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## GRAZING PUBLIC LANDS IN WESTERN SOUTH DAKOTA - WHAT'S IT WORTH?

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### CATTLE 89-22

#### Summary

South Dakota has relatively few acres of public rangeland when compared to other western states. However, public grazing in South Dakota can have a major impact on local area economies in which public grazing occurs.

Total harvested AUMs have declined over the study period. The total value of public land grazing has climbed mainly due to higher cattle prices.

In 1988, South Dakota public lands participated in the production of approximately \$35 million in gross livestock production. This gross production generated an estimated \$66 million in economic activity to the region.

In 1988, public lands accounted for an estimated \$22.8 million of the \$35 million in gross livestock production. This \$22.8 million generated an estimated \$42.6 million in economic activity to the economies in which public grazing occurred. The gross value of public land's contribution to the value of grazing was estimated in 1988 to be \$55.71/AUM with an economic value of \$104.17/AUM.

(Key Words: Public Lands, Grazing, Economic Analysis.)

#### Introduction

Livestock grazing on public lands in South Dakota and in other parts of the west are facing growing competition from other uses of the rangeland. Public lands are by federal mandate "multiple-use" lands. The U.S. Forest Service (USFS) and the Bureau of Land Management (BLM) are required to manage for all expected uses of the land. Conflicts have risen when reallocations of traditional uses are made to accommodate expected future nongrazing uses.

One such conflict is between livestock grazing and prairie dog management. The conflict occurs when ranchers, many of whom depend upon public grazing land to make their ranches economically viable, are asked to reduce or eliminate grazing on a particular tract of land in favor of increasing the number of acres of prairie dogs. The increased acres of prairie dogs are then available for recreationists to hunt with gun and camera or for use in the proposal to reintroduce the black footed ferret into South Dakota.

The outcome of these types of conflicts can have great impacts on local communities as well as specific businesses within those affected communities. For example, decreasing the allowable number of animal unit months (AUMs--the amount of forage required to feed a cow with calf for one month) on a given grazing allotment could result in: (1) a reduction in the number of livestock that the affected rancher(s) can support on the remaining private and public land under their stewardship; (2) the possible loss of a ranch operation (i.e., ranch family) to the local community; (3) the reduction in expenditures for livestock related goods and services provided to the rancher by local agricultural businesses; and (4) a reduction in the expenditures of the rancher for nonagricultural goods and services (i.e., household goods, fast foods, movie tickets, clothing, other entertainment, etc.). Increasing the opportunities for recreation on public lands may result in: (1) an increase in the number of "tourists" to the local community; (2) an increase in expenditures for recreational equipment and supplies; (3) an increase in expenditures for gasoline, fast foods, and other local entertainment; and (4) the creation of new local business which cater to tourist type activities (guide services, motels, etc.).

The total impact that any given change of public land use will have on a local economy depends upon how much of the total expenditures of each industry (local grazing, recreation and tourism) remain in the local community and how much "leaks out" to other areas of the region or country.

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### Purpose of the Study

The purpose of this report is to provide information to the general public concerning the economic value of grazing on public rangelands in South Dakota and to discuss in broad terms the relative importance of both grazing and nongrazing uses of these public lands. Thus, while this report does not directly address the economic pros and cons of specific issues such as livestock grazing and prairie dogs, this study presents information which may need to be considered when reallocations are made in grazing permits to accommodate increases in nongrazing uses of public rangelands in South Dakota.

### Data Sources

Estimates presented in this report were derived from data provided by the USFS (USFS, 1973-88), BLM (BLM, 1973-88), and individual grazing cooperatives as well as other data already available at South Dakota State University (Dooley et al., 1982; SDSU, 1989). Information on recreational hunting was obtained from the South Dakota Department of Game, Fish, and Parks (SDGFP) and the USFS.

### Materials and Methods

Data on the actual number of animal unit months (AUMs) of grazing which were harvested from South Dakota public lands were obtained from the USFS and BLM from 1973 to 1988 (see references). Data included all livestock grazing in South Dakota on the Buffalo Gap National Grasslands, Fort Pierre National Grasslands, Black Hills National Forest, Grand River National Grasslands, and BLM land. Data were unavailable for the Camp Crook Division of the Custer National Forest. Efforts were made to insure that an AUM represented one cow with calf in each database.

All grazing was assumed to be by cow-calf pairs. Data on the actual AUMs harvested from public lands were divided by the average length of permit (in months) by grazing association or direct permit group to estimate the total number of animal units (AUs) which utilized public rangeland for grazing at sometime during the grazing season.

