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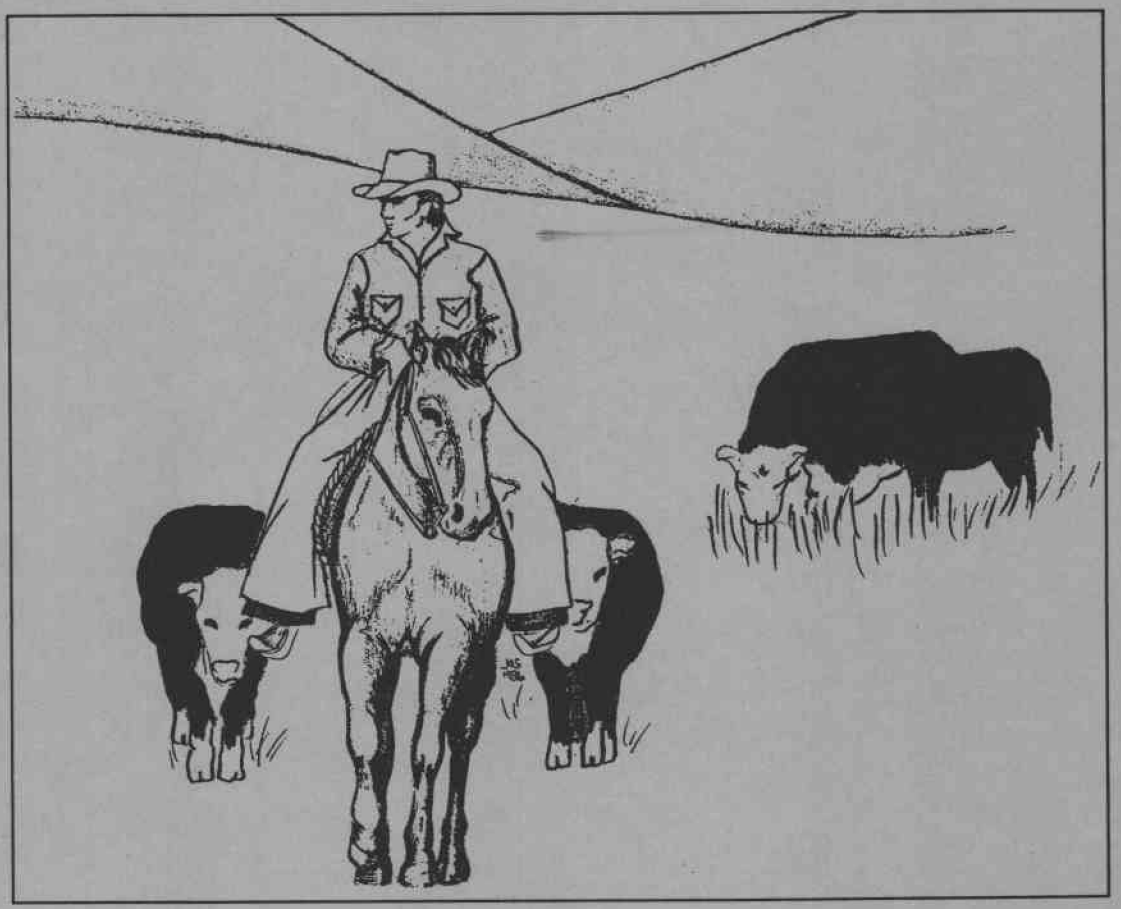

OREGON STATE UNIVERSITY EXTENSION SERVICE

Costs Incurred by Permittees in Grazing Cattle on Public and Private Rangelands and Pastures in Eastern Oregon: 1982 and 1990

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COSTS INCURRED BY PERMITTEES IN GRAZING CATTLE ON PUBLIC AND PRIVATE RANGELANDS AND PASTURES IN EASTERN OREGON: 1982 & 1990

by

Frederick W. Obermiller*

Introduction

The relative costs of grazing livestock on privately owned and leased versus publicly owned and federally administered lands in the western United States is a key part of the federal grazing fee policy debate. The purpose of this report is to provide an updated estimate of grazing costs on federal and private rangelands in one state: Oregon.

The three objectives are practical, technical and policy oriented. First, ranchers as prudent businessmen and women need to understand and minimize both the cash and noncash components of their grazing costs if they are to succeed, since the individual rancher is unable to influence the price of the beef, lamb, or wool he or she sells. The full costs of grazing on certain private and federal rangelands are presented here. Second, an alternative to a more commonly used method of projecting grazing costs is presented, and a comparison of differences in results using the two methods is made. Third, this report has a public policy education objective. Federal grazing fees are the subject of intense public debate, and the current fee system is based on the notion of equalization in total grazing costs, given the differences in the costs of forage use on private and public rangelands in the western United States. Little current information on those cost differentials is available. The present report adds to the knowledge base available to policy makers.

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* The author is a rangeland resource economist, Professor of Agricultural and Resource Economics and Courtesy Professor of Rangeland Resources, at Oregon State University. This report is an expansion and update of an earlier Oregon State University Extension Service publication (Lambert and Obermiller 1983) in which the results of a 1982 Eastern Oregon grazing cost survey were summarized. The results reported in 1983 were developed from survey data obtained under the auspices of a USDA/SEA Extension Project, "Federal Rangeland Management: Improving Citizen Understanding" for which Obermiller and Extension range management specialist Thomas E. Bedell of the Department of Rangeland Resources, Oregon State University, served as co-leaders. The comments and suggestions on earlier drafts by Ludwig M. Eisgruber and Stanley D. Miles of the Department of Agricultural and Resource Economics, and by William C. Krueger and Bedell of the Department of Rangeland Resources, are greatly appreciated.

The Relationship Between Grazing Costs and Grazing Fees

The current grazing fee system involves the use of a formula, called the PRIA formula because it was established by Congress in the passage of the Public Rangelands Improvement Act in 1978.[1] The PRIA formula consists of a "base fee" of $1.23 per animal unit month (AUM) modified by three indices representing changes in average westwide private grazing land rental rates, costs of production for western range livestock operations, and prices received for beef cattle. The indices are updated annually, so the formula-based federal grazing fee changes from year to year. The indices keep the $1.23 per AUM base fee in line with changes in short and long term forage market conditions.[2]

The 1966 Western Livestock Grazing Survey

The $1.23 per AUM base fee was calculated from the results of a massive Western Livestock Grazing Survey conducted by the government in 1966 (Table 1).[3] The $1.23 per AUM base fee represented the amount that would have been charged in 1966 to bring the total (fee plus nonfee) per AUM costs of grazing on federal lands up to a level equal to the total (lease plus

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[1]Public Law 95-514 (October 25, 1978), Sec. 6(a), 43 USC 1905.

[2]There has been considerable confusion as to the intent of the three indices. The "Forage Value Index" (FVI) reflects changes in average private pasture rental rates in the 11 western states. The intent of the FVI is to capture the effect of "long-term adjustments taking place in the western range livestock industry [by duplicating] economic adjustments in the competitive private sector, and [incorporating] changes in technological efficiency" (Secretary of Agriculture and Secretary of the Interior 1977, pp. 3-34 and 3-35). The intent of the remaining two indices (the Beef Cattle Prices Index or BCPI and an index of costs of production in the western range livestock industry or PPI) was to reflect "short-run instabilities that result during periods of demand, supply, and price disequilibrium" not otherwise accounted for in the FVI (Federal Register 1977, p. 6081). The Technical Committee that recommended the use of the BCPI and PPI noted that short run instabilities "have a significant effect on the value of resources used in production" (Secretary of Agriculture and Secretary of the Interior 1977, p. A-11). Inclusion of the BCPI and PPI in the PRIA formula would measure changes in the short run value of the federal forage resource (ibid, pp. A-25 and A-26) and mitigate short run windfall gains and losses otherwise accruing to permittees (ibid, p. A-ll). Over time, the BCPI and PPI have come to be known as "ability to pay" indices measuring the "profitability" of the western public land ranching industry (General Accounting Office 1991, p. 6) rather than measuring short run changes in federal forage values. The confusion exists because the PRIA formula and its indices were intended to estimate the value of an input (forage) rather than the value of an output (beef or wool) as is implied in the recent General Accounting Office report and elsewhere.

[3]In the course of the 1966 Western Livestock Grazing Survey, grazing cost data were collected from over 10,000 ranch operations (Secretary of Agriculture and Secretary of the Interior 1977, Appendix C, Part 2; Houseman et al. 1968). Some held federal grazing permits. Others operated on private lands only. In addition, permit value estimates were collected from 500 financial institutions in the western United States. The grazing cost data were used to estimate "base fees" for the year 1966. Base fees of $1.23 per AUM were estimated for combined Forest Service and Bureau of Land Management grazing allotments in the 11 western states, and $1.33 per AUM for National Grasslands (administered by the Forest Service) in nine Great Plains states. These base fees are defined as the average amounts that, if charged as federal grazing fees in 1966, would have promoted equality among public land and private land ranchers in total grazing costs on a per AUM basis in the two regions. The base fees reflect the differences in structures of grazing costs on federal grazing allotments and leases vis-a-vis private leased grazing lands.

nonlease) per AUM costs of grazing on privately-owned and leased grazing lands in the 11 western states. The $1.23 per AUM was a westwide average. At that price some federal grazing allotment costs would be higher, and others would be lower, than the average private grazing cost level.

