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Cow/Calf Ranching in 10 Western States

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Abstract

This report identifies differences between beef cow/calf operations with permits to graze Forest Service (FS) and Bureau of Land Management (BLM) land and other operations in 10 Western and Plains States. The main differences are that those operations with FS/BLM grazing permits had higher net returns above cash costs (even though their gross receipts and cash costs per cow are lower), sold fewer pounds per cow of all cattle and calves, had larger cow herds, had more sheep, and purchased fewer stocker cattle. Fencing, breeding stock, and hired labor cost permittees more, but they paid sufficiently less for harvested forages and rented pasture to more than offset other higher costs. Regression models based on cow herd size demonstrated that permittees had significantly higher net returns above cash costs per hundredweight of cattle sold.

Keywords: Forest Service, Bureau of Land Management, grazing fee, public grazing lands, animal unit month, stocker cattle, cull cow.

Washington, DC May 1994

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Summary

Ranchers with permits to graze cattle on Federal land (permittees) enjoyed higher net earnings than ranchers without such permits (nonpermittees), both per cow and per hundredweight (cwt) of cattle sold. Lower production costs for permittees more than offset their lower returns per cow. Economies of size may account for some of these differences--since permitees' cow herds averaged more than twice as large as those of nonpermittees.

Permittees' costs were lower by $106 per cow and by $10 per cwt of cattle sold. While permittees' annual costs per cow or per cwt of cattle sold were lower than those for nonpermittees, some costs remained higher, such as for fencing, breeding stock, and hired labor. Much lower permittee costs for harvested forages and rented pasture accounted for the overall lower cash costs. Also, nonpermittees bought more stocker, or young, cattle, which increased their costs.

The value of cattle sold by permittees was $65 per cow lower than that for nonpermittees, although value per cwt of cattle sold was almost the same for both groups.

This report considers ranching on some 300 million acres of public land, mostly in the Western and Plains States. This land is administered by the Forest Service (FS) and Bureau of Land Management (BLM). Those lands provide less than 2 percent of all U.S. forage, public and private, fed to beef cattle. Seventy-six percent of all public forage land is administered by the FS and BLM. These agencies require special permits for commercial activities, including grazing livestock. The fees for grazing have been controversial since they were instituted in 1906 (FS) and in 1936 (BLM). For the average permittee, such fees represent 3.7 percent of total cash costs per cow.

Permits to graze FS/BLM land are valued in the marketplace. The fees charged for grazing forage on FS/BLM lands in the West are below what is considered to be the market value for the forage. They also do not cover the Government's administrative costs. Permit value is the unofficial market mechanism that brings the forage value to its market level. Paradoxically, permittees cannot own grazing permits, even though ranches are bought and sold at prices that implicitly or explicitly include values the ranchers have set for permits. Neither the Federal Government, which owns the FS/BLM lands, nor the public, whose taxes make up the annual difference in fee receipts and grazing program costs, share in the proceeds when ranches are bought and sold. In addition, permits have characteristics of risky assets: The permits may be rescinded for good cause at any time. There is no requirement that they be reissued to the purchaser of a ranch, and the Government can raise the annual grazing fee, causing permit value to decline.

Higher fees would affect individuals and governments. Any increase in grazing fees could affect ranchers' incomes, Federal Treasury receipts, and local economies in the Western States. Ranchers' net incomes could decline as their costs for forages increased. Increased fee receipts could mean more funds for Federal, State, and local entities that receive shares of fee receipts. These increased shares could in part offset reductions in local spending by ranchers.

Cow/Calf Ranching in 10 Western States

Kenneth H. Mathews, Jr., William F. Hahn, Ken E. Nelson, Terry L. Crawford

The Public Grazing Land Issue

The U.S. Department of Agriculture's Forest Service (FS) and the U.S. Department of the Interior's Bureau of Land Management (BLM) administer some 300 million acres of public land,[1] primarily in the Western and Plains States, on which individuals fish, camp, drive snowmobiles, hunt, ski, mine, harvest timber, drill for oil and gas, and graze livestock. Special permits are required for commercial activities, including skiing, mining, harvesting timber, drilling for oil and gas, and grazing livestock. Policy regarding the use of these FS/BLM public lands is both a regional and a national issue.

This report focuses on beef cow/calf operations in 10 Western and Plains States with both permittees (beef cow/calf operators who have federally issued permits to graze National Forests or Bureau of Land Management lands in the Western United States) and nonpermittees (beef cow/calf operators who do not have such permits) and on the use of FS/BLM lands for grazing livestock. This report briefly describes the FS/BLM grazing program; compares and contrasts returns, costs, and characteristics of public grazing land permittees with nonpermittees; and finally, highlights some conceptual economic issues underlying grazing use of FS/BLM lands. The emphasis in this report is on differences, when and where they exist, between the two groups, and the effects these differences have on production and characteristics of each group.

This report summarizes information from several sources: the *1986 Grazing Fee Review and Evaluation Report* (referred to as the *1986 Fee Report*), the 1992 update of that report (*1992 Update*), data collected through a special cow/calf version of the 1990 Farm Costs and Returns Survey (FCRS)[2] of beef cow/calf operations from 10 Western and Plains States (CA, CO, ID, MT, ND, NM, OR, SD, UT, and WY), and other published sources.

These 10 States were selected and summarized separately because they contained both groups of cow/calf operations, permittees and nonpermittees. Because observations from the 10 States included both permittees and nonpermittees, direct comparisons between the two groups can be made. These comparisons are of interest because the grazing fee debates often focus on cost differences between permittees and nonpermittees.

