The return of sagebrush and rabbitbrush has been most rapid on sprayed areas.

Crested wheatgrass seedings, although partly repopulated by big sagebrush, appear to have stabilized with a high grass cover that will last for many years. Bluebunch wheatgrass and squirreltail have decreased since **1975** on most treated and untreated areas. However, desirable native grasses, principally bluebunch wheatgrass, have increased moderately in some untreated areas fenced into crested wheatgrass seedings, suggesting that grazing management should be different for the two wheatgrass species.

At the current low rate of forage utilization in the program area, natural plant succession is a strong determinant of vegetational change. Variations in range trend among pastures grazed alike masked vegetational differences that might be due to the several types of seasonal grazing patterns.

The number of **AUM's** sold on the program area has remained stable since the program began. The amount of forage produced rapidly increased during the **1960's** and met obligated demand by the early **1970's.** Since that time low forage utilization has **left** large amounts **of** herbage on the ground, affording soil protection, lessening erosion, and improving wildlife habitat; unfortunately, this herbage has also posed a fire hazard.

Impacts on the other resources, such as soil, water, wildlife, and recreation have been summarized earlier in the chapter.

2. To analyze the economic impacts of the Vale Program on resources and human values.

Economic analysis indicates that livestock benefits alone (AUM's sold) were not sufficient to justify the costs (program and regular BLM District budgets) under most benefit and cost assumptions. However, if the positive impacts of improved range condition, reduced soil erosion, enhanced recreational opportunity, increased visitation to the area, and stability provided by government spending are considered, the Vale Program has had a pronounced positive influence on the area's economy. We believe the overall benefits have justified the investment of public funds.

3. To determine the life expectancy of various vegetational treatments and physical range improvements used in the program, including the importance and degree of associated maintenance and operational costs that affect their life expectancy.

Seeded ranges have maintained grazing capacities for over 15 years with no signs of reduced forage production, despite moderate sagebrush increase. Grazing capacity of spray-only treatments increased immediately, but then declined as sagebrush invaded; after **10** years, these areas were no more productive than they were before treatment. An increase in forage production on untreated native range has held up over the years. Apparently, spraying can be expected to increase forage production for about 10 years, while plowing and seeding can produce benefits for 15 to 25 years. Burning after treatment but before young sagebrush plants can produce seed may extend the treatment life for up to 50 years.

Life expectancy of the physical items (fences, water developments, roads, etc.) depends on the quality of construction and subsequent maintenance. Because data on frequency and costs of maintenance were not available, this part of the objective was not met. However, about three-fourths of the people surveyed in the opinion poll believed the maintenance of fences and roads was adequate or had improved. They also believed that water developments were the least well maintained. Shifting the maintenance responsibility to the permittees has unevenly distributed costs for some.

4. To ascertain user, public, and BLM perception of the Vale Program.

About 400 completed questionnaires were returned by Vale BLM employees, permittees, environmentalists, and local residents. In-depth interviews lasting from one to several hours were also conducted with **13** people, several from each group. As expected, the permittees and environmentalists were on opposite ends of many issues—for example, whether or not livestock grazing can be a part of successful multiple-resource management. The BLM's position, roughly in the middle of most issues indicates that it has not been co-opted by any group and that it is succeeding as an independent and professional agency.

5. To update the effect of the Vale Program on management initiatives and again make the lessons learned available for guidance in land rehabilitation.

This publication is accomplishment of the objective.

Appendix 1 Plant Names

Nomenclature for common and scientific plant names in the text follows Hitchcock and Cronquist (1973) and *Artemisia* taxa as used by Dealy and others (1981). Chapter 5 includes a list of the potential threatened and endangered species.