Table 1. Summary of Adjusted Combined Public Land (National Forest and Bureau of Land Management) and Private Land Grazing Costs in the 11 Western States in 1966 Dollars Per AUM

	Cattle		Sheep	
Cost Items	Combined Public Costs	Private Costs	Combined Public Costs	Private Costs
Lost Animals	.60	.37	.70	.65
Association Fee	.08	---	.04	---
Veterinary	.11	.13	.11	.11
Moving Livestock To & From	.24	.25	.42	.38
Herding	.46	.19	1.33	1.16
Salt and Feed	.56	.83	.55	.45
Travel To & From	.32	.25	.49	.43
Water	.08	.06	.15	.16
Horse	.16	.10	.16	.07
Fence Maintenance	.24	.25	.09	.15
Water Maintenance	.19	.15	.11	.09
Development Depreciation	.11	.03	.09	.02
Other Costs	.13	.14	.29	.22
Private Lease Rate	---	1.79	---	1.77
Total Operating Costs[a]	$3.28	$4.54	$4.53	$5.66
Difference between private/public	$1.26		$1.13	
Combined cattle and sheep		$1.23[b]		

[a] Excludes the amount of the grazing fee charged in 1966.

[b] Weighted by 80% cattle and 20% sheep AUMs. All column and row headings are as reported to Congress in 1969. "Public costs" as used here refer to grazing costs on public lands, and "private costs" refer to grazing costs on privately owned rangelands.

The 1966 survey data as originally published contained 14 cost activities,[4] a format that Nielsen has continued to follow. These are (1) lost animals, (2) association fees, (3) veterinary services (incurred while the livestock were grazing on the allotment or pasture), (4) moving livestock to and from the allotment or pasture, (5) herding within the allotment or pasture, (6) salting and supplemental feeding, (7) travel to and from the allotment or pasture to check on livestock and perform other management functions, (8) provision of water, (9) maintenance of horses (used in herding and other activities while the livestock were on the allotment or pasture), (10) fence maintenance, (11) maintenance of structural water developments, (12) depreciation of permittee (lessee) financed developments and improvements on the allotment (privately leased pasture or range), (13) other costs, and (14) private grazing land lease rate.

The private grazing land lease rate would be a positive value for private grazing leases and zero for federal grazing permits and leases. The 14 cost activities intentionally excluded the federal grazing fee.[5] The underlying logic was that the new "base fee" would be an amount which, when added to the average federal permittee nonfee grazing costs, would bring total average (per AUM) permittee costs up to the total average private grazing land grazing costs--taking into account the differences in nonfee and nonlease costs incurred in the first 13 cost activities.

The Need for More Recent Grazing Cost Data

Since 1966, the government has not done any grazing cost surveys. The PRIA formula was reviewed by the major western federal land management agencies in the 1980s, but that review did not include collection of data on the relative costs of grazing livestock on federal and private lands in the west. For this reason, in part, the federal grazing fee issue remains highly visible in the public policy arena.[6]

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[4]Cost data were collected for a 15th cost activity: permit value, or the amortized cost associated with federal permit portion of the total resources of a ranch property, part of which was the commensurate land or water base for the grazing permit. The results reported in Table 1 do not include permit value, or more precisely permit cost. Permit cost data were collected and analyzed, but a policy decision subsequently was made and the permit cost was excluded from the array of federal grazing costs. This led to considerable controversy, as the 1969 House and Senate hearing records attest. In 1966, the average amortized permit cost was $0.87 per AUM on BLM allotments and $1.52 per AUM on National Forest allotments. The corresponding costs were not reported for National Grasslands grazing allotments, but records maintained by the Association of National Grasslands suggest that the average National Grasslands permit cost was $1.88 per AUM in 1966.

[5]In 1966 the BLM grazing fee was uniform at $0.33 per AUM westwide while the Forest Service grazing fee varied among and sometimes within National Forests, with an average value of $0.51 per AUM in 1966.

[6]A recurring theme in the establishment of efficient, equitable, and stable federal grazing fees has been the differences, if any, in costs experienced by livestock operators who lease private, versus federal, western grazing lands. From 1981 through 1985 the Forest Service and the Bureau of Land Management conducted a review of the existing federal grazing fee formula pricing system (the PRIA formula fee system). Section 12(b) of PRIA (43 USC 1908) required the Secretaries to report to Congress their recommendations relative to the retention, revision, and/or abandonment of that formula fee system by December 31, 1985. The required report, without recommendations, was submitted to Congress in March 1986 (Secretary of Agriculture and Secretary of the Interior 1986). Before the required evaluation and report was submitted to Congress, President Reagan signed an

> Throughout the history of public rangeland management, no question has remained so long and so persistently in the public eye as the question of grazing use fees. This continuing controversy has been complicated by changing national goals, changing economic and social conditions, regional influences, confusing congressional action, and increasing public interest in multiple use philosophy (Secretary of Agriculture and Secretary of the Interior 1977, p. 2-1).

Since there have been many changes in public resource law, agency grazing regulations and restrictions, court decisions, and other institutions as well as changes in relative prices and production technologies since 1966, it is difficult to rely simply on price indices as a means of updating the "cost equalization" charge, i.e., the federal grazing fee.[7]

Western University Grazing Cost Surveys in the 1980s

For this reason, the USDA/SEA Extension Service sponsored grazing cost surveys in Oregon in 1983 (for the 1982 grazing season).[8] The Eastern Oregon survey was conducted by Oregon State University range economists with the assistance of range scientists and county agricultural Extension agents (Lambert and Obermiller 1983). The following year, these same individuals supervised similar surveys in various other western and Northern Great Plains states in 1984 for the 1983 grazing season (Obermiller and Lambert 1984).

The purpose of these surveys was to gather more recent data comparable to those obtained in the 1966 Western Livestock Grazing Survey and thus contribute to a review of the PRIA formula fee system being conducted by the Forest Service and the Bureau of Land

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Executive Order (Number 12548 on February 14, 1986) freezing the PRIA formula fee system--but adding a $1.35 per AUM "floor" value below which the fee could not fall--pending further action by Congress. Various grazing fee bills were debated in Congress in 1987, 1989, and 1991 (Obermiller 1991a). Late in 1991 a Senate/House Conference Committee agreement resulted in a directive that the Forest Service and BLM update the reported 1986 data and provide Congress with their findings by April 30, 1992. As submitted, the update contains little information beyond that appearing in the original 1986 report (Secretary of Agriculture and Secretary of the Interior 1992).

[7]Legislative efforts over the years have sought to identify the policy goals of federal land management, including the identification of factors relevant to the design of the federal grazing fee structure. Administrative and academic considerations of the issue have concentrated on analyzing the efficiency and equity implications of different fee levels and on technical details involved in designing a fee schedule appropriate to the legislative intent. Livestock production interests, often in alliance with local governments and agricultural lending institutions, have sought to have a fee implemented that does not exceed the economic value of public land forage available for use in their ranch operations and promotes the stability of the Federal grazing land dependent western livestock industry. These interests and arguments are conveniently summarized by Smits (1984). For a more recent discussion of the issues, see Obermiller (1991a).

[8]Independently, Bartlett et al. (1984) conducted a parallel grazing cost survey in Colorado.

Management (Secretary of Agriculture and Secretary of the Interior 1986).[9] That original purpose applies to the present update as well.

The Oregon findings from the original 1983 report are summarized in the Appendix to the present report.[10] The 1982 Oregon survey data are updated to 1990 prices following the same general methodology used by Nielsen (1982 and 1991) to update the 1966 data base. The most recent available index numbers are for 1990, and hence the price index updated forage use costs reported by Nielsen and reproduced in Table 1 are for the 1990 grazing year.

With some modification, the updating procedures outlined by the Secretaries of Agriculture and the Interior (1977, Appendix C)[11] have been followed by Nielsen and are followed here. The primary differences between the costs reported here and those reported elsewhere by Nielsen (1991, reproduced in Table 2) are (1) the present results are for Eastern Oregon only and are not necessarily indicators of westwide average forage use cost differentials, and (2) the base data updated to 1990 values are of more recent vintage--1982 versus 1966. The latter difference is important in that the 1982 Eastern Oregon data would be expected to reflect at least some of the institutional changes in agency grazing regulations and restrictions, etc. between 1966 and 1982, while the updates provided by Nielsen would not.

Price Updated Eastern Oregon Grazing Costs

During the spring of 1983, 1982 grazing season cost information was collected from nearly 100 Eastern Oregon rangeland livestock operators (Figure 1). All of the interviewed operators had relatively large federal grazing permits on either Forest Service allotments or on BLM Section 3 permits or Section 15 leases. Many also leased other privately owned or publicly managed grazing lands.