These 10 Western and Plains States accounted for 15 percent of total operations and 27 percent of the cows represented in the cow/calf version of the 1990 FCRS.[3] Permittees are well represented in this 10-State subgroup: Permittee ranches were 24 percent of total ranches represented in the 10-State subsample of the FCRS, larger than the 9.8 percent actual share of permittees to total cow/calf producers in the West (*1986 Fee Report*). Permittee operations also had 43 percent of the cows represented in the 10-State subgroup. Nationally,[4] permittees totaled 3.6 percent of the ranches and 11.6 percent of all cows represented in the FCRS.

The Public Grazing Land Program Began in 1906

Grazing fees have been charged for grazing FS lands since 1906 and BLM lands since 1936. The existence and level of fees and the justifications for fees have been controversial throughout this period. The Rachford study (1920-24), the Saunderson and Leech

[1]Public grazing lands are primarily Bureau of Land Management (BLM) lands and National Forests (FS), including the National Grasslands (FS) of the Plains States.

[2]The FCRS is an annual survey conducted by the U.S. Department of Agriculture, and is used to estimate national and regional estimates of costs and returns for selected commodities, including beef cow/calf. Each commodity has a special version of the overall survey, and is surveyed on a 4- to 5-year rotation. Cost and return data represent 1990 FCRS data indexed to 1991 dollar amounts.

[3]The cow/calf version of the 1990 FCRS represented just over 98 percent of the U.S. beef cow inventory.

[4]"Nationally" means the 98 percent of the U.S. beef cow herd represented in the FCRS in 1990. Alaska, Hawaii, and the Northeast, with less than 2 percent of U.S. beef cows, were not represented in the survey.

Study (1941), the Nicholson report (1946), the Western Livestock Grazing Survey (WLGS) (1966), and the Public Rangelands Improvement Act (PRIA) (1978) were all attempts to determine the market value of the forage on FS/BLM land (*1992 Update*).

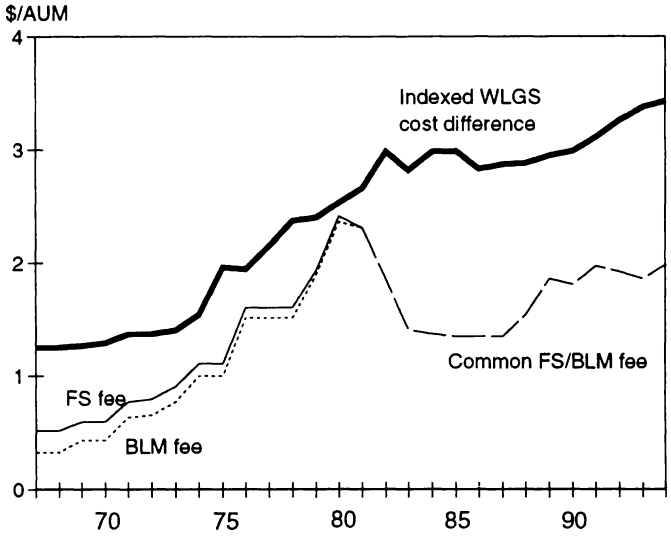
The Western Livestock Grazing Survey (WLGS), which forms the backbone of much of today's fee debate, used methodology developed by Utah State University and was conducted by the Statistical Reporting Service (SRS), Forest Service, and Bureau of Land Management. The objective of the WLGS was to determine costs of grazing on both Federal and private lands so that a reasonable fee for Federal forage could be established. The resulting fee structure was based on a formula that adjusted annually the established difference in costs between grazing on both Federal and private lands--in 1966, $1.23 per animal unit month (AUM)--by a forage value index (FVI) that was determined separately. The FVI was based on changes in estimates of private grazing land lease rates. Fees equal to full market value of the Federal forage were to be phased in over 10 years, beginning in 1969. Several moratoriums during the 10-year phase-in period prevented implementation of the full fee and were followed by the Public Rangelands Improvement Act (PRIA) of 1978.

The PRIA established the fee formula that has been used to set fees since 1979. The PRIA fee formula is based on the difference in costs per AUM established in the WGLS, adjusted annually by the FVI plus indexes for beef cattle prices and producer prices. The latter two indexes were introduced as a device to reflect permittees' "ability to pay" the fee, but in reality introduced double-counting of some costs (GAO, 1991) and kept fees below forage market value. The PRIA fee formula was to be in effect for a trial period from 1979 to 1985, and PRIA required a report to Congress no later than December 1985. In February 1986, an Executive order continued the PRIA formula with a minimum of $1.35 per AUM for an indefinite period, and the PRIA formula is still in effect.

The fee formula or the fee amount can be changed in two ways. Congress can pass grazing fee legislation, which is how the PRIA formula was established. Also, the fee can be altered through Executive order or agency regulations.

Most published research results indicate grazing fees charged were below market value at the time of the studies. Past arguments for higher fees emphasized the need to cover grazing program administrative costs, to be "reasonable," or to reflect the value of

Figure 1
The indexed Western Livestock Grazing Survey (WLGS) cost difference has exceeded grazing fees



public forage. FS/BLM grazing fees approached the indexed forage value in 1980, 2 years after the WLGS fee phase-in was to have brought them in line with the indexed forage value on FS/BLM land (fig. 1). The indexed forage value in figure 1 is the $1.23 base value of an AUM[5] from the 1966 WGLS multiplied by the FVI for each year. However, fees have never equaled or exceeded the indexed forage value. This failure of grazing fees to reach the indexed value of forage and, since 1980, the large differences between the indexed forage value and PRIA-based grazing fees have contributed to arguments that public grazing is subsidized.

