INFLUENCE OF BEEF CATTLE PRICES ON BLM GRAZING POLICY IMPACTS

by
Gerald Marousek
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ABSTRACT

Beef cattle price fluctuations were incorporated in analyzing rancher impacts of reduced BLM grazing allotments. Ranch budgets in five Idaho resource planning areas showed diverse effects from varying permit levels, depending on beef price and role of BLM forage. Results reveal complications of uniform national policy for administering BLM grazing.

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INFLUENCE OF BEEF CATTLE PRICES ON BLM GRAZING POLICY IMPACTS[1/]

Almost since the imposition of grazing regulations on Forest Service and Bureau of Land Management (BLM) lands cattle ranchers in the western states have had disagreements with the two organizations over the use of public rangelands. The most recent dispute, the Sagebrush Rebellion of the 1970s, stemmed from cattlemen's protest concerning reduced grazing on federal rangelands administered mainly by the BLM. For instance, between 1947 and 1976 BLM reduced domestic livestock grazing permits from 14.9 million animal unit months (AUMs) to 10.2 million AUMs, a 31% reduction, on public lands in the 11 contiguous western states (Godfrey and Nielsen 1981). More recently BLM has proposed 20% to 48% grazing reductions for specific planning areas in its environmental impact statements (Godfrey and Nielsen 1981; U.S.D.I. 1980, p. 89; Chambers 1979).

BLM's primary reason for reducing livestock AUMs has been to improve vegetation on deteriorated public lands. Several studies and reports provided the basis for the BLM action (Comptroller General 1982, p. 4). In 1973 only 17% of BLM's rangeland in the West was classified as excellent or good while 73% was classified as fair or poor (Comptroller General 1977, p. 4). On the basis of such findings BLM concluded that these less than desirable range conditions mean a diminishing quality and availability of forage for domestic livestock and wildlife, and inferior watersheds.

In Idaho, where more than 1500 cattle ranchers graze one-fourth million cattle nearly one million AUMs annually on BLM lands (USDI 1979), a reduction in BLM grazing permits will affect a significant segment of the range cattle industry. These operations require a feed source throughout the year and BLM, for the most part, supplies spring-summer and spring-fall grazing while the

Forest Service provides mostly summer grazing. Privately owned, privately leased and state leased lands furnish forage for the remainder of the year (Sharp and Sanders 1978, p. 32).

Ranchers in other western states are confronted with a situation similar to Idaho's. A reduction in AUMs on BLM lands requires that they either reduce cattle numbers, purchase more feed, improve private rangelands and/or shift cropland to irrigated pasture or hayland. All of these activities decrease operators' net returns since reducing cattle numbers usually lowers gross receipts more than costs, purchasing feed and converting cropland are expensive and improving deeded rangeland in order to increase forage production has limited potential and is costly. Net returns could be maintained only if beef production per cow or beef cattle prices increased enough to counter the losses (C.A.S.T. 1974). In essence, for operators who greatly depend on public grazing, a cut in AUMs would cause a reduction in their operations in terms of year-round grazing capacity, cow numbers, income and assets. Ultimately, an increase in AUMs should enhance ranchers' year-round grazing capacity and income if BLM can rehabilitate the rangelands to produce more forage.

Grazing fees have been another controversial issue on public rangelands. Since they were introduced on Forest Service lands in 1906 and on BLM lands in 1936 the majority of western cattlemen have believed the fees were too high, while other special interest groups such as environmentalists have believed they have been too low (Hooper 1967). In trying to reconcile this controversy federal legislation has sought to achieve two objectives: that the grazing fee system collect a "fair market value" for the forage consumed on western federal lands and that the fees be equitable for the public and the ranchers who use these lands (U.S.D.A. & U.S.D.I. 1977, pp. 1-7, 1-8).

The Public Rangeland Improvement Act of 1978 (PRIA), encompasses these

two objectives for establishing a grazing fee formula (Appendix). The formula includes a "fair market value" of $1.23 per AUM for public lands, adjusted yearly by the same percentage as the change in fees charged on western private grazing lands. The "fair market value" is also adjusted annually by a beef price index and a prices paid index, designed to help prevent ranchers from being "forced out of business" when beef prices are low and production costs are high (U.S.D.A. & U.S.D.I. 1982, p. 1-1).