In the Eastern Oregon grazing survey, some of the 1966 survey cost activities were combined due to (1) similarities in management activities and (2) the relatively low value of some of

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[9]Rather than evaluating the relative differences in per AUM grazing costs on federal and private grazing lands as was done in the 1966 study, thereby providing a consistent basis for updating the $1.23 and $1.33 per AUM base fees, the 1980s evaluation of the PRIA formula placed exclusive reliance on a "mass appraisal" of private sector grazing leases (Tittman and Brownell 1984). The mass appraisal technique and results have been criticized as an inappropriate basis for verification of the PRIA formula, given the intent of Congress in the establishment of that formula (Nielsen et al. 1984).

[10]The original report entitled "Costs Incurred by Permittees in Grazing Cattle on Public and Private Rangeland in Eastern Oregon" (Special Report 692, Oregon State University Extension Service) is out of print. Since the present update derives from the original findings, it seems appropriate to provide the reader with a summary of the original results.

[11]The Secretaries identified various indices published, or to be published, by the USDA Statistical Reporting Service (since 1986 the National Agricultural Statistics Service or NASS) as a basis for price updating the various components of the PRIA grazing fee formula. The indices were and are published in the NASS *Agricultural Prices* series.

Table 2. Grazing Costs Per AUM on Public Versus Private Rangelands: 1966 Costs Price Updated to 1990.

OPERATION	FEDERAL GRAZING PERMITS	PRIVATE LEASES
Lost Animals	$ 1.82	$ 1.12
Association Fees	.27	- 0 -
Veterinary	.45	.53
Moving Livestock To and From	1.11	1.16
Herding within Operation	1.86	.77
Salt and Feed	2.32	3.09
Travel To and From Operation	1.49	1.19
Water (Production Items)	.27	.20
Horse	.50	.31
Fence Maintenance	.89	.92
Water Maintenance	.69	.55
Development Depreciation	.37	.10
Other	.44	.47
TOTALS	**$ 12.48**	**$ 10.41**
Federal Grazing Fee (1990)	1.81	- 0 -
Private Lease Rate (excludes any services provided by lessor) (1990)	- 0 -	4.35
Total Operating Costs/AUM	**$ 14.29**	**$ 14.79**

Source: Nielsen (1991).

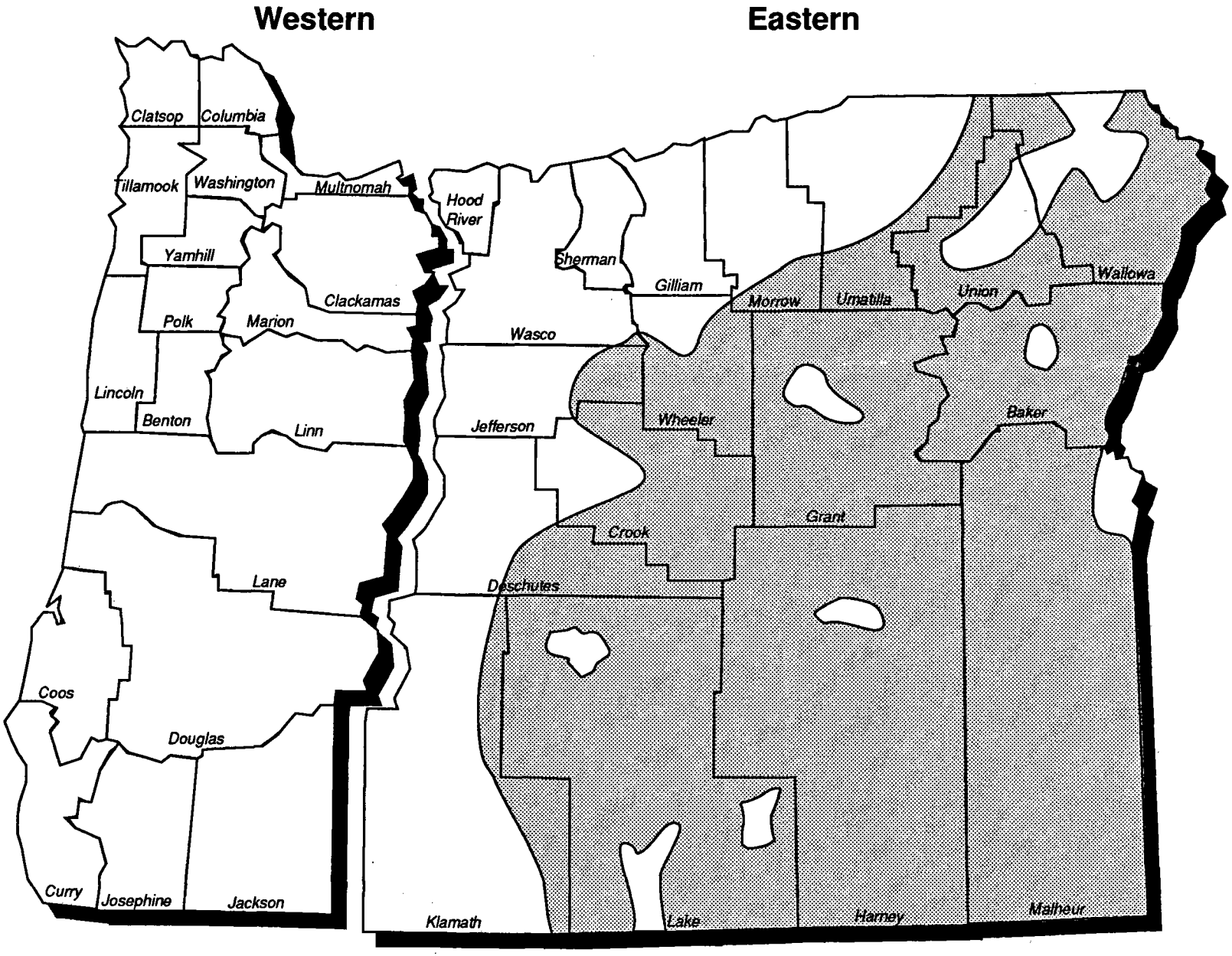

Figure 1. Significant Federal Land Grazing Regions in Eastern Oregon

the itemized 1966 costs. Specifically, veterinary services (item 3) were combined with salt and supplemental feeding costs (item 6). Fence (item 10) and structural water maintenance costs (item 11) were combined and defined simply as "maintenance" costs in the Eastern Oregon grazing study. Costs of water provision (item 8) were added to the other costs (item 13) category. Horse costs (item 9) were added to herding costs (item 5) and defined as"routine management" costs in the Eastern Oregon survey results. In the Eastern Oregon survey, a new cost activity "meetings and paperwork" was separated from the "other costs" category as defined in 1966 because of the perception on the part of many permittees that this type of overhead cost had increased measurably since 1966. Since depreciation (item 12 in the 1966 survey) was included in the "other costs" category in the 1982 Eastern Oregon results along with other types of costs specific to the use of the allotment, a "miscellaneous" cost activity as identified in the Eastern Oregon survey corresponded to nonallotment miscellaneous costs in the 1966 Western Livestock Grazing Survey.

These differences in categorization notwithstanding, the sum of all grazing costs in the 1982 Eastern Oregon survey was inclusive of and conceptually equivalent to the sum of all grazing costs in the original 1966 Western Livestock Grazing Survey--and in the various updates provided by Nielsen. Therefore, the reported per AUM grazing costs in the 1966 survey as updated to 1990 equivalent prices by Nielsen could be directly compared with the 1982 Eastern Oregon costs updated to 1990 prices.

Because the Eastern Oregon data were categorized somewhat differently than the 1966 data, as noted, the *Agricultural Prices* indices used to adjust the Oregon data differ slightly from those used by Nielsen. The indices selected for the Oregon grazing costs update are consistent with the 1977 recommendations of the two Secretaries, and are as shown in Table 3. The indices are derived from the "Indexes of Prices Received and Paid by Farmers, United States, 1979-90" appearing on page A-3 of the Annual Price Summary (June 1991). The index values have been recalculated using 1982 as the base year (1982=100) to correspond to the year for which the Eastern Oregon grazing survey results apply.

1990 Updated Eastern Oregon Grazing Survey Results

In Table 4, the price index updated grazing costs, by activity, from the 1982 Eastern Oregon grazing survey are expressed in 1990 dollars. With two exceptions, each activity cost is self-explanatory since each is the product of its 1990 index value times the corresponding 1982 activity value. The two exceptions are maintenance and license/lease costs. Maintenance costs on BLM allotments were increased by $1.00 per AUM in 1982 dollars to reflect the Bureau's policy change (see footnote 13 in the Appendix), then updated to 1990 prices. License/lease costs on federal allotments were updated using the 1982 fee to license/lease cost ratio. The ratio was applied to the $1.81 per AUM federal grazing fee actually paid in 1990 to reflect exchange of use relationships (as were discussed in footnote 19 in the Appendix).