Critics also contend that fee receipts have been less than grazing program administrative costs. Program costs exceeded receipts by $47 million in 1990, when fee receipts were $27 million and program costs were $74 million (*1992 Update*).

[5]A BLM AUM for billing purposes is the forage required for 1 month for one cow, one horse, one bull, one yearling, or five sheep. For billing purposes, an FS AUM is converted to a billing unit (BLM AUM) by dividing FS AUM's by 1.2. There are more precise definitions for AUM's used by both BLM and FS to determine carrying capacity.

The Current Situation

While costs and receipts for permittees are lower than for nonpermittees, some of the difference in costs appear to be due to the larger size of permittee operations. Receipts and costs per unit of commodity produced decline for many agricultural commodities for larger operations. In fact, size accounts for some of the differences between permittees and nonpermittees on both a per-cow and per-hundredweight (cwt) basis. However, there appears to be some advantage accruing to permittees that allowed them to become larger in the first place.

Costs and Returns for Permittees and Nonpermittees

A comparison of group means of the 10-State subset of FCRS data suggests a $106 per-cow cash cost differential in 1991 between permittees and nonpermittees, with permittees having the lower costs (table 1). Permittee costs per cwt of cattle sold were also lower than nonpermittees' costs by just over $8 per cwt, $63.45 versus $71.81 (tables 1 and 2).

Permittees spent slightly more on new fences and breeding stock than did nonpermittees, which was more than offset by nonpermittee expenditures (cow/calf enterprise share) for trucks, machinery, equipment, buildings, and capital costs of homegrown forages. Permittees used an average of almost three times as many horses as did nonpermittees, and almost a third more pickup trucks (31 percent) than did nonpermittees. This relatively heavier use of horses may suggest some substitution of horses for pickup trucks on permittee operations.

Nonpermittees' public grazing pasture expenses averaged 36 percent of permittees' expenses for all public grazing (table 1). Almost 15 percent of nonpermittees used sources of public grazing, such as State lands, county lands, Department of Defense, Bureau of Reclamation, and other forage sources not administered by FS or BLM. Forage from other public sources was often more costly per forage unit than FS/BLM forage, and dependence on other public forage sources was often lower than permittee dependence on FS/BLM forage.[6]

Average dependence for the 15 percent of nonpermittee operations with other public grazing was almost 6 percent of their total grazed forage needs. Greater nonpermittee purchases of stocker cattle[7] increased both their per-cow costs and receipts. Nonpermittees spent over nine times the dollar amount to purchase other nonbreeding cattle as did permittees.

"Cow-calf/stocker" subgroups purchased stockers. "Cow-calf" subgroups did not purchase stockers. Nonpermittee cow/calf operations sold 70 pounds more cull cows than cow/calf permittees, suggesting a higher culling rate. A higher culling rate could reduce the number of low-producing cows in the herd, which by itself would tend to increase average output per cow. In general, land is used more intensively in nonpermittee operations than in permittee operations.

Estimated receipts per cow in 1991 were lower for permittees ($431) than for nonpermittees ($496), by $65 (table 1). However, estimated receipts per cwt of permittee cattle sold ($79.12), were slightly higher (by $0.29 per cwt) than nonpermittees' receipts.

Net returns above cash costs per cow were higher for permittees than for nonpermittees, remaining positive for permittees even after accounting for capital expenditures. Relatively more pounds of calves sold by permittees, combined with generally higher prices per cwt paid for calves, resulted in permittee revenues that were greater per cwt of cattle sold than nonpermittee revenues.[8]

Permittees would be expected to own less of the land they operate because of their dependence on FS/BLM land, which generally contains large acreages. Surveyed permittees owned 19 percent of the share of

[6]Dependence in this analysis is, defined in terms of grazed forages only, the ratio of grazed FS BLM forages (head months) to total grazed forages (head months). This dependence is different from the dependence reported in the *Grazing Fee Review and Evaluation* and its 1992 update because several feed sources were excluded here, making dependence higher. Specifically excluded were hay, grain, and other feeds fed. Including an estimate of the AUM's in hay, grain, and other feeds fed brings average dependence down to about 25 percent.

[7]Stocker cattle are usually calves weighing 300-600 pounds that are purchased and pastured to gain additional weight before going into the feedlot. Stockers are often just-weaned calves that are pastured until they are yearlings, that is, until sometime after their first birthday.

[8]Calf weights may be understated if calves are being weaned at weights much greater than 500 pounds. The 500-pound break was used because it is consistent with the weight categories used in other USDA reports, especially reports by USDA's National Agricultural Statistics Service. If calves are actually weaned at weights over 500 pounds, which we suspect is more the case now than it was in 1982, then some calves are categorized as stockers or yearlings in this report, which would lower both average calf weights by placing a 500-pound ceiling on calf weights and yearling weights by adding smaller calves to the group. Calf weights for permittees surveyed in the 1990 cow/calf FCRS were higher than in 1982.