Common name	Scientific name
Antelope bitterbrush	*Purshia tridentata*
Basin big sagebrush	*Artemisia fridenfafa fridenfafa*
Big bluegrass	*Poa ampla*
Black cottonwood	*Populus trichocarpa*
Black greasewood	*Satcobatus vermiculafus*
Bluebunch wheatgrass	*Agropyron spicatum*
blander silver sage	*Artemisia cana* **bolanderi**
Budsage	*Artemisia splnescens*
Cereal rye	*Secale cereale*
Cheatgrass	*Bromus fectotum*
Cleftleaf sage	***Artemisia*** *arbuscula thermopola*
Clover	*Trifolium* **spp.**
Cottonwood	*Populus* spp.
Crested wheatgrass	*Agropyron crisfatum* and *A. desertorum*
Curlleaf mountainmahogany	*Cercocarpus ledifolius ledifolius*
Cutting wheatgrass	*Agropyron caninum*
Dwarf threetip sage	*Artemisia tripartita rupicola*
Early low sage	*Artemisia longiloba*
Fairway crested wheatgrass	*Agropyron crisfatum*
Giant wildrye	*Elymus cinereus*
Halogeton	***Halogeton*** *glomeratus*
Hawthorn	*Crafaegus* spp.
Idaho fescue	*Fesfuca idahoensis*
Indian ricegrass	*Oryzopsis hymenoides*
Intermediate wheatgrass	*Agropyron infermedium*
Larkspur	*Delphinium* **spp.**
Low sage	*Artemisia arbuscula arbuscula*
Medusahead	*Taeniatherum asperum*
Mock orange	*Philadelphus lewisii*
Mountain alder	*Alnus incana*
Mountain big sagebrush	*Artemisia fridenfafa vaseyana*
Mountain silver sage	*Artemisia cana viscidula*
Mustard	*Brassica* **spp.** and *Sisymbrium* spp.
Needle-and-thread	*Stipa wmata*
Needlegrass	*Stipa* **spp.**
Nomad alfalfa	*Medicago sativa*
Ponderosa pine	*Pinus ponderosa*
Prairie junegrass	*Koeleria cristata*
Pubescent wheatgrass	*Agropyron trichophorum*
Quaking aspen	***Populus tremuloides***
Rabbitbrush	*Chrysothamnus* spp.
Russian thistle	*Salsola* spp.
Russian wildrye	*Elymus junceus*
Sagebrush	***Artemisia*** *tridenfata*
Sattbush	*Atriplex* spp.

Common name	Scientific name
Sandberg bluegrass	*Poa sandbergii*
sedges	*Carex* spp.
Shadscale	*Atriplex confertifolia*
Silver sage	*Artemisia cana*
Snowbeny, mountain	*Symphoricarpos oreophilus*
Spiny hopsage	*Grayia spinosa*
Squirreltail	*Sitanion hystrix*
Standard crested wheatgrass	*Agropyron desertorum*
Stiff sage	*Artemisia rigida*
Strawberry clover	*Trifolium fragiferum*
Subalpine Mg sagebrush	*Artemisia tridentata spiciformis*
Tall wheatgrass	*Agropyron elongatum*
Threetip sagebrush	*Artemisia tripartita*
Thurber's needlegrass	*Stipa thurberiana*
Western juniper	*Juniperus occidentalis*
Western wheatgrass	*Agropyron smithii*
Wheatgrass	*Agropyron* spp.
Whitmar wheatgrass	*Agropyron inerme*
Wild cherry	*Prunus* spp.
Wild rose	*Rosa* spp.
willow	*Salix* spp.
Winterfat	*Eurotia lanata*
Wyoming big sagebrush	*Artemisia tridentata wyomingensis*
Yellow sweetclover	*Melilotus officinalis*

Appendix 2

Quest onnaire

Resource Management on That Part of the Vale BLM District in Malheur County, Oregon

A Survey of Community Opinions

'Thirteen years ago on the BLM's Vale District in Malheur County, Oregon, the Vale Range Rehabilitation Program was completed. Ten years have passed since our first evaluation of the program. As independent researchers from the University of California, we are charged with reevaluating the program this year. This survey is one part of the reevaluation. Besides collecting biological data by re-sampling transects and plots established ten years ago, we are asking users of BLM lands in Malheur County how they feel about the program, and how it has affected their use of Malheur County lands. Our goal is to help the BLM and other land management agencies better manage public rangelands to meet the needs of resource users. We need your opinions and ideas about the Vale Program, Including whether the program benefited you or not.