As in 1982, the 1990 Eastern Oregon grazing costs on BLM allotments vary among regions. Among the surveyed permittees, those holding BLM allotments in Southeastern Oregon incur lowest per AUM grazing costs. The primary sources of these cost advantages are lower turn-out, gathering and take-off, and routine management costs, all of which are understandable given the fairly flat topography and, in some areas, large acreage of improved rangelands

in Southeast Oregon. Conversely, Forest Service and BLM Baker/Eastside Cascades allotments are more costly due to higher gathering/take-off and routine management costs, again due largely to topographical factors.

Table 3. Price Indices and Values Used to Update 1982 Eastern Oregon Grazing Costs to 1990 Equivalent Prices.

Index	Reported Values by Year[a] 1982	1990	Equivalent 1990 Value 1982=100	Cost Activity for Which Index Value Applies
Meat animals	155	193	124.5	Death loss
Production items	153	171	111.8	Miscellaneous
Feed	122	128	104.9	Salt, feed, vet.
Fuels & energy	210	204	97.1	Maintenance
Farm & motor supplies	152	154	101.3	Maintenance
Autos & trucks	159	231	145.3	Turn-out, Gathering/take-off
Building & fencing	135	144	106.7	Maintenance
Farm services/cash rent	169	166	98.2	Turn-out, Gathering/Take-off, Maintenance, Meetings/paperwork, Association fees, License/lease, Other
Wage rates	144	191	132.6	Management, Maintenance, Other
Composite maintenance[b]	160	173	108.1	Maintenance, Other
Composite hauling[c]	164	199	121.0	Turn-out, Gathering/Take-off

[a] 1977=100.

[b] The mix of activities in the "maintenance" and "other" categories required the use of an appropriate composite maintenance index. The indices used to construct that index included farm and motor supplies, fuels and energy, building and fencing, and wages—all of which were equally weighted.

[c] The mix of activities in the "turn-out" and "gathering/take-off" categories required the use of an appropriate composite hauling index. The indices used to construct that index included farm services/cash rent and autos and trucks—both of which were equally weighted.

Table 4. Per AUM Grazing Costs and Costs by Activity in 1990 Dollars for Grazing on Bureau of Land Management, Forest Service, and Privately Leased Lands in Eastern Oregon.

		Group									
		Malheur/Grant n=15		Baker/Eastside Cascade n=18		Harney/Lake n=45		Forest Service n=64		Private Leases n=23	
Activity[a]	1990 Index Value	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost
Turn-out	121.0	.65	6.4	1.04	4.8	1.54	10.9	1.20	6.3	2.43	9.5
Gathering and take-off	121.0	.98	9.7	3.53	16.4	2.01	14.2	3.92	20.7	1.56	10.4
Management	132.6	1.52	15.0	5.69	26.5	2.28	16.2	5.62	29.6	1.54	10.2
Maintenance[b]	108.1	1.61	15.9	2.98	13.9	1.89	13.4	1.97	10.4	.69	4.6
Meetings/paperwork	98.2	.47	4.6	.32	2.4	.18	1.3	.22	1.2	.03	0.2
Salt, feed, med.	104.9	.30	3.0	.42	2.0	.44	3.1	.34	1.8	.38	2.5
Death loss	124.5	2.56	25.3	3.09	14.4	3.34	23.7	2.42	12.8	1.58	10.5
Other	108.1	.18	1.8	2.14	10.0	.65	4.6	.67	3.5	.05	0.3
Miscellaneous	111.8	.01	0.1	.03	0.1	.01	0.1	.02	0.1	.00	0.0
Association fees	98.2	.13	1.3	.49	2.3	.00	0.0	.79	4.2	.00	0.0
License/lease[c]	98.2	1.72	17.0	1.73	8.1	1.77	12.5	1.80	9.5	7.77	51.7
Total Cost		**10.13**	**100.0**	**21.46**	**100.0**	**14.11**	**100.0**	**18.97**	**100.0**	**15.03**	**100.0**

[a] All activities are defined and described in Lambert and Obermiller (1983, Appendix II, Part II).

[b] Includes $1.00 per AUM estimated increase in maintenance costs due to BLM policy change in 1982 (see footnote 21).

[c] The federal grazing fee in 1990 was $1.81 per AUM versus $1.86 per AUM in 1982. Hence, the ratio of 1982 license/lease costs to $1.86 was used to adjust the 1990 updated forage use costs consistent with exchange of use arrangements. For further elaboration see footnote 20.

Sources: Tables 3 and A-6.

Grazing costs on private leased lands are equivalent to average grazing costs on BLM permits and leases, and lower than average grazing costs on Forest Service allotments. The structure of the private grazing costs is markedly different however. The lease rate itself constitutes over half of the total grazing cost on private grazing lands, while the grazing fee represents only eight to 17 percent of the total grazing cost on federal allotments. In both absolute and relative terms, death loss and improvement maintenance costs are lower on private grazing leases as are various incidental costs: meetings and paperwork, other, miscellaneous, and association fees. Many of these cost items are not incurred directly by the lessee, but rather are provided by the landlord and incorporated in the price of the lease in private grazing lease arrangements. In summary, the lease to nonlease cost ratio on private grazing leases is much higher than the fee to nonfee cost ratio incurred by federal permittees.

Combined Federal Versus Private Grazing Cost Results

In their 1968 report, Houseman et al. justified the derivation of a single westwide average "base fee" of $1.23 per AUM as follows:

> Differences among ranching areas, as shown by the data, were not large enough in relation to the wide variation that existed within areas to provide a basis for recommending differential base fees among ranching areas (ibid., p. 2).

In their 1977 Report to Congress, the Secretaries of Agriculture and the Interior amplified on the Houseman report as follows:

> The wide variation of grazing cost [sic] among individual allotments should be interpreted as a reflection of the actual situation and not as an indication of inaccurate data...The committee concluded there was no statistical support from the survey data for differential base fees between BLM and FS ranges...Because of the variation involved, the committee concluded that the grazing cost data did not provide a basis for establishing differential base fees between cattle and sheep (ibid., pp. C-28 and C-29).

Applying this same logic to the price updated results of the 1982 Eastern Oregon grazing survey yields the combined per AUM grazing costs given in Table 5. Total per AUM grazing costs on BLM allotments and private grazing leases in the Oregon survey are nearly the same in 1990 prices at $15.07 per AUM (BLM) and $15.03 per AUM (private) respectively. Forest Service allotment grazing costs in 1990 prices are higher, at $18.97 per AUM.[12] Weighted by the number of BLM and Forest Service allotments in the 1982 Oregon survey (78 and 64, respectively), the combined federal agency allotment grazing costs in 1990 prices in

[12]Most of the difference in BLM and Forest Service grazing costs is explained by the higher average "gathering/take-off" and "management" costs on Forest Service grazing allotments. The higher Forest Service "gathering/take-off" costs probably are a function of terrain: gathering livestock on forested, mountainous country typical of Forest Service allotments requires more effort than in open allotments (as are characteristic of BLM grazing lands). Terrain was mentioned as influencing the gathering effort by many of the Forest Service permittees who were interviewed in 1983. For much the same reason, time spent in herd management and relatively more horse use on Forest Service allotments may explain the higher Forest Service grazing costs.

Table 5. Per AUM Grazing Costs and Costs by Activity in 1990 Dollars for Grazing on Combined Bureau of Land Management, Forest Service, Combined Federal, and Privately Leased Lands in Eastern Oregon.

	Group							
	Bureau of Land Management n=78		Forest Service n=64		Combined Federal n=142		Private Leases n=23	
Activity*	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost	Cost ($/AUM)	% of Total Cost
Turnout	1.25	8.3	1.20	6.3	1.23	7.3	1.43	9.5
Gathering and take-off	2.16	14.3	3.92	20.7	2.95	17.5	1.56	10.4
Management	2.92	19.4	5.62	29.6	4.14	24.6	1.54	10.2
Maintenance	2.09	13.9	1.97	10.4	2.04	12.1	.69	4.6
Meetings/Paperwork	.31	2.1	.22	1.2	.27	1.6	.03	.02
Salt, feed, med.	.41	2.7	.34	1.8	.39	2.3	.38	2.5
Death loss	3.13	20.8	2.42	12.8	2.81	16.7	1.58	10.5
Other	.90	6.0	.67	3.5	.80	4.8	.06	0.3
Miscellaneous	.01	0.1	.02	0.1	.01	0.1	.00	0.0
Association fees	.14	.09	.79	4.2	.43	2.6	.00	0.0
License/lease	1.75	11.6	1.80	9.5	1.77	10.5	7.77	51.7
Total Cost	**15.07**	**100.0**	**18.97**	**100.0**	**16.83**	**100.0**	**15.03**	**100.0**

* All activities are defined and described in Lambert and Obermiller (1983, Appendix II, Part II).

Eastern Oregon are $16.83 per AUM, or $1.80 per AUM higher, on average, than comparable grazing costs on private grazing leases.[13]

Where are the significant differences in combined federal and private grazing lease costs in the Eastern Oregon data? On average, the direct fee/lease cost is much higher on private grazing leases, averaging $7.77 per AUM in 1990 prices and representing 51.7 percent of the total grazing cost on private leased grazing lands. In contrast, the grazing fee (adjusted for exchange of use agreements) on federal grazing lands was $1.77 per AUM in 1990 prices, representing 10.5 percent of the total grazing cost per AUM on combined federal grazing allotments.