Table 1--Cow/calf production cash and economic costs and returns per cow for permittees[1] and nonpermittees, 1991

Item	Permittees			Nonpermittees		
	All	Cow/ calf	cow/calf stocker	All	Cow/ calf	cow/calf stocker
			Dollars per cow			
Cash receipts:						
Steer calves	48.05	54.66	41.69	33.93	47.72	17.43
Heifer calves	33.99	42.01	26.26	30.92	43.79	15.53
Stocker steers	155.07	106.62	201.75	183.57	114.35	266.33
Stocker heifers	62.63	35.06	89.20	94.41	67.34	126.78
Other cattle	131.48	123.14	139.52	153.04	167.15	136.17
Total	431.22	361.49	498.42	495.87	440.35	562.21
Cash expenses:						
Purchased nonbreeding cattle	5.20	1.49	8.77	47.71	18.86	82.22
Feed--						
Grain	3.85	5.46	2.29	9.29	6.24	12.93
Protein supplements	18.92	23.56	14.45	14.54	10.47	19.40
By-products	2.89	3.60	2.20	4.44	4.50	4.36
Harvested forages	64.33	63.86	63.97	96.94	91.85	103.04
Pasture (FS/BLM grazing)	12.50	11.13	13.80	NA	NA	NA
Pasture (Other public grazing)	2.82	3.20	2.46	5.59	6.23	4.82
Pasture (other rented)	32.15	29.46	34.76	53.32	47.48	60.30
Total feed costs	137.46	140.27	133.93	184.12	166.77	205.21
Other--						
Veterinary and medicine	11.71	9.10	14.21	12.89	13.17	12.58
Livestock hauling	3.44	2.82	4.04	2.70	3.04	2.30
Marketing	5.50	4.51	6.46	8.30	8.20	8.42
Custom feed mixing	.65	.26	1.03	.97	.78	1.19
Fuel and lube	16.34	19.14	13.64	13.66	15.22	11.79
Machinery and building repairs	23.19	22.24	24.11	25.70	28.54	22.29
Hired labor	36.53	31.80	41.08	20.64	18.78	22.86
Miscellaneous	5.40	6.73	4.13	5.60	5.85	5.30
Total, variable cash expenses	245.42	238.36	251.40	322.29	279.21	374.16
General farm overhead	36.63	37.06	36.11	48.64	56.13	39.69
Taxes and insurance	8.96	9.47	8.47	14.53	17.03	11.54
Interest (non-real estate)	12.86	6.48	19.01	20.35	18.54	22.50
Interest (real estate)	41.91	41.90	41.92	45.88	58.97	30.21
Total, fixed cash expenses	100.36	92.01	105.51	129.39	150.68	103.94
Total cash expenses	345.78	333.47	356.91	451.68	429.89	478.10
Cash receipts less cash expenses	85.44	28.12	141.51	44.19	10.46	84.11
Capital replacement	83.29	67.14	98.84	123.01	110.84	137.57
Total, cash expenses and capital replacement	429.07	400.51	455.75	574.69	540.73	615.67
Net cash returns	2.15	-38.50	42.67	-78.82	-100.38	-53.46
Economic (full ownership) costs:						
Variable cash expenses	245.42	238.36	251.40	322.29	279.21	374.16
General farm overhead	36.63	37.16	36.11	48.64	56.13	39.69
Taxes and insurance	8.96	9.47	8.47	14.53	17.03	11.54
Capital replacement	83.29	67.14	98.84	123.01	110.84	137.57
Operating capital	8.15	7.68	8.60	11.16	9.81	12.76
Other nonland capital	29.00	30.48	27.57	33.39	34.16	32.48
Land	66.61	93.14	41.05	88.79	113.14	59.68
Total, economic costs	478.06	483.43	472.04	641.81	620.32	667.88
Residual returns to management unpaid labor, and risk	-46.84	-121.94	26.38	-145.94	-179.97	-105.67

[1]Permittees are defined as holders of permits to graze Forest Service or Bureau of Land Management lands. Nonpermittees may hold permits for other types of Federal, State, or locally administered land. Permittee and nonpermittee columns pertain to the 10 States in which there were both categories of cow/calf operations.
Source: 1990 Costs and Returns Survey data

Table 2–Characteristics of surveyed cow/calf operations, by permittee versus nonpermittee, 1990

Item	Unit	U.S.	Permittees			Nonpermittees		
			All	Cow/calf	Cow/calf stocker	All	Cow/calf	Cow/calf stocker
Cows per operation	head	68	221	171	309	93	81	114
Peak number of cattle per operation	head	---	471	360	664	213	180	270
Peak number of sheep per operation	head	---	112	120	99	13	13	14
Operations with sheep	pct	---	15	16	13	9	10	7
Pounds of cattle sold per cow:								
Calves--								
Steers	lbs	60	48	55	42	34	48	17
Heifers	lbs	59	40	49	30	36	51	18
Yearling--								
Steers	lbs	145	178	122	232	210	131	305
Heifers	lbs	88	77	43	109	116	83	155
Other cattle	lbs	164	202	189	214	233	258	202
Total	lbs	516	545	458	627	629	571	697
Feed fed per cow:								
Grain	lbs	254	92	127	59	268	182	371
Protein	lbs	139	124	140	96	78	69	94
Harvested forage	tons	2.0	1.5	1.5	1.6	2.5	2.4	2.7
Byproducts	lbs	107	60	87	35	148	137	160

Source: 1990 Farm Costs and Returns Survey data.

total land they operated, compared with 41 percent for nonpermittees. This reduced ownership shows up in both total average assets per operation and assets per cow (table 3).