McCarl and Brokken (1985) recently evaluated eight alternative grazing fee systems, concluding that further consideration be given a simplified forage value index system, an administrative cost system and an open eligibility bidding system. They did not, however, address the impacts on users of changing permit and fee levels under the PRIA formula.

The Problem

In 1981 and 1982 BLM prepared environmental impact statements (EIS) for five resource planning areas in southern Idaho as part of the land use planning process to improve soil, vegetation and water resources along with increasing forage for livestock and wildlife (Figure 1). The economic analysis for the proposed grazing management programs estimated the effects on cattle operators' returns from changes in BLM forage permit level. The enterprise budgets used 1977-1979 beef cattle prices to represent a long-run average. The authors conceded, however, that the three year average may not depict the wide range in cattle prices that can occur over an entire cattle cycle (Gee 1981).

The purpose of the study reported here was (1) to determine the impacts on herd size, feed sources and economic returns for changes in BLM permit levels over the most recent beef cycle and (2) to evaluate the effectiveness of the PRIA fee formula in achieving the goals of "fair market value" for BLM forage and preventing ranchers from being "forced out of business" when beef prices are low.

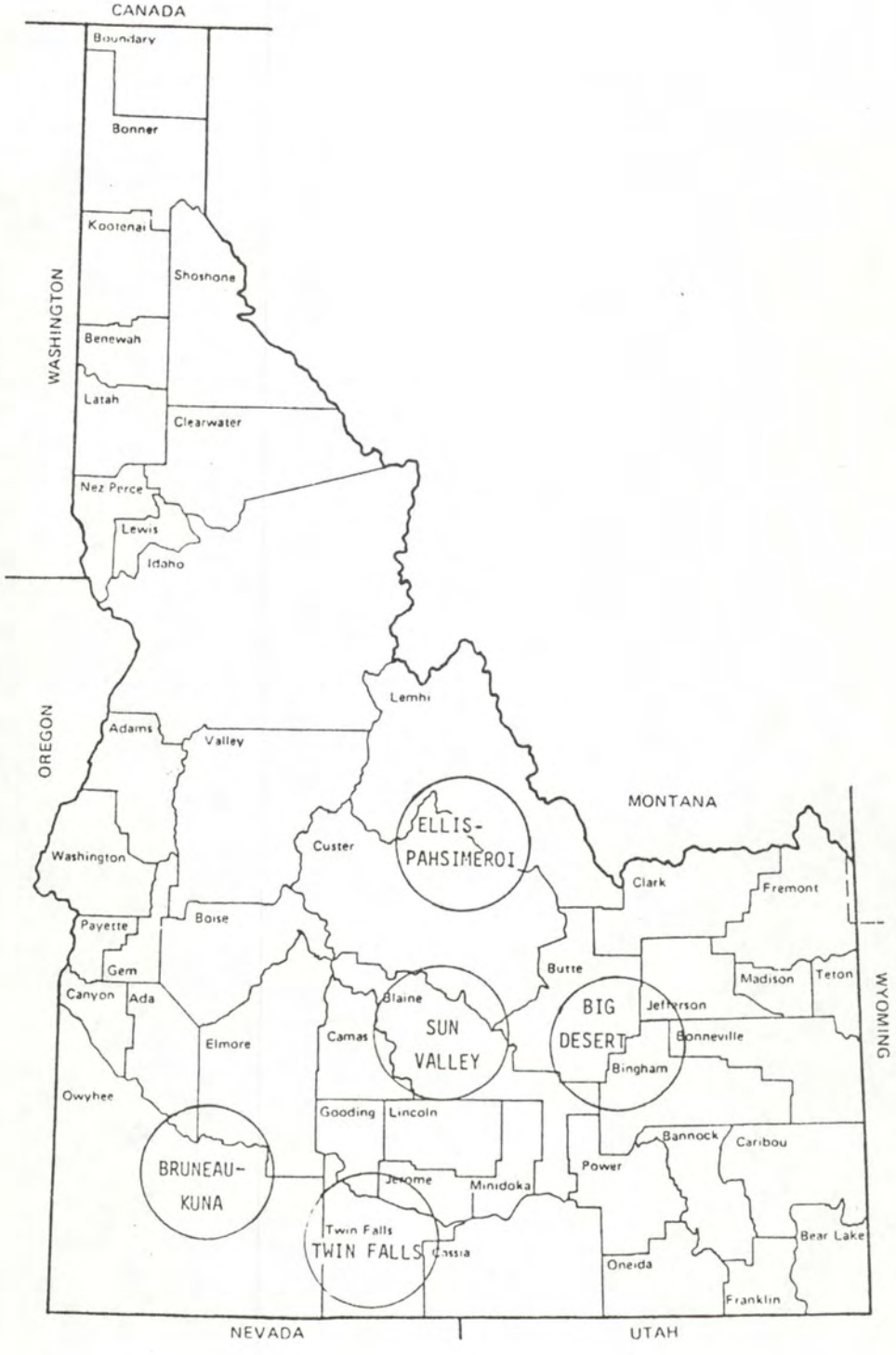

Figure 1. BLM Rangeland EIS Areas, Idaho, 1981 - 1982.

Procedures

The typical beef cattle cycle lasts from 9 to 12 years. It is characterized by three stages: rapid growth, deceleration and turnaround. The last beef cattle cycle began with the turnaround in 1967 and continued through 1979 (Beale et al. 1983, pp. 3-4).

Beef cattle prices, by classes, were adjusted to 1982 dollars for each year of the 1967-1979 cattle cycle. Class prices were weighted by marketing percentages to determine the average annual price on a constant (1982) basis (U.S.D.A. Ag. Prices, Idaho Range Sales, Livestock and Meat Statistics, various issues). High and low price years for the 1967-1979 beef cycle were 1973 and 1974, respectively.

The EIS enterprise budgets were updated with 1982 beef cattle prices and costs of production (Table 1). These data, along with average, high and low beef prices for the 1967-1979 beef cycle, were used in a profit optimizing linear programming model to estimate change in herd size, feed sources used and returns for cattle operations confronted with an increase or decrease in BLM permit level at various stages of the cycle.