All responses to this questionnaire will be strictly confidential. They are gathered for research purposes only. Your name or address will not be used in the analysis, nor will your identity be made public or released to anyone.

First we would like to know what you think about conditions and activities on Malheur County BLM lands in general. This first set of questions refers to Vale District BLM lands in Malheur County.

1. How extensive, if at all, do you think the following problems are on Vale District lands? (circle one number for each)

	not a problem	problem in some areas	problem in many areas	problem In most areas	don't know
Loss of streamside vegetation	1	2	3	4	5
Streambank erosion	1	2	3	4	5
Reduction in wildlife and game	1	2	3	4	5
Rangeland soil loss	1	2	3	4	5
inadequate public facilities	1	2	3	4	5
Poor road conditions	1	2	3	4	5
Agricuttural pests	1	2	3	4	5
Too much fencing	1	2	3	4	5
Too little fencing	1	2	3	4	5
Restrictions on use and development of resources	1	2	3	4	5
Overgrazing	1	2	3	4	5
Under-use of forage	1	2	3	4	5
Air pollution	1	2	3	4	5
Water pollution	1	2	3	4	5
Too many roads	1	2	3	4	5
Too few roads	1	2	3	4	5
Inadequate fire control	1	2	3	4	5
Wild horses	1	2	3	4	5
Cutbacks in BLM budgets	1	2	3	4	5

2. Below is a list of things that happen on Malheur County BLM lands. Please tell us whether you think there is too much, too little, or just enough of each activity going on in general. (circle one number for each)

	don't know	too much	just right	too little
Livestock grazing	1	2	3	4
Hunting	1	2	3	4
Fishing	1	2	3	4
Off-road vehicle use	1	2	3	4
Road development	1	2	3	4
Water contamination	1	2	3	4
Range vegetation conversion	1	2	3	4
Stock water development	1	2	3	4
Camping	1	2	3	4
Hiking	1	2	3	4
Backpacking	1	2	3	4
Rafting	1	2	3	4
Wilderness designation	1	2	3	4
Protection of endangered species	1	2	3	4
Wild horse grazing	1	2	3	4
Wildlife habitat improvement	1	2	3	4

3. What is the most serious problem BLM has managing Malheur County rangelands?

4. How familiar are you with the following BLM programs in Malheur County? (circle one number for each)

	very familiar	somewhat familiar	not familiar
Livestock management	1	2	3
Wildlife habitat management	1	2	3
Recreation management	1	2	3
Wild horse and burro program	1	2	3
Wildfire control program	1	2	3
Riparian management	1	2	3
Erosion control after fire	1	2	3
Cadastral survey	1	2	3
Research natural area program	1	2	3
Wilderness study area program	1	2	3

5. How do you think uses of Malheur County BLM lands have changed since 1973?

	don't know	increased	the same	decreased
Livestock grazing	1	2	3	4
Hunting	1	2	3	4
Fishing	1	2	3	4
Rafting	1	2	3	4
Off-roading	1	2	3	4

Camping	1	2	3	4
Picnicking	1	2	3	4
Mining	1	2	3	4
Rock-hounding	1	2	3	4
Bird-watching	1	2	3	4
Pleasure riding	1	2	3	4

6. The amount of sagebrush cover on the district is (circle one number):
1. too much 2. too little 3. just right 4. don't know

7. The amount of crested wheatgrass on the district is (circle one number):
1. too much 2. too little 3. just right 4. don't know

8. The amount of cheatgrass on the district is (circle one number):
1. too much 2. too little 3. just right 4. don't know

9. Have you noticed any increase or decrease in wildlife use of areas where sagebrush has been replaced by crested wheatgrass? (circle numbers that apply—you may circle more than one).