There was no separate question on the FCRS instrument that asked specifically for permit value, although land value and other assets were specifically asked. (The permit value is the result of permittee capitalization of the difference between the fee paid for grazing on public lands and the market rental value of the grazing over time.) Therefore, assets reported in table 3 likely do not reflect permit share of assets in every case. However, permit value may have been included in two ways. First, permit value may have been included implicitly by respondents when reporting land values, especially if a ranch price did not include permit value as a separate item. A maximum estimated permit value of $56,168 could be added to ranch assets in table 3, if one assumes the average number of cattle and sheep.[9] Assets would be increased by $254 per cow. Second, dollar amounts for debt service reflect any interest costs for permit values included in long-term debt.

The most common type of business organization for both groups was the sole proprietorship. Almost 10 percent more nonpermittees than permittees (86 percent versus 77 percent) were sole proprietors. A

[9]Permittees had an average peak number of 471 head of cattle (1990 FCRS data), of which 221 were cows, approximately 206 were calves, the remaining approximately 44 head we assume were yearlings, for a total of 265 animal units of cattle, plus 112 head, or 22.4 animal units, of sheep. This yields a total of 297.4 animal units per permittee operation (FCRS), where an animal unit is defined as a cow/calf pair, a yearling, or 5 sheep. With an average permit value of $68 (*Grazing Fee Review and Evaluation*, 1986) and estimated total FS/BLM AUM's of 826 (297.4 animal units adjusted by 36 percent dependence), an estimate of average ranch permit value is $56,168.

Table 3–Characteristics of cow/calf operations, 1990

Item	Permittee			Nonpermittee		
	All	Cow/calf only	Cow/calf stocker	All	Cow/calf only	Cow/calf stocker
			Years			
Operator characteristics:						
Average age	55	56	52	53	53	55
			Percent			
Operation characteristics:						
Ratio of calves born to cows reported	93.1	91.4	94.7	92.8	94.4	90.9
Percent dependence on Forest Service/Bureau of Land Management land	36.3	37.0	35.8	NA	NA	NA
Percent of land owned	19.6	18.9	20.3	41.3	37.3	50.3
			Dollars			
Financial characteristics:						
Average ranch sales	111,387	69,874	183,423	65,482	53,178	86,253
Ranch value of cattle sold	95,300	61,815	154,012	46,116	35,668	64,095
Average government payments	3,224	2,097	5,181	7,457	6,928	8,349
Average assets	1,335,864	1,144,214	1,668,427	889,381	1,021,905	655,656
Average debt	122,136	98,567	163,036	73,407	73,990	72,423
Debt/asset ratio	.09	.09	.10	.08	.07	.11
Asset/cow ratio	6,094	6,764	5,451	9,472	12,541	5,796

NA = not applicable: nonpermittees do not graze Forest Service/Bureau of Land Management land.
Source: 1990 Farm Costs and Returns Survey data.

larger share of permittee than nonpermittee operations were more formally organized as corporations. Both permittee and nonpermittee groups had roughly the same share of partnerships, but almost three times as many permittee operations were formally organized family corporations, and these permittee family corporations (averaging 514 cows) were much larger than nonpermittee family corporations (averaging 167 cows).

Size of Operation

Two results stand out in the permittee-nonpermittee estimates from the FCRS data: average costs (variable, all cash, and economic costs) and receipts, either per cow or per cwt, for permittees were significantly lower than for nonpermittees, with differentials being much greater for costs than for receipts for all cattle sold. Also, permittees clearly had larger livestock operations than nonpermittees, with over twice as many cows and peak numbers of cattle as did nonpermittees (table 2). In addition, permittees averaged almost nine times as many sheep as nonpermittees. Nationally, costs and receipts per cow generally decline as size of operation increases (*Economic Indicators of the Farm Sector: Costs of Production--Livestock and Dairy, 1990,* 1992).

Since permittees are larger, on average, than nonpermittees, size of operation was expected to account for part of the reason for differences in costs and receipts (table 4). Regression analyses on both a per-cow and per-cwt basis provided some interesting insights. Regressions incorporating cow herd size demonstrated that for equal size, while there was little or no significant difference between the two groups for (1) all cash costs (including capital expenditures) or (2)

Table 4–Sampling characteristics of 1990 FCRS cow/calf data

Item	1990 FCRS[1]		1986 Fee report	1992 Update
	Permittees	Non-permittees-	Permittees, 1982	Permittees, 1990
Ranches represented	16,482	51,807	NA	NA
		Percent		
Percent of cows on operations of:				
20-99 cows	8.1	25.6	14.5	11.6
100-499 cows	59.4	52.3	41.9	41.0
500 or more cows	32.5	22.0	44.9	47.4
Percent of operations with:				
20-99 cows	33.9	61.6	44.5	42.1
100-499 cows	56.9	35.1	46.5	45.3
500 or more cows	9.2	3.3	10.9	14.4

value of cattle and calves sold,[10] permittees had significantly higher net returns above cash costs per cwt of cattle sold than nonpermittees. All cash costs per cow were a nonlinear function of size, measured by cow numbers and number of purchased stockers. The number of purchased stockers was the only variable significant in explaining a higher value of cattle and calves sold on a per-cow basis.

If both permittees and nonpermittees are producing the same commodity (beef cattle) for the same markets, then, given the same regions and sizes, there should be no differences between permittee and nonpermittee costs or returns. However, regression results for net returns above cash costs per cwt suggest that there is some advantage accruing to permittees. Further, the chicken-or-egg question remains: Are permittee operations so much larger than nonpermittee operations because they have permits or do they have permits because they are so much larger?