BLM permit levels were varied by +/- 10%, +/- 25% and +/- 50%, adjustments plausible, yet significant enough to affect herd size and returns. BLM grazing fees per animal month (AM) were calculated in constant (1982) dollars for each of the cattle price scenarios, assuming the PRIA formula had been in effect. [2/]

Past evidence indicates that public grazing fees have not been priced at "fair market value" because many grazing permits have been sold for a pecuniary amount when transferred from one livestock operator to another (Hooper 1967, Roberts 1967, Nielsen 1972, Torell 1985). Grazing permits acquire monetary value when the price of the public grazing fee is less than the marginal

Table 1. Summary of Beef Cattle Enterprise Budgets Using BLM Grazing, Idaho, 1982.

Area[1]	Size[2]	BLM Grazing[3]	Receipts		Feed Costs		Cash Costs Excluding Feed		Other Costs[4]		Return above Cash Costs		Return to Land, Risk & Management	
			Total	$/Cow	Total	$/Cow	Total	$/Cow	Total	$/Cow	Total	$/Cow	Total	$/Cow
1	136	10; Sp	$ 30,404	224	$ 11,760	86	$ 15,387	113	$ 26,479	195	$ 3,260	24	$ -23,219	-170
1	608	9; Sp	125,533	206	58,982	97	63,546	104	99,697	164	3,005	5	-96,692	-159
1	144	4; Sp, S, F	32,235	224	13,247	92	15,898	110	27,075	188	3,090	21	-23,985	-167
1	393	25; Sp, S, F	84,154	214	34,757	88	34,470	88	60,578	154	14,927	38	-45,651	-116
2	53	35; Sp, S, F, W	13,684	258	3,478	66	5,998	113	10,537	199	4,208	79	-6,329	-119
2	243	28; Sp, S, F, W	56,157	231	21,828	90	28,701	118	35,743	147	5,628	23	-30,115	-124
2	1,232	24; Sp, S, F	276,670	225	121,910	99	157,246	128	178,349	145	-2,486	-2	-180,835	-147
3	165	9; Sp, F	39,400	239	16,020	97	20,245	123	30,929	187	3,135	19	-27,794	-168
3	112	29; Sp, S, F	25,752	230	9,732	87	12,994	116	20,265	181	3,026	27	-17,239	-154
3	87	14; Sp	19,933	229	8,410	97	8,986	103	18,114	208	2,537	29	-15,577	-179
3	535	25; Sp, S, F	108,565	203	53,446	100	57,585	108	83,339	156	-2,466	-5	-85,805	-160
3	407	7; Sp, F	96,855	238	32,273	79	36,500	90	74,438	183	28,082	69	-46,356.	-114
4	49	12; S	11,476	234	4,265	87	5,818	119	11,551	236	1,393	28	-10,158	-207
4	185	6; S, F	41,554	225	16,092	87	19,158	104	33,554	181	6,304	34	-27,250	-147
4	569	4; S, F	123,247	216	47,804	84	55,473	97	81,492	143	19,970	35	-61,522	-108
4	2,489	1; S, F	505,986	203	248,967	100	227,017	91	311,645	125	30,002	12	-281,643	-113
5	268	7; S	57,931	216	22,145	83	29,428	110	44,281	165	6,358	24	-37,923	-142
5	55	23; Sp, S	12,070	219	4,547	83	6,048	110	12,059	219	1,475	27	-10,584	-192
5	192	15; Sp, S, F	41,025	214	15,088	79	20,245	105	34,428	179	5,692	30	-28,736	-150
5	701	15; Sp, S, F	144,357	206	66,394	95	68,972	98	106,892	152	8,991	13	-97,901	-140
5	1,196	25; Sp, S, F, W	245,296	205	99,793	83	102,340	86	172,329	144	43,163	36	-129,166	-108
5	346	17; Sp, F, W	74,399	215	27,259	79	32,162	93	57,906	167	14,978	43	-42,928	-124