1. increase 2. no change 3. decrease 4. depends on size of seeding.
5. depends on location of seeding. 6. depends on wildlife species.

9a. If you know of any, please give one or two examples of DECREASED use by wildlife of areas where sagebrush has been replaced by crested wheatgrass:

9b. If you know of any, please give one or two examples of INCREASED use by wildlife of areas where sagebrush has been replaced by crested wheatgrass:

10. Have you had contact with any of the following sources of information about natural resources? Please rate the following sources of information, depending on how useful their information is to you. (circle one number for each)

	no contact	no info available	info, but not useful	good source of info
BLM	1	2	3	4
USFS	1	2	3	4
Agricultural Extension	1	2	3	4
Conservation Group	1	2	3	4
Department of Fish and Game	1	2	3	4
Mining Bureau	1	2	3	4
Magazine	1	2	3	4
Newspaper	1	2	3	4
Chamber of Commerce	1	2	3	4
Advisory Board	1	2	3	4
Livestock Association	1	2	3	4
Television	1	2	3	4

11. What additional sources of information should be available?

12. Would the following management changes have an effect on management of the Vale District's public rangelands? (circle one number for each)

	strong positive effect	moderate positive effect	no effect	negative effect	strong negative effect
More use of Advisory Boards	1	2	3	4	5
More emphasis on multiple use management	1	2	3	4	5
More public Input into management decisions	1	2	3	4	5
More cooperation of BLM with user groups	4	2	3	4	5
More cooperation of user groups with BLM	1	2	3	4	5

13. Which rehabliltation practices do you think should follow wildfires like those of mid-August, **1986** (circle one number for each):

	never	in some cases	in most cases	in ail cases	don't know
Seeding with native species	1	2	3	4	5
No rehabilitation — let nature take its course	1	2	3	4	5
Closure to grazing for 1 or 2 years	1	2	3	4	5
Closure to all uses for 1 or 2 years	1	2	3	4	5
Seeding with crested wheatgrass and cereal rye	1	2	3	4	5

14. In the majority of situations that you are familiar with, BLM management of the following in Malheur County is: (circle one number for each)

	very good	satisfactory	needs improvement	poor	don't know
Wild horses	1	2	3	4	5
Wildlife habitat	4	2	3	4	5
Uvestock grazing	1	2	3	4	5
Recreational use	1	2	3	4	5
Mining	1	2	3	4	5

15. Below are some statements about natural resources and their management. Please circle one number for each, showing the extent to which you agree or disagree with it.

	strongly agree	agree	neither agree nor disagree	disagree	strongly disagree
Protecting water quality should be a government responsibility	1	2	3	4	5
The government has a responsibility to protect natural resources	1	2	3	4	5
Government regulation results in a loss of essential liberties and freedoms	1	2	3	4	5
Livestock producers do not get any government subsidy	1	2	3	4	5
The government has the right to regulate resource management on private lands	1	2	3	4	5
The government has the right to determine the appropriate use of public lands	1	2	3	4	5
Livestock grazing is the best use of public rangelands	1	2	3	4	5
The government does a good job of consulting citizens before making resource decisions	1	2	3	4	5
The government is more responsive to people who live in cities	1	2	3	4	5
Grazing fees should be raised on public lands	1	2	3	4	5
All recreational users should pay to use BLM lands	1	2	3	4	5

Questions 16 through **23** pertain specifically to the Vale Rangeland Rehabilitation Program.