The $7.77 per AUM lease cost in the Eastern Oregon survey data included the value of services provided by the landlord. Consequently, private grazing nonlease costs were, in many cases, substantially less than the corresponding federal grazing nonfee costs. Costs incurred by private lessees were notably lower for the following grazing cost activities: gathering and take-off ($1.56 versus $2.95 per AUM), management ($1.54 versus $4.14 per AUM), maintenance ($0.69 versus $2.04 per AUM), death loss ($1.58 versus $2.81 per AUM), and others.

Private lease agreements often include provisions for herd management and gathering prior to take-off by the lessor. Maintenance of structural improvements usually is done by the landlord--the lessor. A private lease arrangement may provide for the replacement by the lessor of livestock that die or are lost while on the private pasture or range. The aggregate value of these lease conditions is included in the lease rate. Therefore, on average, it would be expected that certain nonlease costs on private grazing leases would be less than the same types of nonfee costs on federal grazing permits.

Comparing the 1966 and 1982 Price Updated Data Bases

As has been discussed, the original 1966 Western Livestock Grazing Survey data are now 26 years old. Since 1966, there have been major changes in public law, agency regulations, public participation in federal land management planning, and other institutions, all of which would be expected to affect the structure of federal grazing land grazing costs. Simply price updating the 1966 data, as has been done by Nielsen (1982, 1991) and the Public Lands Council (1991), cannot be expected to capture the influence of institutional change on relative grazing costs.

[13]The price updated 1990 Eastern Oregon grazing costs include the grazing fee charged for the use of federal allotments. In 1990, the grazing fee was $1.81 per AUM, one cent per AUM higher than the grazing cost differential on federal versus private grazing leases. In other words, given the results of the Eastern Oregon grazing survey and the price updating methodology, if the grazing fee on the surveyed Eastern Oregon federal grazing allotments had been zero in 1990, the total forage use costs on combined federal and private grazing lands in the survey would have been the same.

For this reason, certain cost activities were combined in the 1966 westwide data base update (given in its original form in Tables 1 and 2) and the 1982 Eastern Oregon update (Table 5) to facilitate comparisons of structural change as manifest in per AUM grazing costs. In Table 1, "herding within operation" and "horse" costs were combined to form "routine management" costs in Table 6; "veterinary" costs were combined with "salt and feed" costs to become "salt, feeding, and vet" costs in Table 6; "fence maintenance" and "water maintenance" were combined to form "maintenance" costs in Table 6; "association fees" were combined with "federal grazing fee" to become "fees and rents" in Table 6; and "water", "development depreciation", and "other" costs were combined to form "other" costs in Table 6. The recombinations from Table 5 to create the cost activities listed in Table 6 are fewer and similar.

For at least two reasons, the comparisons by cost category in Table 6 are difficult to interpret. First, the updated 1966 data are westwide averages, while the updated 1982 data are for the Eastern Oregon survey only. For the two to be directly comparable, the "average" Eastern

Table 6. Differences in Major Categories of Grazing Costs Per AUM in 1990 Dollars for Federal Grazing Permits and Private Grazing Leases from Updated 1966 Westwide and 1982 Eastern Oregon Data Bases.

	Cost Per AUM in 1990 Dollars					
	Federal Grazing Permits			Private Grazing Leases		
Cost Category	1966 Data	1982 Data	1982 as % of 1966	1966 Data	1982 Data	1982 as % of 1966
Turn-out[a]	.29	1.23	424	.48	1.43	298
Gathering/Take-off[a]	.82	2.95	360	.64	1.56	244
Routine Management	2.36	4.14	175	1.08	1.54	143
Maintenance	1.58	2.04	129	1.47	.69	47
Salt, Feeding, & Vet	2.77	.39	14	3.62	.38	10
Death Loss	1.82	2.81	154	1.12	1.58	141
Fees and Rents	2.08	2.20	106	4.35	7.77	179
Other	1.08	1.08	100	.67	.06	9
Total Cost	**14.29**	**16.83**	**118**	**14.79**	**15.03**	**102**

[a] "Gathering/take-off" costs and "turn-out" costs are combined in Table 1 and expressed as "moving livestock to and from." They are separated in Table 6 based on the proportional contributions of the two activities observed in the Eastern Oregon data set.

Oregon surveyed rancher would have to run an operation structurally similar to the "average" westwide rancher. Second, the 1966 private land rental value ($1.79 per AUM in Table 1) updated to $4.35 per AUM in Tables 2 and 6 is a land charge only and does not include the value of the average bundle of services provided by the lessor in a private grazing lease arrangement. Consequently, several of the nonlease costs in the 1990 update of the 1966 data base would be expected to be higher than the corresponding values in the update of the 1982 data base--even if the westwide and Eastern Oregon survey data are comparable.

Differences in the Updated Survey Results

Looking first at the private lease data, the 1990 updated total grazing costs per AUM are remarkably similar. Using Nielsen's approach, the updated 1966 data base results in a 1990 value of $14.79 per AUM, while using the alternative approach, the updated 1982 data base yields a 1990 value of $15.03 per AUM--a 24 cent per AUM or two percent difference in the two estimates. This suggests that the basic structure of the private grazing land market may have changed little since 1966, and that in contemporary prices the total cash plus noncash grazing cost for privately owned and leased grazing lands is about $15 per AUM. The structures of the activity costs from the updated 1966 and 1982 data bases are quite different. With the exception of the very high supplemental feed and medicine cost from the 1966 survey update, most of the structural differences may be due to the "bare ground" nature of the lease rate in the 1966 data versus the land plus lessor services value in the 1982 Eastern Oregon survey.

The structural differences in the combined federal grazing cost data are less easily explained. In Eastern Oregon, it apparently is much more expensive to move livestock to and from the federal grazing allotment than is the case westwide, assuming both updated costs are reasonably accurate. However, in subsequent parallel analyses in other western states (Obermiller and Lambert 1984), results similar to those obtained in Eastern Oregon were observed. This suggests that the price index updated livestock movement costs from the 1966 study may understate current livestock movement costs by a substantial margin.

Another major difference is the smaller routine management cost in the 1966 grazing survey data base update. This may reflect structural change. Restrictions on livestock placement and herding within allotments have increased due to changes in regulations and restrictions since 1966. These changes would not be reflected in simple price updates of the 1966 survey results. The same logic applies to the lower death loss costs in the updated 1966 data. Since 1966, changes in predator control policy, noxious and poisonous weeds and associated control practices, and other factors probably have led to a higher incidence of livestock loss on federal grazing allotments. The much higher supplemental feeding and medicine cost in the 1966 update is enigmatic and is not consistent with contemporary rangeland livestock grazing management practices.

Summary: Differences and Similarities in Updated Total Costs

These structural differences notwithstanding, the overall per AUM grazing costs derived from the updates of the 1966 and 1982 data bases are similar. The updated Eastern Oregon survey data results are higher, by $2.54 per AUM, at $16.83 per AUM (versus $14.29 per AUM

from the 1966 data base update). The Eastern Oregon grazing cost estimate is 18 percent higher than the updated 1966 value. This difference is consistent with the institutional sources of change in death loss and routine management as just discussed.

The results of the price updates of the 1966 Western Livestock Grazing Survey results and the 1982 Eastern Oregon grazing survey suggest that structural changes since 1966 have occurred in the western public land dependent livestock industry. These changes may have been sufficient to alter the relative proportions of various sources of grazing costs on BLM and Forest Service grazing permits and leases.

Policy Implications

Since 1966, it may have become relatively more costly to graze livestock on federal versus private leased, pastures and rangelands in Eastern Oregon, and possibly in the western United States. If so, the relative increases in federal allotment grazing costs may have caused permit values to decline relative to deeded base property and private grazing land values. This would imply that the values of ranches with federal grazing permits may have declined relative to the values of ranches without grazing permits as a consequence of changes in agency grazing regulations and associated public policies (Torell and Doll 1991; Obermiller 1991b). Put differently, changes in federal grazing policies and regulations may have led to relative asset devaluation in the federal land dependent sector of the western livestock industry in Eastern Oregon. The Eastern Oregon case study does not provide comprehensive results applicable to all federal land dependent ranches. However, the results suggest a shift in relative grazing costs worthy of further study.

A second implication has current public policy overtones. Federal grazing fees, and perhaps the underlying permit system, will be the subject of Congressional inquiry in 1992--and probably for years to come. The intent of PRIA was to establish an administered pricing system using a formula that would maintain cost equality between permittees and nonpermittees in grazing livestock on federal and private rangelands. The Eastern Oregon case study results suggest that permittees' total grazing costs have increased relative to private sector total grazing costs since the Western Livestock Grazing Survey of 1966--even with PRIA in effect. Again, these case study findings need broader confirmation.