[1] Area 1: Big Desert Planning Unit; Area 2: Bruneau-Kuna Planning Unit; Area 3: Ellis-Pahsimeroi Planning Unit; Area 4: Sun Valley Planning Unit; Area 5: Twin Falls Planning Unit.

[2] Number of cows in the herd.

[3] Percent annual feed and seasonal dependency on BLM lands. Sp = Spring; S = Summer; F = Fall; W = Winter.

[4] Other costs are family labor, depreciation and interest on investment except land.

value product (MVP) of public grazing. MVP is defined as the added return that is received from the last AM of public grazing consumed. The permit value will then equal the sum of the present value of the future differences between the MVP of public grazing and the grazing fee. The reason for the fee being less than the MVP of grazing is the public grazing fee system is not a free competitive market, since the federal government controls the amount of the fee and restricts who can use the forage. If the public forage was placed on a free competitive market the fee would be bid up to the price which equals the MVP of grazing (Nielsen 1972).

Shadow pricing was used to determine the MVP of BLM forage under various return specifications as a measure of the "fair market value" fee formula goal. Grazing fees collected as a percentage of ranchers' gross receipts under the several cattle price scenarios were used to assess the goal of helping prevent cattle operators from being "forced out of business" when beef prices are low.

Results

Herd Size Effects from Changing Permit Levels

When a decrease in BLM forage occurs, net returns are optimized by decreasing herd size for all 22 budgets. It is not economical to maintain initial herd size by purchasing hay to totally compensate for BLM forage reduction.

When there is an increase in BLM forage most operators will benefit by increasing herd size. However, two rancher groups, using BLM forage only two months of the year for less than 10% of total forage needs, increase herd size by only one cow. Any significant increase in their herd size would be uneconomical because they would have to purchase hay ten months of the year for the additional cows. The remaining 20 groups, which have significant increases in herd size, are dependent on BLM forage for at least four months of the year.

The optimal decrease or increase in herd size is closely related to the cattle operation's dependency on BLM rangeland as a feed source. The R^2 values indicate a strong correlation between change in herd size (dependent variable) and rancher's dependency on BLM when the permit level is varied (Table 2). For example, a 10% decrease in AMs will invoke an average reduction in herd size of .1211 times the percentage dependency on BLM rangeland as a feed source. On the other hand, if the cattle operation is 20% dependent on BLM forage as a feed source then a 50% increase in BLM AMs would allow the rancher to optimize herd size by increasing it about 12.57%. The regression coefficients for increases in BLM forage permits have a slightly greater absolute value than those for the same percentage decreases, indicating that herd size is slightly more sensitive to allotment increases than to decreases.