16. How familiar are you with the Vale Rangeland Rehabilitation Program (circle one)?

a. A little
b. Somewhat familiar
c. Very familiar
d. I was involved in it
e. Not at all. Go to ***question #24 (page 12)*** *if you* ***are not familiar with the Vale Rangeland Rehabilitation Program.***

17. How did you find out about the program, or become familiar with it?

18. Overall, how much, if at all, have the following groups benefited from the Vale Program (arcle one number for each)?

	a lot	some	not at all	lost benefits	don't know
Recreationalists from Malheur County	**1**	**2**	3	**4**	**5**
Recreationalists from other counties	**1**	**2**	**3**	**4**	**5**
Local businesses	**1**	**2**	**3**	**4**	**5**
Off-road vehicle users	**1**	**2**	**3**	**4**	**5**
Fishermen	**1**	**2**	**3**	**4**	**5**
Hunters	**1**	**2**	**3**	**4**	**5**
Rafters	**1**	**2**	**3**	**4**	**5**
Politicians	**1**	**2**	**3**	**4**	**5**
Miners	**1**	**2**	**3**	**4**	**5**
Campers	**1**	**2**	**3**	**4**	**5**
Hikers	**1**	**2**	**3**	**4**	**5**
BLM employees	**1**	**2**	**3**	**4**	**5**
Livestock permittees	**1**	**2**	**3**	**4**	**5**
Other livestock producers	**1**	**2**	**3**	**4**	**5**
Birdwatchers	**1**	**2**	**3**	**4**	**5**

19. If you believe that any groups lost benefits, please tell us why:

20. Please tell us whether you believe populations of the following Wnds of wildlife have increased, decreased, or not changed in Malheur County as a whole, as a result of the Vale Rangeland Rehabilitation Program.

	increased	not effected	decreased	don't know
Deer	1	**2**	**3**	4
Antelope	1	**2**	**3**	4
coyotes	1	**2**	**3**	4
Reptiles and amphibians	1	**2**	**3**	4
Bighorn sheep	1	**2**	**3**	4
Sage grouse	1	**2**	**3**	4
Pheasants	1	**2**	**3**	4
Chukkars	1	**2**	**3**	4
Doves	1	**2**	**3**	4
owls	1	**2**	**3**	4
Quail	1	**2**	**3**	4
Birds of prey	1	**2**	**3**	4
Other birds	1	**2**	**3**	4
Rabbits	1	**2**	**3**	4
Fish	1	**2**	**3**	4
Ground squirrels	1	**2**	**3**	4

21. How well do you think the following aspects of the program have been maintained since 1973 (circle one number)?

	inadequate	adequate	improved	don't know
Forage management	1	2	**3**	4
Fences	1	2	**3**	4
Water developments	1	2	**3**	4
Roads	1	2	**3**	4
Streamside vegetation	1	2	**3**	4
Sagebrush control	1	2	**3**	4
Grass seedings	**1**	**2**	**3**	**4**

22. What **is** the best resutt of the Vale Rehabilitation Program?

23. What is the worst result of the Vale Rehabilitation Program?

Questions ***24*** *through 31* are to be answered only by those with livestock in Malheur County. ***If*** *you* ***are*** *not a livestock producer, please go on to question #32 (page* ***14.)***

24. What is the present total'livestock carrying capacity of your ranch, excluding calves?

a. 1-50
b. 51-100
c. **101-300**
d. **301-500**
e. **501-1000**
f. More than a thousand.

25. Do you raise calves, stockers, or both? Please describe your operation in brief:

26. What percent of your total forage supply comes from BLM lands in Malheur County? _____ From other BLM lands? _____ From State lands? _____
From USFS lands? _____ From other public lands? _____
From leased private land? _____ From your own land? _____

27. Did the rehabilitalion program change your grazing use of Malheur County BLM rangelands? (circle one number) **1.** yes 2. no

27b. If yes, how?