If the public policy in setting grazing fees is to maintain average cost equality in federal and private rangeland livestock grazing operations, it is necessary to repeat the 1966 public versus private land grazing cost survey using appropriate sampling techniques and statistical methodology. Structural changes in federal grazing policy and related resource administration since 1966 call to question the accuracy of current cost estimates based exclusively on changes in relative prices over the past 26 years.

Appendix

Summary of Results from the 1983 Eastern Oregon Grazing Survey

The Eastern Oregon Grazing Survey: A Case Study Approach

The questionnaire used in the 1983 Eastern Oregon grazing survey was patterned after that used in the 1966 Western Livestock Grazing Survey[14] and was designed to gather information that would allow Oregon State University Extension Service economists to calculate the permittees' cash and noncash costs associated with grazing livestock on land under four ownership patterns. Those four ownerships included grazing lands managed (1) by the Bureau of Land Management, (2) by the Forest Service, (3) by the U.S. Fish and Wildlife Service, and (4) by privately owned rangelands leased from other operators. The questionnaire used in the 1982 Eastern Oregon study is reproduced in Appendix I of the original report (Lambert and Obermiller 1983).

Survey Procedures

The grazing survey was not designed to gather information from a random sample of Eastern Oregon ranchers. Agricultural Extension agents in all Eastern Oregon counties with significant amounts of federal grazing lands were asked to compile lists of 10 to 15 ranchers in their areas who operated on federal grazing allotments, some of whom also ran livestock on privately leased grazing lands. The ranchers so identified were believed to keep detailed cost and ranch records. Therefore, the 1982 grazing cost estimates could not be statistically applied to all Eastern Oregon permittees, nor to all ranchers without reference to the holding of a federal grazing permit or license. The results reported in 1983 more nearly conform to a "case study" of federal and private grazing costs incurred by selected Eastern Oregon permittees.

Strategic Bias Control Procedures

In any survey in which the results may affect, or may be perceived to affect, the respondent's welfare, the possibility of "strategic bias" exists. While this possibility is of considerable concern in the valuation of public goods for which there is no market and for which "willingness to pay or sell" values are sought, it also may be relevant in the present instance (see, for example, Desvousger et al. 1983, and Schultz et al. 1982). Since the results of the grazing cost survey could be perceived by ranchers as influencing the amount they would pay for federal land forage, specifically the federal grazing fee, it is possible that ranchers could have strategically overstated the costs of utilizing federal forage supplies while understating the costs of utilizing private land forage supplies.

[14]The 1966 Western Livestock Grazing Survey form is reproduced on pages 421-451 of the 1969 "Review of Grazing Fees" House hearing conducted by the Subcommittee on Public Lands of the Committee on Interior and Insular Affairs.

In an effort to minimize the possibility of strategic bias, and based on experience gained in similar survey efforts in the past, answers which seemed unduly high or low were scrutinized in the course of the interview both on the particular question of concern and on subsequent questions dealing with similar categories of costs. In the coding of data, remaining "outlier" cost estimates were discarded.[15]

These procedures, as well as the survey results, suggested that bias in the reported results was not a significant problem. However, this did not imply that further attempts to evaluate the extent of possible bias in the reported results were unwarranted. Similarly, if the Eastern Oregon grazing cost study were to be repeated elsewhere, as subsequently was done, it would be important to provide cross-checks and objective verification of noncash cost estimates provided by respondents as in the original Eastern Oregon study.

Overview of the 1983 Eastern Oregon Grazing Survey Results

Of the 179 federal allotments and privately leased pastures for which data were gathered in the original Eastern Oregon grazing cost study, 14 questionnaires were found to be unusable for various reasons.[16] Statistical analysis was conducted on the data for the remaining 165 allotments. Characteristics of the surveyed population of Eastern Oregon ranchers are presented in Tables A-1 and A-2.

The 142 BLM and Forest Service cattle permits for which usuable data were collected represented about six percent of all active cattle permits authorized in Oregon by the two federal agencies in 1982. The 191,154 surveyed cattle AUMs constituted about 12 percent of all cattle AUMs used on Oregon BLM and Forest Service grazing lands in 1982, meaning that the ranchers who were interviewed had larger than average grazing permits. On average, the 78 BLM permittees had permits for 1,711 AUMs and the 64 Forest Service permittees had permits for 901 AUMs. Since in 1982 the average number of AUMs for both Oregon Forest Service and BLM permittees was about 700, it can be concluded that the surveyed Forest Service permittees were slightly larger than average while the surveyed BLM permittees were substantially larger than average.[17]

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[15]This is a standard procedure in the analysis of grazing costs. See, for example, Houseman et al. (1968) and Tittman and Brownell (1984).

[16]These numbers are exclusive of the four U.S. Fish and Wildlife Service surveyed allotments, of which two yielded otherwise usable data.

[17]This observation may be significant since as Houseman et al. (1968) demonstrated in their statistical analysis of the 1966 westwide grazing survey data, and as was demonstrated in the statistical analysis of the 1982 Eastern Oregon data, per AUM forage use costs decline as the size (in either AUMs or AUs) of the Federal grazing permit increases due to economies of size and spreading of fixed costs. As was shown in the analysis of the Oregon data for the 1982 grazing season, BLM livestock operators in Southeast Oregon who ran larger than average cattle operations (in terms of both the population of Oregon BLM permittees and the BLM permittees in the 1983 Eastern Oregon grazing survey), had per AUM forage use costs that were significantly lower than the comparable costs for BLM, National Forest, and private grazing land leases elsewhere in the state.

Table A-1. Sampling Information for 1982 Survey of Eastern Oregon Permittees' Cash and Noncash Grazing Costs.

County or Area	Number of Ranchers Interviewed	Number of Allotments/Pastures for Which Data Were Collected							
		Total				Usable			
		BLM	USFS	Private	USF&WS[a]	BLM	USFS	Private	USF&WS
Malheur	14	15	0	3	0	14	0	0	0
Baker	13	14	7	4	0	12	7	4	0
Grant	10	2	11	4	0	1	9	4	0
Harney	13	24	4	3	3	23	3	3	1
Lake	16	22	13	4	1	22	13	4	1
Northeastern Oregon (Wallowa, Union, Umatilla, & Morrow Counties)	10	0	12	6	0	0	12	5	0
Eastside Cascades	10	5	8	3	0	5	6	3	0
Crooked River National Grasslands (Gray Butte Grazing Association)	11	1	14	0	0	1	14	0	0
Total	**97**	**83**	**69**	**27**	**4**	**78**	**64**	**23**	**2**

[a] Fish and Wildlife Service, United States Department of the Interior.

Table A-2. Number of Animal Unit Months (AUMs) Included in the 1982 Survey of Eastern Oregon Permittees.

	Ownership		
County or Area	Bureau of Land Management	Forest Service	Private
Malheur	25,799	------	-----
Baker	7,027	7,863	2,766
Grant	680	10,145	4,370
Harney	35,324	2,336	3,127
Lake	60,291	9,588	4,839
Northeastern Oregon	-----	15,366	3,959
Eastside Cascades	4,352	6,552	1,260
Crooked River National Grasslands	42	5,809	-----
Total	**133,495**	**57,659**	**20,318**

Procedures Followed in Estimating 1982 Grazing Season Costs

Information on the noncash (as well as cash) components of grazing land use was collected, and therefore a common means had to be developed to convert information such as family (unpaid) labor, horse use, and lost animals into dollar values. The assumptions underlying these conversions appear in Appendix II of the original report.

The costs of using an allotment (or pasture) were converted to a dollar cost per permitted (or leased) animal unit month (AUM). Eleven line items were included in the grazing cost calculations, as described in Appendix II of the original report. These roughly corresponded to turnout activities at the beginning of the grazing season, gathering and take-off activities at the end of the grazing season, management and animal care associated with the cattle while they are on the allotment, maintenance of range improvements, costs resulting from livestock death losses while on the allotment or pasture, fees and rents, and other relatively minor activities.

After the various grazing activities were converted to their corresponding costs, the 167 usable cost records itemized in Table A-1 were placed in 22 groups distinguished on the basis

of land ownership (BLM, Forest Service, U.S. Fish and Wildlife Service, private) and geographic region (Malheur County, Baker County, Grant County, Harney County, Lake County, four Northeastern Oregon counties, a north-south strip along the east flank of the Cascades, and the Crooked River National Grassland in Central Oregon.

Average costs on a per AUM basis in 1982 dollars, by land ownership classification, are presented in Tables A-3, A-4, and A-5.[18] The standard deviations listed next to these average figures indicates the amount of variation that was present among the observed costs within each group.[19]

Rather than dealing in detail with the small numbers of observations in each of the 22 different groups, analysis of variance was employed to determine if aggregation of the data across counties would be appropriate. Results of this analysis indicated that, for the grazing cost observations on Forest Service allotments as well as private leased lands, the differences among counties were not statistically significant. Therefore, for all eight areas in which 64 Forest Service allotments were encountered, and for the six areas containing 23 private leases, the overall cost figures could be considered representative of all the Forest Service permittees, and of all those who leased private rangelands and pastures, in the survey.