As the West was settled, an operator could gain control of large areas by obtaining water rights or other advantageous property without having to actually own all of the land. These watered areas and other advantaged acreages were claimed and settled, assuring control of the surrounding public domain. These early settlement patterns exist today. So, the opportunity for large cow herds was established early, but is there an advantage held by permittees that allows large herds to persist in the present? Economic theory would suggest equilibration in the absence of any advantages.

The Demand for Forest Service/ Bureau of Land Management Forage

The demand for public grazing land is derived from the demand for livestock products, primarily beef. Estimates of what share of U.S. beef cattle derive at least part of their forage needs each year from FS/BLM land vary from about 3 percent to 8 percent. If FS/BLM forage were the only forage, it would support less than 1.5 million head of beef cattle--less than 2 percent of the total U.S. inventory of cattle and calves.

Two perspectives on grazing fees for public lands are the individual rancher's perspective and the aggregate perspective of all forage users. Permittees, as rational individual economic decisionmakers, will use input combinations, including the FS/BLM forage resource, that equilibrate all marginal input costs with one another. Alternative forage sources, like private grazing land (leased or owned), hay, or cropland, tend toward equality where the increment in returns per dollar spent for each forage type is equal. Constraints on resources alter the final solution somewhat. Equal marginal principles applied to the use of all resources used in beef cow/calf production may explain why some permittee costs are higher than nonpermittee costs, but nonpermittee land costs from all sources are much higher than permittee land charges.

However, there are institutional constraints on the use of FS/BLM forage. The preceding scenario depends on private forage sources being available in quantities sufficient to substitute for Federal grazing. If there are no alternative private forage sources, including harvested forages like hay, then increased FS/BLM grazing fees or reduced stocking rates would more likely require adjustments in cattle numbers. Further, the more dependent a local livestock ranching industry is on FS/BLM land for forage, the less likely private land is to be available in sufficient quantities

[10]All cash costs, value of production, and net cash returns were regressed on a dummy variable for permittee-nonpermittee (0=permittee, 1=nonpermittee), cow numbers, cow numbers squared, purchased stocker numbers, purchased stocker numbers squared, and percent dependency. Regressions were estimated on both a per-cow and per-cwt basis, and a variable for cwts of cattle sold per cow was included as a regressor in the cash costs per cow regression. A significance level of 10 percent was used for testing the null hypothesis that the selected regressors had no effect on the dependent variables. R-square statistics ranged from 0.32 to 0.006.

to replace FS/BLM land, and the greater the effects of higher grazing fees on the local economy.

There were 16.8 million FS/BLM-permitted AUM's in 1990, and this number varies about 1 million AUM's from year to year (about 15.8 million AUM's were actually grazed in 1991) (personal communications with D. Waite (BLM) and M. Bellinger (FS)).

Although the equivalent amount of forage in any 2 AUM's is considered the same, the attributes of each allotment are different, so that all allotments are not of equal marginal value. For example, an allotment on level land with ample water supplies requires less effort for daily activities from both cattle and ranchers than an allotment on a rocky hillside with inadequate water, even if the same forage species were available in both places. Rougher terrain increases losses from accidents and injuries to both livestock and ranch personnel; machinery and equipment break down more often and wear out sooner; more bulls, rams, and studs are needed to breed given numbers of cows, ewes, and mares; providing needed water can be a problem; and livestock expend more energy to get an AUM's worth of forage.

Valuing FS/BLM forage is complicated because of the variation in quality and location. Basing forage consumption on AUM's rather than on acres or some other basis alleviates many of the problems of quality differences between allotments. Nevertheless, some range in values is observed in the different average appraised AUM values for each of the six pricing areas delineated in the *1986 Grazing Fee Review and Evaluation Report* and the 1992 update of that report.

By definition, an "average" value per AUM means AUM's on some allotments are valued at more than the average value and some are valued at less than the average value. In the 1992 updated report, the appraised value of FS/BLM forage ranged from $4.68 to $10.26 per head or per pair (a cow and an unweaned calf) per month. For yearling cattle, the range was $4.68 to $7.74 per head per month. For both categories of livestock, the highest appraised value for forage was pricing area one, the Northern Plains. The lowest appraised region was pricing area five, basically the desert Southwest.

This variation in AUM quality is also relevant when comparing the FS/BLM grazing fee and the Private Grazing Land Lease Rate (PGLLR). The PGLLR is collected by National Agricultural Statistics Service (NASS) and used in calculating the FVI. Private land is generally considered to be of higher quality than FS/BLM land. The better land within the public domain was patented (procedures followed that allowed transfer of title of public domain to individuals) because it was better suited to agricultural enterprises, with the remaining land left in the public domain. Private land generally leases at a higher rate and may also include some services provided by the landowner. Because of the higher grazing lease rates, the PGLLR is not a direct estimate of the market value of FS/BLM land. However, the PGLLR is useful as a measure of the change in the value of all grazing land because the value of various pasture forages in a region change at about the same rates. Thus, as the PGLLR changes, the market value of FS/BLM forage changes proportionally.

Average dependence, defined as the share of total grazed forage needs that come from FS/BLM forage, was just over 36 percent for permittees in the 1990 FCRS cow/calf data. This 36 percent is conceptually different from the estimated 23 percent dependence found in the *1986 Fee Report* and the *1992 Update*. The earlier *1986 Fee Report* and the *1992 Update* included all feed requirements, including a substantial amount of hay, grain, and concentrates used in winter feed, in their estimate of 23 percent dependence. The 36 percent FS/BLM dependence reported here is based on only grazed forages and excludes hay, grain, and concentrates used in winter feed.[11] Permittees also obtain some grazed forage from other public forage sources not owned by the FS or BLM, which makes their total dependence on all public grazed forage sources greater than 36 percent. The effects of different fee rates on ranch incomes and local economies on a larger scale are influenced by dependence.