1. Decreased permitted AUMs....how many? _____
2. Increased permitted AUMs....how many? _____
3. Changed season of use....how?
4. Please explain any other changes:

28. Below are some statements about the Vale Program. Circle one number for each, showing whether you agree or disagree with it.

	agree	neither agree nor disagree	disagree
The Vale Rehabilitation Program:			
Increased fire hazard	1	2	3
Resulted in wasted forage	1	2	3
Improved rangeland productivity	1	2	3
Improved the productivity of my ranch	1	2	3
Was too expensive	1	2	3
Helped the community	1	2	3
Was a mistake	1	2	3
Should get more funding	1	2	3
Benefited other users	1	2	3

29. What is your major problem in grazing or any other use of the public land in the Vale District?

30. How long has your family owned this ranch? _____

31. Which kinds of projects most help you or could most help you to make best use of Vale District BLM lands (circle one number)?

	no help	some help	very helpful
Crested wheatgrass seeding	1	2	3
Water developments	1	2	3
Fencing	1	2	3
Brush control	1	2	3
Cooperative management agreements	1	2	3

Now we need to find out a few things about you. This information will be used only to improve our analysis of the rest of the questionnaire.

32. How many times each year do you do the following on Malheur County BLM lands?

	never	less than 3 times/yr	3 to 6 times/yr	more than 6 times/yr
Fish	1	2	3	4
Hunt	1	2	3	4
Camp	1	2	3	4
Hike	1	2	3	4
Raft	1	2	3	4
Mine	1	2	3	4
Picnic	1	2	3	4
Rock-hound	1	2	3	4
Birdwatch	1	2	3	4
Off-roading	1	2	3	4
Pleasure ride	1	2	3	4
Swimming	1	2	3	4

33. In what year did you first begin to use Vale District lands? _____

34. What is the major difficulty you have in using these lands?

35. Within the last two years, have you (circled one number each):

	yes	no
Written a letter to the government about a policy issue	1	2
Attended:		
A city council meeting?	1	2
An advisory board meeting?	1	2
A public hearing?	1	2
BLM public forum?	1	2
Planning commission meeting?	1	2
School board meeting?	1	2

36. What is your principal occupation(s)? and source(s) of income?

37. What state and county do you live in _____?
How long have you lived there? _____

38. What was the last grade you attended in school? (circle one letter)

a. No formal education
b. Between grades K-12
c. Some college or graduate of junior college
d. Graduate of 4-year college
e. Post-graduate work

38b. If you graduated from college, what was your major subject?
_____

39. Do you have any responsibility in the management of public lands in Malheur County? _____. If so, with which agency? _____
How long have you held this position? _____

40. Have you been a member of any of the following kinds of groups at any time in the last ten years?

	yes	no
Farm organization or bureau	1	2
Livestock association	1	2
Wildlife association	1	2
Hunting or fishing club	1	2
Chamber of Commerce	1	2
Community Service Group	1	2
Town or county government	1	2
Outdoor Recreation Club	1	2
Environmental Group	1	2
Other conservation group	1	2

41. Please take this opportunity to give us any additional comments on the Vale Rehabilitation Program, land management in Malheur County, and BLM management of Vale **District** lands. Tell **us** what's right and what's wrong about it all.

Thank you for your help with this survey! Please remember to write your address on the outside of the envelope if you would like us to send you a summary of our results.

U.S. GOVERNMENT PRINTING OFFICE: 1988– – 591132/82006

Heady, Harold F., *ed.* 1988. The Vale rangeland rehabilitation program: an evaluation. Resour. Bull. PNW-RB-157. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station; U.S. Department of the Interior, Bureau of Land Management. 151 p.

This manuscript discusses the initiation, execution, and outcome of an 11-year (1962-1972) rangeland rehabilitation program in southeastern Oregon. Resource Bull. PNW-70 (1977) is updated with 1986 measurements and evaluations of vegetational conditions, wildlife, recreational use, livestock grazing, and management of public rangelands. The mix of multiple uses has changed since 1977 as a result of new laws, regulations and public opinion. Perceptions about the management of the area's public land are surveyed. The lessons from this large and successful program should serve as a guide for managing other rangelands.

Pacific Northwest Research Station
319 S.W. Pine St.
P.O. Box 3890
Portland, Oregon 97208


UNITED STATES CONSTITUTION
We the People
1787 1791 BICENTENNIAL 1987