Effects on Hay Purchases

If herd size is reduced as a result of a cut in BLM forage allotment, feed requirements would be expected to drop also, with opposite effects for allotment increases. This was the case, with two exceptions: two groups of ranchers optimize returns by purchasing more hay when the BLM forage permit level is reduced; one of these two also optimizes returns by purchasing less hay when the permit level is increased. These two situations differ from the others in that only these groups graze cattle during the winter months on BLM lands and also have a high summer grazing dependency on deeded land (a noncash cost in the budgets). Hence it is economical to purchase more hay to offset some of the forgone BLM forage during the winter months to fully use the deeded land. It is also economical for them to purchase approximately the same amount or less hay when the permit level is increased, since BLM forage is being provided during the winter months when hay is normally fed.

Hay purchases were decreased by the two groups for which it is uneconomical

Table 2. Effects of Varying BLM Permit Level on Herd Size by the Percentage Dependency on BLM Forage.

Percentage Change in BLM AMs	Regression Coefficient *	95% Confidence Interval	R^2
-10%	-.1211	-.1394 to -.1028	.71
+10%	.1293	.1062 to .1416	.75
-25%	-.3005	-.3352 to -.2659	.79
+25%	.3160	.2695 to .3626	.73
-50%	-.5981	-.6535 to -.5428	.84
+50%	.6285	.5431 to .7138	.75

* Significant at the 5% level.

to increase herd size when the BLM forage permit level is increased. The reason is that both groups can substitute BLM grazing for hay in April when they use both feed sources.

Other feed sources may be reduced with a change in BLM permit level. There are two reasons: (1) when the BLM forage permit level is decreased other feed requirements are lowered also, since the herd size has been reduced; (2) when the permit level is increased BLM forage may be substituted for other feeds, since BLM forage is one of the most economical feed sources available.

Returns under Different Prices and Permit Levels

Return above cash costs is defined as the money remaining for family labor, depreciation of assets, interest on investment and return to land, risk and management, after cash costs have been paid.

Initial Returns: Four Price Scenarios. Wide fluctuations in return above cash costs occur at different stages of the cattle cycle (Table 3). For the majority of groups return under the low price scenario is substantially less than under 1982 prices, even though beef cattle prices are similar. The large difference occurs when a group is highly dependent on hay purchases and public grazing, which cost nearly twice as much under the low price scenario as under 1982 prices. Return above cash costs under average prices ranges upward from three times greater than under 1982 prices; return above cash costs under the high price scenario is about twice that under average prices.

Average Prices. Increasing the BLM permit level improves return above cash costs under average prices and decreasing the BLM permit level lessens that return for all 22 groups. [3/] For 16 groups, decreasing the permit level has more effect on return above cash costs than increasing the permit. The reason is that hay purchases rise more when the permit level is expanded than they drop when it is contracted. Other feed sources are also reduced when decreasing the BLM permit level but they cost less than purchased hay.

Table 3. Effects on Cattle Ranchers' Return Above Cash Costs Under Four Price Scenarios When Varying BLM Permit Level by 25%.