Grazing Program Costs and Fee Receipts

Not all FS/BLM fee receipts are retained in the Federal Treasury, and not all rangeland program costs are due to livestock grazing. Shares of FS/BLM fee receipts are allocated to nonprogram recipients, like State or county entities. Of the $27 million in fee receipts collected in 1990, half, or $13.517 million, went to the Range Betterment Fund--funds set aside, beginning in 1979 with PRIA, and used to improve the public lands generally within the Forest Region or BLM district where they were collected (*1992 Up-*

[11]Estimating grain, protein supplement, byproduct, and hay AUM's for the FCRS data yields an overall FS/BLM dependency of about 25 percent, which is comparable to the 23 percent dependency estimate from the earlier *1986 Fee Report* and *1992 Update*.

date). Another $5.534 million, just over 20 percent, went to the States and counties where it was collected. Another $897,000, 3 percent, was used to improve forest roads and trails. Finally, $7.086 million, or 26 percent, was retained in the Federal Treasury. These proportions have been relatively constant from year to year since 1979, although the dollar amounts depend on the fee rate, and come from the slightly different allocation schedules each agency has for each particular type of land it administers.

Not all of the $74 million (1990) in program costs is due directly to livestock grazing (*1992 Update*). FS/BLM estimates that about $22 million would be spent on range management, wildlife, and rangeland-monitoring projects even if there were no livestock grazing on the public lands.

As fees increase, especially to a level above the "market" rate, the percent of available AUM's leased could decline. A decline in leased AUM's would affect fee receipts, and there may be a maximum amount of fee receipts to be obtained from leasing public grazing lands. Only about a fourth of fee receipts would go to the Federal Treasury under the current structure for allocating fee receipts to the various participating entities.

Economic Effects of Higher Fees

FS/BLM permits are risky assets: They can be rescinded for good cause at any time, there is no requirement that they be reissued to the purchaser of a ranch, and grazing fees can be increased at any time either by legislation or by Executive order. The fee itself, under the current PRIA fee formula, fluctuates from year to year. The fee was highest for Forest Service leases in 1980 when the fee was $2.41. Inflation would make the 1980 $2.41 fee almost $4 in 1993 dollars, compared with the actual $1.86 fee charged in 1993. Permittees who graze the National Grasslands have seen fees as high as $3.55 (1981) and $3.58 (1991). For comparison, the 1981 National Grassland fee would be about $5.80 in 1993 dollars.

Like any other risky asset, such as land, stocks, bonds, or diamonds, permit value is subject to fluctuation. The holder of a risky asset speculates that its value will increase or, at least, remain constant. However, the risk attribute of these assets implies that their value can decline as well. When their value declines, the speculator holding them suffers a loss.

The purchaser of a Federal grazing permit takes the risky asset scenario one step further--at no point does this person ever actually own the permit! Instead, the purchaser of a permit is, in effect, acquiring a license to graze FS/BLM land. It is a license that becomes worthless if the permit is withdrawn by the Federal Government, and its value declines if FS/BLM grazing fees are increased. These possibilities imply that permit value also includes a discount for the risk of losing grazing privileges, and if so, the forage may actually be worth more than permit value suggests. In the past, this discount has probably been small because virtually all permits were routinely transferred to new ranch owners and, except for the PRIA modifications, the fee formula has been unchanged since 1969. However, this risk discount may not be so small at present because of the uncertainty in 1994 about future fee levels.

Conclusions

Permittees' receipts and costs are lower than for nonpermittees both per cow and per cwt of cattle sold. The permittees' cost advantage averages almost twice as much as the nonpermittees' gross revenue advantage, leaving the permittees with the average net advantage. One reason permittees' costs average lower is their lower costs for forage and pasture, to which the relatively low FS/BLM grazing fees contribute.

However, other factors complicate the cost-difference picture. Lower receipts and costs are generally associated with larger operations. Permittee costs and receipts per cow would be somewhat lower because they have cow herds over twice as large as those of nonpermittees. Explicitly accounting for cow herd size demonstrated that for equal size, permittees continued to have significantly higher net returns above cash costs per cwt of cattle sold, even though there was little or no difference between permittees and nonpermittees for all cash costs or for value of cattle and calves sold. Permittees adjust to lower land charges by increasing expenditures per cow for some other production items, such as hired labor, horses, fences, protein feeds, fuel, and lubricants.

The effect of increasing FS/BLM fees is relatively small for the average permittee because FS/BLM fees are only 3.7 percent of total cash costs per cow. Doubling fees would increase permittee costs by about $12 per cow. This $12 per cow would have the same effect on net returns as a decline in average cattle prices of about 2.2 cents per pound. However, as de-

pendence on Federal forage rises, so do the cost shares of FS/BLM forage to individual permittees. Higher local dependence on Federal forage also increases the local effects of higher FS/BLM grazing fees.