Typical sales per AU were estimated from SDSU data. These sales were multiplied by estimated AUs utilizing public rangeland to estimate total value of livestock produced which utilize public rangeland at sometime during the grazing season. This figure

represents the total return to livestock which graze public and private lands but does not indicate public land's share of the value of grazing.

To determine public land's share of the total value of grazing, the total value was divided by a ratio of the length of time cattle graze on public land to the total time cattle graze during any given year. An assumption was made that all sales of grazing livestock were returns to the grazing enterprise. This implies that the grazing enterprise pays for the feed and feeding of the associated livestock during nongrazing months.

The economic value of public land's share of grazing was computed by applying a multiplier to the gross value computed above. The multiplier selected for use in this study was derived from a study of the Impact of Public Land Policies on the Livestock Industry and Adjacent Communities, Big Horn County, Wyoming (Lewis et al., 1977). The value of the multiplier was 1.87. This multiplier implies that \$1.87 of business activity was generated in the region by \$1.00 of production in the livestock sector. Other multipliers from the same study include 1.86 for food, drink, and lodging; 2.09 for trade (tourists); 1.41 for manufacturing, 1.41; and 1.78 for small grains.

The economic impact of public rangeland grazing to local communities was estimated by allocating public rangeland's share of the value of grazing on public lands over those counties in which public grazing occurs. The allocation was made by multiplying public land's share of the value of grazing by the ratio of the acres of public rangeland to the total acres of rangeland in each county. Total acres of public rangeland in each county as well as the total acres of rangeland by county were computed from 1982 U.S. agricultural census data and information from the USFS (USFS, 1988) and BLM (BLM, 1988). To facilitate this analysis, the value of an acre of public grazing was assumed to be the same in each county.

### Results

#### Animal Unit Months Harvested from SD Public Rangelands

Actual AUMs harvested from South Dakota public rangeland have followed a downward trend from the early 1970's (Figures 1 and 2). The peak year for harvested AUMs was 1974 at 478,526 AUMs. The low years were 1981 at 406,909 AUMs and 1988 at 408,542. Both 1981 and 1988 were considered

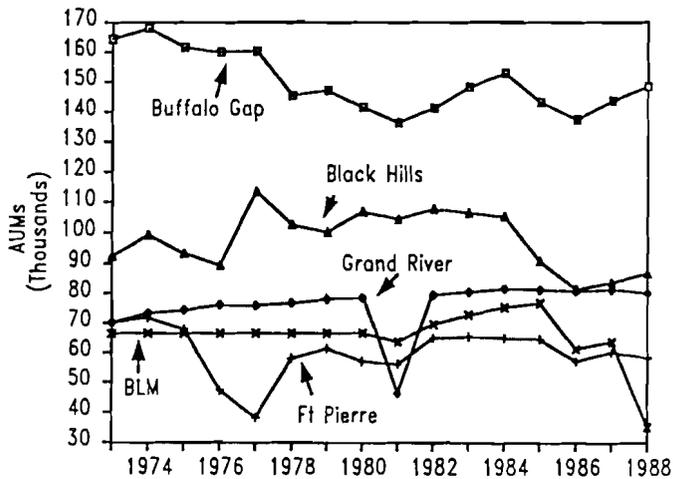


Figure 1. AUMs harvested from SD public rangeland and jointly administered private land by land agency, 1973-88.

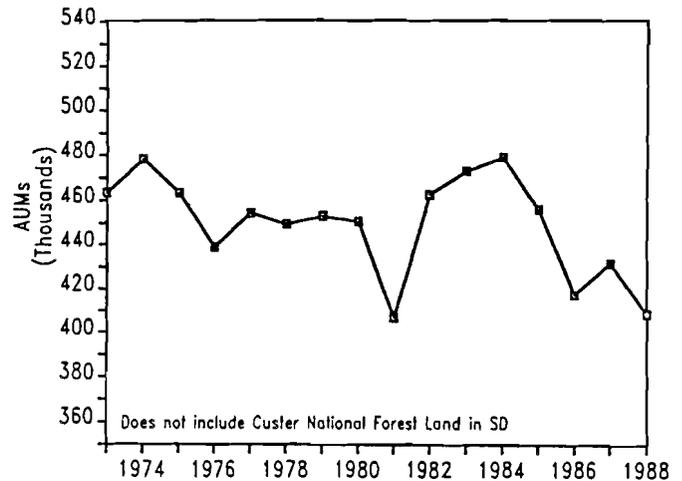


Figure 2. AUMs harvested from SD public rangeland and jointly administered private land, 1973-88.

drought years. The Buffalo Gap National Grasslands provide the largest amount of public land grazing in the state (148,542 AUMs in 1988). Grazing on the Grand River National Grasslands and on BLM land had an increase in actual harvested AUMs from 1973 until the mid 1980's.