Budget No. + AM Permit Level →	Average Prices			1982 Prices			High Prices			Low Prices		
	Initial Return	Change in Return		Initial Return	Change in Return		Initial Return	Change in Return		Initial Return	Change in Return	
	Initial	-25%	+25%	Initial *	-25%	+25%	Initial	-25%	+25%	Initial	-25%	+25%
1	$ 22,094	$ -1,092	$ 620	$ 3,398	$ -493	$ 748	$ 45,582	$ -1,763	$ 923	$ 4,029	$ -372	$ -591
2	71,329	-3,002	1,545	3,020	-658	2,411	166,473	-6,413	1,108	-15,611	1,370	-295
3	22,075	-265	151	3,068	-40	-69	47,024	-680	566	2,334	344	-464
4	63,164	-6,018	3,957	14,881	-2,147	544	126,007	-11,964	9,859	5,643	2,088	-4,856
5	13,352	-622	622	4,746	-274	667	24,886	-1,165	1,128	3,487	50	-651
6	30,597	-3,386	3,386	5,572	-1,327	853	72,431	-6,682	6,728	-12,251	893	-167
7	114,610	-15,905	15,905	-2,868	-6,899	6,424	320,011	-27,418	27,466	-98,695	-2,446	3,180
8	26,654	-716	673	3,164	-131	15	56,336	-1,699	1,663	91	743	-675
9	18,864	-1,615	1,011	3,020	-399	-170	38,167	-3,704	3,290	543	1,408	-2,601
10	15,193	-1,092	916	2,429	-551	394	30,691	-1,736	1,967	2,902	-439	-662
11	62,144	-4,838	4,381	-2,360	-709	1,886	143,979	-11,714	8,243	-12,038	5,452	-2,388
12	82,195	-1,394	1,395	28,034	-521	614	159,110	-2,926	2,916	19,568	680	-823
13	8,764	-465	220	1,464	-229	78	17,900	-730	450	1,548	-178	-163
14	32,550	-629	522	6,339	-302	194	65,281	-981	986	6,990	-214	-130
15	97,668	-579	370	19,700	-247	2,544	195,421	-983	719	22,467	-77	-4,384
16	323,214	-1,359	1,359	30,026	-350	-1,685	718,812	-2,930	3,128	-22,197	1,032	2,093
17	60,997	-1,579	760	6,348	-459	328	95,715	-2,200	757	5,715	-219	891
18	9,692	-871	649	1,988	-435	306	19,171	-1,353	1,334	1,818	-330	-487
19	30,518	-1,199	1,199	5,735	-288	210	62,342	-2,710	2,717	3,315	1,061	-941
20	49,607	-1,920	1,667	8,985	536	425	193,813	-9,490	9,118	-27,898	2,786	-4,908
21	184,498	-18,200	17,484	43,140	-8,720	8,646	366,183	-27,797	27,017	9,060	-6,609	4,902
22	59,872	-4,960	4,515	15,041	-2,965	2,789	116,799	-5,908	5,436	10,552	-4,849	3,990

* These values differ somewhat from those in Table 1. because the programming model computed cow herd size beyond whole numbers.

For the other six groups, increasing the BLM permit level has the same impact on return above cash costs as decreasing it.

1982 Prices. For 18 of the 22 groups there is a direct relationship between a change in the BLM permit level and return above cash costs under 1982 prices. In most cases the change in return under 1982 prices is less than under average prices. This is because 1982 beef prices are about 40% less than with average prices, while cash costs are approximately the same under both scenarios. For three groups expanding the permit level decreases return because costs per cow increase more than receipts when the herd size is enlarged.

High Prices. Under the high price scenario expanding the permit level increases return above cash costs and reducing permits decreases return in all budgets, nearly always with a greater change than under average prices. The reason is the same as under 1982 prices, although in this situation cattle prices are about 30% higher.

Low Prices. Under the low price scenario raising the BLM permit level decreases return above cash costs in most cases, while lowering the level increases return in more than one-half of the budgets. The reason for the contradiction between this scenario and the other three is that public grazing fees and purchased hay prices are now the highest while beef cattle prices are lowest. The combination of these two factors, high feed costs and low beef cattle prices, causes a greater change in cash costs than in receipts per cow when the permit level is varied. When permits are increased high priced hay must be purchased along with the higher grazing fees to support the larger cattle herd, while cash receipts are low. When the permit level is decreased less hay is purchased which saves more in feed costs than is foregone in cash receipts.

Returns decrease for several groups under low prices when the permit level

is either decreased or increased. These groups have one thing in common: either they do not purchase hay at the initial permit level and thus cannot decrease hay purchases, or they do not significantly reduce hay purchases with a drop in permits. Therefore they cannot reduce costs by purchasing less high priced hay when permits are reduced. They do, however, lose revenue from having a smaller herd that produces less beef. Finally, several budgets showed a direct relationship between changes in permit level and return.

Return to Land, Risk and Management. This return is the income available after family labor, depreciation and interest on investment except land have been subtracted from return above cash costs. It shows the effects of these costs with a change in BLM permit level. In many cases, increasing the permit level invokes a positive change in return above cash costs but results in a negative change in return to land, risk and management under the same price scenario. Conversely, decreasing the permit level may result in a negative change in return above cash costs but show a positive change in return to land, risk and management. This occurs when the change in the added cost categories is greater than the change in return above cash costs.

The longer run analysis (including costs of family labor, depreciation and interest on investment except land) accentuates the impact of price-cost relationships. Thus, returns to land, risk and management, when varying BLM permit levels over the beef cattle cycle, are even more diverse than returns above cash costs.