Tests for the statistical equivalence of the grazing cost means over all of the BLM grazing districts and leases failed to exhibit the same similarities. Aggregation across all BLM grazing districts and leases therefore was unwarranted. Further tests on the 78 BLM observations supported grouping the observations into the following three categories aggregated on statistical (and tentatively geographical) grounds: (1) Malheur County and the one observation from the Grant County operator, and (2) Baker County and the scattering of observations along the east slopes ofthe Cascades from Klamath County northward to Crook County, and (3) Harney and Lake Counties.

Per AUM, grazing costs in 1982 prices for all five resultant groups (three BLM, one Forest Service, and one private) were as presented in Table A-6. Analysis of variance tests were conducted to see if there were significant differences among these five groups in the average grazing cost on Forest Service, BLM, or private grazing lands. The results showed no statistically significant differences among the costs of grazing on privately leased land, on Forest Service land, and on the BLM allotments in the Baker/Eastside Cascades group. However, costs were found to be significantly lower in the BLM allotments in Harney and Lake Counties and in Malheur County (including the one observation from the Grant County operator). The lower cost grazing areas are high desert terrain with "blocked in" federal land holding and scattered improved ranges.

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[18]Groups containing only one observation were excluded from Tables A-3, A-4, and A-5 to avoid the possible disclosure of privileged information. These observations were, however, included in the reported aggregation of results (Table A-6).

[19]The average costs reported in Tables 4a-4c and 5 were unweighted by permit size. It is a reasonable hypothesis that the size of the permit should influence forage use costs due to economies of size. Using the unweighted averages permitted explicit testing of the significance of this relationship, as subsequently discussed.

Table A-3. Per AUM Grazing Costs and Costs by Activity in 1982 Dollars of Grazing on Bureau of Land Management Lands in Eastern Oregon, by County or Region.

Activity	County or Area									
	Malheur n=14		Baker n=12		Harney n=23		Lake n=22		Eastside Cascades n=5	
	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.
Turn-out	.56	.44	.89	.73	1.06	1.12	1.49	1.95	.86	.08
Gathering and take-off	.83	.60	2.70	2.76	1.46	1.09	1.84	1.32	3.57	2.70
Management	1.08	.80	4.63	4.09	1.93	1.42	1.50	1.30	3.61	3.56
Miscellaneous	.40	.71	1.81	2.04	.78	.74	.72	1.11	1.49	.88
Meetings/paperwork	..52	.49	.65	.80	.19	.33	.17	.21	.35	.19
Salt, feed, med.	.24	.15	.50	.85	.41	.73	.43	.57	.20	.11
Death loss	2.15	.95	2.60	2.09	2.72	2.59	2.64	1.72	2.68	2.53
Other	.18	.31	2.81	5.86	.67	1.45	.53	1.15	.09	.18
Miscellaneous	.01	.05	.02	.06	.05	.04	0.00	0.00	.05	.09
Associate fees	.14	.39	0.00	0.00	0.00	0.02	0.00	0.00	1.80	2.20
License/lease	1.82	.10	1.73	.30	1.84	.10	1.86	0.00	1.86	0.00
TOTAL COST	**7.95**	**1.99**	**18.35**	**9.99**	**11.08**	**5.39**	**11.17**	**5.55**	**16.55**	**3.90**

Table A-4. Per AUM Grazing Costs and Costs by Activity in 1982 Dollars of Grazing on Forest Service Lands in Eastern Oregon, by County or Region.

Activity	County or Area													
	Baker n=7		Grant n=9		Harney n=3		Lake n=13		Northeastern Oregon n=12		Eastside Cascades n=6		Crooked River National Grasslands n=14	
	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.
Turn-out	2.40	1.80	.83	.39	.71	.01	1.27	.86	.78	.62	.46	.47	.60	.69
Gathering and take-off	4.73	4.59	4.56	3.06	2.06	.65	4.70	2.96	3.07	2.87	2.17	1.50	1.14	1.00
Management	4.33	3.52	3.63	1.79	2.68	.63	3.90	4.43	6.33	6.53	1.75	.61	4.50	5.74
Maintenance	3.65	3.42	2.36	1.61	1.38	.51	1.57	1.96	2.12	2.34	1.65	.67	.71	1.22
Meetings/paperwork	.26	.30	.07	.08	.26	.16	.20	.22	.28	.33	.13	.06	.27	.47
Salt, feed, med.	.18	.04	.14	.12	.14	.09	.34	.29	.40	.49	.28	.08	.47	.78
Death loss	2.59	11.97	1.58	.97	1.32	.46	2.82	2.15	1.86	2.27	3.20	1.40	.71	1.38
Other	.28	.34	1.40	3.75	.56	.80	.33	.45	.37	1.03	.10	.13	1.02	3.55
Miscellaneous	.09	.18	.02	.05	0.00	.00	0.00	0.00	.01	.04	.03	.06	0.00	0.00
Association fees	0.00	0.00	.64	.92	.41	.58	0.00	0.00	.34	.64	0.00	0.00	2.85	.20
License/lease	1.86	0.00	1.79	.12	1.86	.00	1.86	0.00	1.86	0.00	1.86	0.00	1.86	0.00
TOTAL COST	**20.38**	**8.85**	**17.04**	**8.10**	**11.38**	**.69**	**17.00**	**10.23**	**17.42**	**12.64**	**11.62**	**3.23**	**14.12**	**7.95**

Table A-5. Per AUM Grazing Costs and Costs by Activity in 1982 Dollars of Grazing on Privately-Owned Leased Lands in Eastern Oregon, by County or Region.

Activity	County or Area											
	Baker n=4		Grant n=4		Harney n=3		Lake n=4		Northeastern Oregon n=5		Eastside Cascades n=3	
	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.	Cost ($/AUM)	Std. Dev.
Turn-out	.77	.35	1.77	1.87	2.70	3.15	.60	.37	.85	.57	.73	.21
Gathering and take-off	.93	.69	2.41	1.67	.45	.43	1.21	.59	1.26	1.26	1.23	.30
Management	.17	.17	.90	.52	.76	.12	2.03	1.43	1.79	1.08	1.03	.44
Maintenance	0.00	0.00	.08	.13	.81	.57	.54	.14	1.73	1.64	.39	.39
Meetings/paperwork	.11	.17	.03	.04	0.00	0.00	.04	.07	.01	.02	0.00	0.00
Salt, feed, med.	.30	.51	.52	.75	.10	.10	.38	.22	.40	.34	.28	.16
Death loss	.95	1.07	1.80	.82	2.54	.63	1.22	.82	.75	.64	.69	.82
Other	0.00	0.00	.12	.21	.03	.05	0.00	0.00	.10	.19	0.00	0.00
Miscellaneous	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Association fees	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
License/lease	9.63	1.85	9.81	2.91	2.91	6.58	2.72	.40	11.27	6.69	6.38	1.49
TOTAL COST	**12.85**	**3.58**	**17.44**	**6.28**	**6.28**	**9.06**	**8.74**	**1.79**	**18.16**	**5.41**	**10.73**	**1.26**

Table A-6. Per AUM Grazing Costs and Costs by Activity in 1982 Dollars for Grazing on Bureau of Land Management, Forest Service, and Privately Leased Lands in Eastern Oregon.

Activity[a]	Group													
	Bureau of Land Management									Forest Service n=64			Private Leases n=23		
	Malheur/Grant n=15			Baker/Eastside Cascade n=18			Harney/Lake n=45								
	Cost ($/AUM)	% of Total Cost	Std. Dev.	Cost ($/AUM)	% of Total Cost	Std. Dev.	Cost ($/AUM)	% of Total Cost	Std. Dev.[b]	Cost ($/AUM)	% of Total Cost	Std. Dev.	Cost ($/AUM)	% of Total Cost	Std. Dev.
Turn-out	.54	6.8	.43	.86	4.9	.61	1.27	11.4	--	.99	6.2	1.02	1.18	8.4	1.59
Gathering and take-off	.81	10.2	.58	2.92	16.7	2.70	1.66	14.9	--	3.24	20.2	3.08	1.29	9.2	1.16
Management	1.15	14.5	.82	4.29	24.5	3.86	1.72	15.5	--	4.24	26.4	4.76	1.16	8.3	1.06
Maintenance	.49	6.2	.76	1.76	10.1	1.74	.75	6.7	--	1.82	11.3	2.13	.64	4.6	1.03
Meetings/ paperwork	.48	6.1	.49	.53	3.0	.68	.18	1.6	--	.22	1.4	.31	.03	0.2	.09
Salt, feed, med.	.29	3.4	.22	.40	11.3	.71	.42	3.8	--	.32	2.0	.46	.35	2.5	.44
Death loss	2.06	26.0	.98	2.48	2.3	2.25	2.68	24.1	--	1.94	12.1	1.95	1.27	9.1	1.02
Other	.17	2.2	.30	1.98	14.2	4.93	.60	5.4	--	.62	3.9	2.28	.05	0.4	.14
Miscellaneous	.01	0.1	.05	.03	0.2	.07	.01	0.1	--	.02	0.1	.07	0.00	0.0	0.00
Association fees	.13	1.6	.37	.50	2.9	1.41	0.00	0.0	--	.80	5.0	1.20	0.00	0.0	0.00
License/lease	1.77	22.4	.20	1.78	10.2	.25	1.82	16.6	--	1.85	11.5	.05	8.06	57.5	5.14
Total Cost	**7.92**	**100.0**	**1.92**	**17.52**	**100.0**	**8.54**	**11.12**	**100.0**	**5.53**	**16.06**	**100.0**	**9.50**	**14.02**	**100.0**	**6.26**

[a] All activities are defined and described in Lambert and Obermiller (1983, Appendix II, Part II).