The Federal Government does not account for permit value when assessing differences in costs of grazing the FS/BLM lands versus private lands. Permit value is a paradox. For one thing, neither the Forest Service nor the Bureau of Land Management formally recognize permit value--permittees have only the privilege of grazing forage on FS/BLM land for the period of the lease and under the conditions of the lease agreement. On the other hand, banks, other lenders, and the Internal Revenue Service attach a value to possession of the license to graze FS/BLM forage. If the Federal government were to account for permit value, the net effect would be a transference of public wealth to private individuals.

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U.S. Department of Agriculture
Economic Research Service

SUMMARY OF REPORT #TB-1818

U.S. Food Demands Projected for 1990-2010: Present, Future Markets Estimated

December 1993

Contact: Noel Blisard or James R. Blaylock, 219-0862

A new study uses Bureau of the Census data to project the likely U.S. expenditures for food in the years 1990-2010. The study incorporates census information on such demographic factors as age, race, income distribution, region of residence, season of the year, and number of persons in the household. Another factor greatly affecting food expenses is the proportion of food consumed at home or elsewhere than home. The study allows for varying estimates in the growth of the U.S. population in the next 20 years as well as suggesting two scenarios for the increase in average income over that period of time.

Study Also of Interest to Marketers

The report, *U.S. Demand for Food: Household Expenditures, Demographics, and Projections for 1990-2010,* from USDA's Econonomic Research Service, should provide guidance to farmers and food processors as well as to those concerned with nutrition education and food policy. Also, markets for various foods are shown by demographic grouping as gaining or losing market share. The authors include suggestions as to targeted marketing for broad and narrow food categories.

Present Food Expenses Charted

Present expenditures are considered first, as a base for future changes. Higher income families presently spend more for food away from home, and more on fish, cheese, dairy products such as ice cream, fresh fruit, and processed fruit than do households of lower incomes. Americans 65 and older spend more on food at home than any other age group. In both Northeastern and Western States, more is spent on total food than in other sections of the country. Nonblacks spend more on every food category than blacks do, except for meat, poultry, fish, and eggs. More sweets are eaten in fall, by about 33 percent, perhaps because of the holidays. The Northeastern States buy 50-71 percent more butter than other regions do, while the South spends least on fruits but most on pork.

Future Food Shopping Will Differ

Projections can be made of future food demands of the Nation, given assumptions about the population growth rate, regional migration, age distribution, and income. Growth in food expenditures in the next 20 years will be slower; from 1970 to 1990, total food expenditures grew by 39 percent. But, from 1990 to 2010, they will grow only slightly over 31 percent, and this growth will not be evenly spread over foods or demographic groupings. For example, spending on fish would increase by 13.5 percent; dairy products other than milk, cream, and butter by 13 percent; fresh fruit by 16 percent; and margarine by 12 percent. The greatest gain, influenced more by the 1- or 2-percent rise in income than by any other factor, would be in food consumed away from home, which would grow by 37 percent, while food at home would increase by only 24 percent.

To Order This Report...

The information presented here is excerpted from ***U.S. Demand for Food: Household Expenditures, Demographics, and Projections for 1990-2010,*** TB-1818, by Noel Blisard and James R. Blaylock. The cost is $12.00.

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SUMMARY OF REPORT #AER-692

Hog Producers' Gains and Costs, 1988-91, Show Profits Peaked in 1990

March 1994

Contact: Kenneth H. Mathews, (202) 219-1286

Returns to hog producers were positive in 1990-91, but rose most in 1990. Net returns in 1990 increased for feeder pig producing and feeder pig finishing operations because hog and pig prices were higher in 1990 and feed prices were lower. When prices for slaughter hogs, feeder pigs, and cull hogs dropped in 1991, profits declined. This report, *Costs and Structure of U.S. Hog Production, 1988-91*, from USDA's Economic Research Service, summarizes USDA data to trace methods, technologies, sizes, numbers, costs, and returns in various branches of the U.S. hog production industry.

Improved Technologies Led to More Efficient Hog Production

The hog production industry changed significantly in the 1980's, becoming more specialized as industrialization and capital were substituted for labor. Feed use declined by 14 percent, or 60 pounds, per hundredweight of hogs and pigs sold from 1980 to 1988, with the North Central States showing the lowest feed expenses. However, protein, feed supplements, and byproducts increased as farms increased in size. Larger litters, which have been the trend since at least 1973, also added to the positive residual returns to management and risk for larger farrow-to-finish operations during 1988-91. However, these residual returns and risk were negative in 1988-90 for operations with 300 head and, in 1989, for operations with 650 head.

Larger Operations Showed Different Cost Patterns

Operations have become larger, with successively larger shares of production produced by fewer operations. The larger operations showed cost and return advantages in litter size, feed expenses, and fixed cash costs. The large operations weaned more pigs per litter and weaned pigs earlier at smaller weights. These larger operations also sold market hogs at slightly lower weights. However, some costs, especially veterinary and hired labor expenses, increased dramatically as size of enterprise increased. Average purchased feed expenses were greatest for the largest operations, suggesting that, as the size of operation increased, a smaller share of feed was grown onfarm. Feed expenses and fixed cash costs declined as size of farrow-to-finish operation increased to 1,300 head, but then increased somewhat with an even larger size of operation.

Nevertheless, the largest firms were not much more profitable than the small ones on the basis of per hundredweight of hogs sold. The increased profits of large firms appear to come mostly from increased volume, which justifies the present trend of increasing size in hog operations.

To Order This Report...

The information presented here is excerpted from ***Costs and Structure of U.S. Hog Production, 1988-91,*** AIB-692, by Hosein Shapouri, Kenneth H. Mathews, Jr., and Pat Bailey. The cost is $9.00.

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