Grazing Fees and Ranchers' Gross Receipts

One problem with the PRIA grazing fee formula is that it bases a given year's fee on the previous year's beef prices and production costs. For example, the grazing fee for the low price year of the last beef cattle cycle (1974) is based on prices for the previous year, which is the cycle's high price year. Hence if the PRIA grazing fee formula had been used in 1974,

producers would have been confronted with low beef cattle prices and high public grazing fees. In 1973 they would have paid a grazing fee more closely corresponding to the high beef cattle prices received that year.

Grazing fees paid as a percentage of gross income are a measure of the relative cost of using BLM forage. For the 22 producer groups this value was 3.4 to 4.4 times as large in the beef cycle's low price year, compared to the high price year (average: 3.8). By this measure the PRIA formula does not appear to help prevent beef cattle producers from being "forced out of business" when beef prices are low.

There is a high correlation between BLM grazing fees as a percentage of gross income and cattle operators' percentage dependency on BLM land as a feed source (Table 4). Under high prices and initial BLM permit level the regression coefficient is .095, signifying that the mean value of the 22 groups' grazing fees as a percentage of gross income equals .095 times a group's dependency on BLM forage. Under low prices that figure rises to .280, a 195% increase over the coefficient under high prices. Thus the PRIA formula's inability to reflect beef cattle prices is further magnified by the importance of BLM forage in ranchers' operations.

Value of BLM Forage

In order to determine if BLM is charging "fair market value" for public grazing on federal lands in Idaho, shadow prices were calculated on the BLM grazing units for each of the 22 budgets using average beef cattle prices for the 1967-1979 cattle cycle. Shadow prices measure the change in return for a unit increase or decrease in BLM forage; they are the estimated value of the marginal AM of grazing (MVP) to the user (Table 5).

Sensitivity analysis shows the number of AMs by which the permit level can be altered without changing the shadow price. Price sensitivity of BLM forage varies widely among the 22 groups. Because BLM grazing serves different roles

Table 4. Correlation Between Ranchers' BLM Forage Dependency and BLM Grazing Fees as a Percentage of Gross Income, Under Three Price Scenarios and Three Permit Levels.

	Regression Coefficient *	R^2
1982 Cattle Price Scenario		
Initial BLM Permit Level	.114	.94
-25%	.093	.95
+25%	.132	.92
High Cattle Price Scenario		
Initial BLM Permit Level	.095	.94
-25%	.076	.95
+25%	.111	.92
Low Cattle Price Scenario		
Initial BLM Permit Level	.280	.94
-25%	.226	.95
+25%	.325	.92

* Significant at the 5% level.

Table 5. Shadow Prices and Sensitivity Analysis of BLM Forage Under Three Sets of Returns.

Budget No.	BLM AMs	Return Above Cash Costs			Return Above Cash Costs and Family Labor			Return to Investment Except Land		
		Shadow Price	Sensitivity Analysis (-)	(+)	Shadow Price	Sensitivity Analysis (-)	(+)	Shadow Price	Sensitivity Analysis (-)	(+)
1	213	$17.49	3	1	$13.35	3	1	$ 9.07	1	1
2	740	8.12	1	840	8.12	6	838	7.21	740	479
3	75	13.53	1	3	6.35	1	3	2.66	1	16
4	1,379	11.58	29	7	9.20	29	27	7.43	53	28
5	248	17.20	1	13	11.94	1	13	10.02	1	35
6	989	13.52	989	625	11.91	106	25	9.03	989	202
7	4,504	12.28	4,504	14,822	11.60	4,504	14,822	9.06*	4,504	14,822
8	227	9.87	141	7	3.65	141	7	2.48*	141	50
9	415	6.70	5	351	3.82	5	49	1.14	29	65
10	112	24.77	2	179	8.93	2	179	8.37	2	57
11	1,752	9.11	11	60	8.38*	457	174	8.38*	457	578
12	362	14.49	15	677	9.59	15	677	5.12	15	677
13	81	11.53	2	4	8.99	2	4	6.80	5	4
14	137	16.21	137	17	13.03	131	17	10.10	137	17
15	321	9.72	6	3,037	6.12	6	3,037	3.09	56	3,037
16	446	10.60	446	20,875	8.73	446	1,972	7.25*	446	6,295
17	258	15.44	258	8	10.68	258	8	8.59*	258	232
18	162	17.48	1	1	12.37	1	1	7.79	1	1
19	385	13.90	184	706	8.65*	50	1,067	5.05*	28	53
20	1,392	9.49	1,392	77	6.25	1,392	77	2.43*	1,392	1,057
21	4,494	15.10	4,494	5	12.82	4,494	5	10.79*	4,494	22,220
22	939	18.19	1	370	16.43	1	370	14.44*	253	370

*Indicates a decrease in herd size of 10% or more when adding the cost of one animal month of BLM forage.

in ranchers' operations, the permit level may or may not be critical in determining the MVP of that forage.