[b] Due to a computer space memory limitation, standard deviations could not be computed for the Harney/Lake permittee activity costs.

Differences in Average Grazing Costs by Cost Activity

Even with the similarities in the average grazing costs among three of the five groupings, the distributions of these costs by activity appeared to vary. The greatest proportion of the per AUM cost of private leased rangeland was attributable to the cost of the lease itself--slightly more than $8.00 per AUM, on average, in 1982. The cost of the federal allotment grazing lease was close to the $1.86 per AUM grazing fee charged by the federal agencies in 1982.[20] Major cost savings associated with private leases were reduced death losses of stock , fewer requirements for lessee management of the animals, and lower costs of maintenance of structural improvements on private leased grazing lands.

Turn-out costs were relatively low across all five groups of Eastern Oregon ranchers. In many cases, turn-out required only the opening of gates or the driving of cattle a short distance from their last pasture. Gathering and take-off costs were generally much higher than turn-out costs. For the 64 Forest Service observations, an average of about 20 percent of the total grazing cost was due to the gathering and take-off activity.

In all of the groups except for the Malheur County area, cattle management costs were much higher on the federal grazing lands than on the privately leased lands. Average number of trips to the allotment during the grazing season, distance travelled to the allotment, and horse use were usually greater when cattle grazed on federal allotments.

An issue of much concern to the livestock industry since the adoption of the BLM's rangeland improvement policy in the fall of 1982 had been the future cost to the permittees of maintaining structural improvements on their public land allotments. Unfortunately, the grazing data collected in Eastern Oregon were for the 1982 grazing season, and hence the effect of the change in improvement policy was not reflected in the original Eastern Oregon data set.[21]

Sources of Differences in Grazing Costs

An explanation was sought for the wide variation in costs seen in the observations. Among the factors which were felt to have an influence on the per AUM grazing costs were the size of the permit or lease, the number of animals in the allotment, the length of the grazing season, the distance of the allotment from the headquarters ranch, and the distance from the

[20]Reported values were slightly less than $1.86 because of exchange of use AUMs available to some permittees.

[21]Elsewhere, the BLM has estimated that the policy change, on average, increased BLM permittees' maintenance costs by $1.00 per AUM in 1982 prices. If this estimate applies in the Eastern Oregon case, the implication is that the total forage use costs per AUM for BLM permittees, as appear in Tables A-3, A-4, and A-5, understated actual costs in subsequent years by $1.00 per AUM in 1982 prices.

last pasture or allotment in which the cattle grazed.[22]

Preliminary analysis of the data showed that the size of the permit in AUMs did not exert as great an influence on grazing costs as did the number of animals grazed (AUs).[23] Results were further improved when the length of the permitted grazing season was included as an explanatory variable. Similarly, even though the distance the animals had to travel from their last pasture did exert a statistically significant positive influence (at the 95 percent level of confidence) on the per AUM grazing cost, the distance from the home ranch to the allotment was found to have been an even more important factor.

Thus, the analysis examined the extent to which the observed variation in per AUM grazing costs could be explained by the number of animal units in the allotment or pasture (AUs), the length of the grazing season (WEEKS), and the distance from the headquarters ranch (DISTHQ). All of these independent variables were initially modified by the locational and ownership characteristics of the different groups. Upon testing, however, it was found that these characteristics had little significant impact on the influences of the explanatory variables. Therefore, these interaction effects were deleted from the model. Locational and ownership characteristics of the data were only retained to test their influence on the intercepts of the regression equations.

Factors Significantly Affecting Per AUM Grazing Costs

The results of the regression analysis on the 1982 Eastern Oregon grazing cost data are reported in Table A-7. The dependent variable in all cases was the grazing cost per AUM associated with the permit or of the private grazing lease. The constant term represented the intercept of the regression plane and was, in all cases, significantly different from zero. Since the interaction effects were deleted from the model, the coefficients on the three dependent variables were the same for all models (as were the associated t-values reported in parentheses). The following interpretations could be placed on the coefficients listed in Table A-7.

(1) For the sample of 165 allotments and pastures included in the 1982 Eastern Oregon survey, increasing the number of animal units in the allotment by one animal would have caused a decrease in the grazing cost per AUM of using that allotment by $0.0034 (or 0.34 cents) in 1982 prices;

(2) Similarly, the grazing cost per AUM was inversely related to the length of the grazing season. A one week increase in the length of the permitted grazing season reduced the grazing cost per AUM by $0.1861 (or about 19 cents) in 1982 prices;

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[22]The factors responsible for differences in grazing costs have been recognized elsewhere. See, for example, the Bureau of the Budget (1964), Houseman et al. (1968), and the Secretaries of Agriculture and the Interior (1977).

[23]Ordinary least squares (OLS) regression analyses were conducted on various combinations of these variables. In addition, dummy variables were introduced to account for the geographical and land ownership groupings in which the data were placed.

Table A-7. Regression Results for Per AUM Total Cash and Noncash Grazing Costs, in 1982 Dollars, Incurred by Permittees in Grazing on Bureau of Land Management, Forest Service, and Privately Leased Lands in Eastern Oregon and Eastern Oregon Subregions.

	Variable (T-Value in Parentheses)				Number of Observations
	Constant	AUs	WEEKS	DISTHQ	
	--- Ordinary Least Squares Parameter Estimates----				
Bureau of Land Management					
Malheur/Grant	12.4707 (4.655)	-.0034 (-2.054)	-.1861 (-2.359)	.0742 (3.015)	15
Harney/Lake	14.0879 (7.774)	-.0034	-.1861	.0742	18
Baker/Eastside Cascades	19.9420 (8.961)	-.0034	-.1861	.0742	45
Private Leases	15.7526 (7.548)	-.0034	-.1861	.0742	23
Forest Service	18.6093 (11.195)	-.0034	-.1861	.0742	64
	-----Weighted Least Squares Parameter Estimates-----				
Forest Service	16.0890 (5.33)	-.0060 (1.659)	-.1792 (1.379)	.1495 (3.409)	64

(3) The distance from the headquarters ranch exerted a positive influence on grazing costs. When the other variables were held constant, each additional mile of distance between the ranch headquarters and the allotment or pasture added $0.0742 (or about 7 cents) to the grazing cost per AUM in 1982 prices.

The results just reported did not accurately describe the cost relationships on Forest Service allotments due to a statistical problem that is commonly found with data of the sort collected in the Eastern Oregon grazing survey. That problem (heteroskedasticity) was overcome by applying a more advanced form of analysis (weighted least squares) to the Forest Service data.[24] Coefficients derived using this alternative approach also are reported in Table A-7.

Since the data were transformed by this procedure, direct comparison of the Forest Service coefficients with those obtained for the remaining four groups was not possible. However, the same general relationships held. Costs per AUM declined with increases in the number of animal units (at the 90 percent level of confidence) and increased with the distance from the home ranch. Although not significant, there appeared to be a slight negative relationship between the length of the grazing season and the average grazing costs on Forest Service grazing allotments.

The results of the 1983 Eastern Oregon grazing survey may be summarized as follows. Grazing costs per AUM for the 165 pastures and allotments in the study were influenced by three factors. Costs tended to decline (1) with increases in the number of animals in the allotment and/or (2) with increases in the length of the grazing season. (3) Increasing distance from the home ranch to the grazed federal allotment or private pasture increased the costs associated with the use by livestock of these allotments and pastures.

Conclusions from the 1982 Eastern Oregon Grazing Survey

The results reported by Lambert and Obermiller in 1983 suggested avenues for further inquiry. Factors were identified that influenced cash and noncash grazing costs, and these costs were found to vary, on either an activity or an average grazing cost basis, among certain areas in Eastern Oregon. On economic grounds, this finding gave cause for questioning either the efficiency (in the sense of maximization of producer and consumer surplus) or the distributional equity among all permittees of a single federal grazing fee uniformly charged to all Forest Service and BLM permittees. The results offered no evidence that the surveyed permittees uniformly enjoyed appreciably lower costs of grazing on their federal grazing allotments than they did on their leased, privately owned rangelands. As would be expected, with a single grazing fee charged on federal grazing allotments that differ in productivity, topography, accessability, etc., average federal rangeland grazing costs could be higher or lower than corresponding costs on private leased grazing lands on a case-by-case basis.

[24]Each observation was multiplied by the square root of the number of animal units associated with that observation.

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