Much of the decrease in AUMs utilized between 1985 and 1988 are the result of several factors, one of which is voluntary "nonuse" by permittees. "Nonuse" represents the difference between the permitted number of AUMs of grazing allotted by the governing agency and what is actually used. Often another permittee will "fill-in" behind someone's nonuse to take advantage of the available grazing. In drought years nonuse may go unused due to the lack of available grass.

For the 1985-88 period the reduction in the actual AUM's utilized were a result of one or more of the following: (1) voluntary reductions by permittees due to drought or economic conditions of the livestock industry and (2) agency mandated reductions resulting from the unavailability of grass (Butch Ellis, Steve Libby, and Mark Stiles, personal communication).

The average length of time cattle are permitted to be on public lands ranged from 6 months (BLM and Grand River National Grasslands) to 4.7 months (Black Hills Nation Forest) with an average of 5 months.

#### Estimated Animal Units Utilizing SD Public Rangelands

The number of animal units (AUs) grazing public lands ranged from 78,909 in 1988 to 92,479 in 1975 (Table 1). The second highest number of cow/calf pairs (AUs) was 92,231 in 1984.

#### Estimated Value of Livestock Sold

The estimated value of livestock sold per animal unit from livestock which graze both public and private rangeland is presented in Table 2. These values were computed as the total sales of steer and heifer calves, cull cows, and cull heifers from a typical South Dakota herd divided by the average number of producing cows in the herd. This analysis assumes a 95% calving percentage (includes replacements of dead calves with purchased calves shortly after birth) with a 1% death loss and 16% of the heifers kept for replacements. Thus, out of 100 cows, 95 live calves are born, 1 calf dies, 44 steers and 33 heifers are available for sale (77 total), and 2 cull heifers are sold as well as 15 cull cows. Average weights for each class of livestock were the same for each year of the analysis (Dooley et al., 1982; SDSU, 1989) and South Dakota average prices by class of livestock were used.

TABLE 1. ESTIMATED AUs ON SOUTH DAKOTA PUBLIC RANGELAND  
BY LAND AGENCY, 1973-88

Year	Buffalo Gap NG	Fort Pierre NG	Grand River NG	Black Hills NF	BLM	Total
1973	32414	14060	11680	20246	11084	89483
1974	33129	14345	12202	21719	11084	92479
1975	31875	13576	12398	20426	11084	89359
1976	31535	9434	12666	19592	11084	84311
1977	31575	7638	12623	24906	11084	87825
1978	28634	11589	12787	22528	11084	86622
1979	28983	12262	12990	21949	11084	87267
1980	27873	11396	13078	23477	11084	86907
1981	26829	11198	7699	22936	10592	79253
1982	27759	12968	13232	23657	11576	89192
1983	29133	13069	13402	23404	12118	91125
1984	30027	12964	13570	23151	12520	92231
1985	28116	12879	13526	19984	12771	87276
1986	27006	11381	13437	17828	10175	79826
1987	28215	11977	13520	18233	10586	82530
1988	29188	11625	13338	18906	5853	78909

TABLE 2. ESTIMATED GROSS PRODUCTION PER ANIMAL UNIT GRAZING  
SOUTH DAKOTA PUBLIC LANDS, 1988

	Weight, cwt		Price, \$		Percent		Total, \$
Calves	4.69	x	101	x	77	=	364.74
Cull heifers	8.50	x	70	x	2	=	11.90
Cull cow	10.0	x	46	x	15	=	69.00
					Total income		445.64

Analysis assumes a 95% calf crop, 1% death loss, 16% replacements

The total sales from livestock which grazed both public and private land in South Dakota are shown in Figures 3 and 4. Figure 3 shows the total value by public land agency. Figure 4 shows the total value. All values have been adjusted for inflation to 1988 values. In Figure 3, the value for livestock sold increases between 1987 and 1988 for each for each public land unit with the exception of BLM grazing land. The value of grazing on BLM land declined due to a large decrease in the total number of AUMs used in 1988 (63,516 AUMs in 1987, 35,115 AUMs in 1988). Voluntary nonuse by permittees rather than mandatory reductions by BLM accounted for the 1988 decline.