The shadow price of BLM forage decreases as additional noncash cost categories are included in calculating returns. Attention must be given to which return is most appropriate when comparing shadow prices to the BLM grazing fee. Many ranchers own their real estate investment without debt, so interest on land investment may be an opportunity cost which they do not recognize (Workman and Hooper 1971). Ranchers should consider the value of family labor, depreciation costs and interest on investment other than land. Thus the return to investment except land is the logical choice.

Shadow prices under return to investment except land ranged from $1.14 to $14.44 per AM. Seventeen of 22 were more than $5.00, while the highest grazing fee under the PRIA formula was $2.36 (1980). The highest fee estimated for the 1967-1979 cattle cycle was $4.69. On the basis of these comparisons, the MVP of BLM forage to the majority of cattlemen in the five Idaho resource planning areas is greater than the grazing fees charged by BLM.

Conclusions

Political realism suggests that (1) the PRIA grazing fee formula, or variation thereof, is likely to be continued and (2) pressures to reduce the level of grazing permits on BLM lands will persist. The impacts of these policies are therefore important to beef cattle producers using BLM forage and to the economic communities of which they are a part.

While the results reported here apply only to operations involving BLM lands in five Idaho resource planning areas, both the commonalities and the diversities may well exist for other western U.S. beef producers using BLM forage. Briefly, these results are:

1. Cow herd size and hay purchases are positively correlated with, and sensitive to, changes in BLM permit level;

2. The impact on returns of changes in BLM permit level is affected by beef prices, but even for a given beef price the effect on return may differ by the type of operation;
3. The relative cost burden of BLM grazing fees on ranchers' budgets fluctuate by a factor of three to four over the beef cattle cycle, compounded by the importance of BLM forage to the operation;
4. The MVP of BLM forage exceeds the PRIA grazing fee in most budgets; however, both MVP level and price sensitivity vary widely because of the role of BLM forage in ranchers' operations.

The study results demonstrate that range beef production operations differ both between resource planning areas and among individual enterprises within areas. The study revealed significant differences in both costs and gross receipts per cow as well as dependency on BLM forage as a feed source. Impacts of changing the grazing permit level are not consistent for all operators. Furthermore, grazing fee impacts differ over time, due to the high variation in beef cattle prices, and these too may have unique effects on individual operations. These relationships signify some of the problems of applying a uniform national policy to management and pricing of public natural resources.

APPENDIX

PRIA Grazing Fee Formula

$$EV = \frac{BV \times [FVI + (BCPI - PPI)]}{100}$$

EV = the fee to be charged, which Congress defined as the fair market value and which is the economic value of the grazing to the user, and where annual increases or decreases in the fee are limited to plus or minus 25 percent of the previous year's fee.

BV = $1.23, the base value established in 1966 through the Western Livestock Grazing Survey.

FVI = the forage value index, an index of annually surveyed private grazing land lease rates, 1964-1968 = 100.

BCPI = the beef cattle price index, an index of USDA annually reported prices of beef cattle over 500 pounds, 1964-1968 = 100.

PPI = the prices paid index, indexed prices that producers of livestock pay for selected production times, 1964-1968 = 100.

(U.S.D.A. and U.S.D.I. 1985. 1985 Grazing Fee Review and Evaluation (Draft Report), p. 13).

NOTES

1/ The author acknowledges the contribution of John R. Wilson, recorded in his MS thesis "Economic Impact of Bureau of Land Management Grazing Permit Policies and Fees on Southern Idaho Cattle Ranchers" (University of Idaho, December, 1984).

2/ The PRIA formula was initiated in 1978. Grazing fees calculated as described were: 1967-1979 average, $1.97/AM; 1973, $3.75/AM; 1974, $4.69/AM; 1982, $1.86/AM.

3/ Table 3 shows results for 25% BLM permit level decreases and increases; results for 10% and 50% adjustments differ in magnitude, but not in direction.

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