Total sales from herds grazing both public and private land ranged from \$19.4 million in 1975 to \$38 million in 1979 (Figure 4, "Gross Value" line). Total value for 1988 was estimated at \$35.2 million.

The "Multiplied Value" line in Figure 4 represents the estimated total economic activity generated from the gross sales of livestock grazing both public and private land. The values on this curve reflect the impact that dollars spent on producing livestock on public land have in other parts of the local economy. They were calculated utilizing a multiplier of 1.87 (Lewis et al., 1977). In 1988, the \$35.2 million in gross

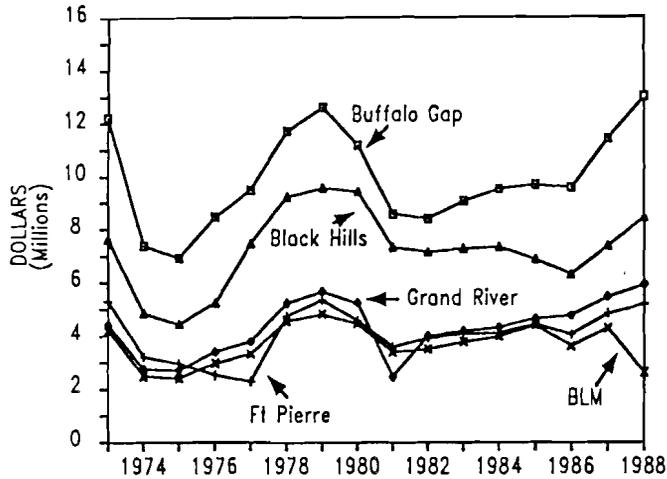


Figure 3. Estimated value of calves sold from herds grazing on both SD public and private rangeland by land agency, adjusted to 1988 dollars, 1973-88.

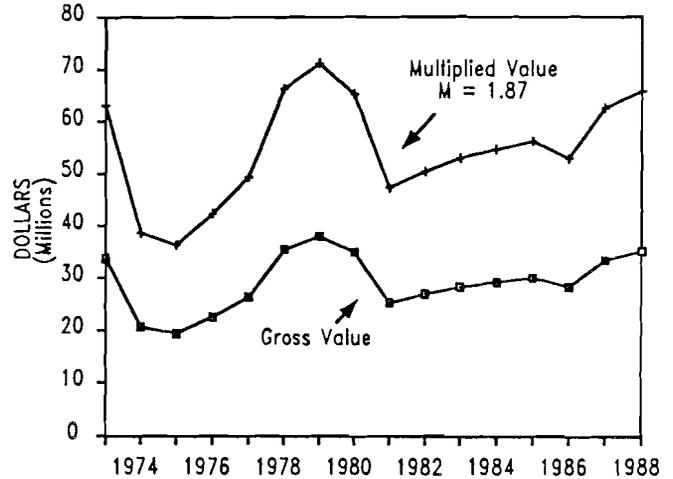


Figure 4. Estimated value of calves sold from herds grazing on both SD public and private rangeland, adjusted to 1988 dollars, 1973-88.

livestock sales from herds grazing both public and private land was estimated to generate \$65.8 million in total economic activity to western South Dakota.

Although the total number of AUs utilizing public rangeland have tended to decline, the effects of the recent drought and ongoing herd reduction on livestock prices have resulted in relatively high total value estimates over the last 3 years. Price appears to be more important than the number of AUMs harvested in determining total value of grazing on public lands.

The prices used in Figures 3 and 4 are adjusted for inflation using the Producers' Price Index for livestock (U.S. Department of Commerce, 1989). All prices were adjusted to 1988 values (1988 = base year).

#### Public Land's Contribution to Total Value of Grazing

The contribution of public land grazing to the total value of grazing was calculated by public land unit (Figure 5) and total (Figure 6). Public land's contribution, in 1988 dollars, ranged from \$12.6 million to \$22.8 million between 1975 and 1988, respectively (Figure 6). This translates into a return per AUM of grazing on public land of \$27.19 in 1975 to \$55.71 in 1988. The value of grazing on the Buffalo Gap National Grasslands in 1988 was estimated at

\$8.3 million (Figure 5). The Black Hills National Forest contributed \$4.8 million.

#### Economic Value of Public Land's Contribution

Public land's contribution to local economies in which public grazing takes place ranged from \$23.6 million in 1975 to \$46.1 million in 1979 (Figure 6). Public land's contribution in 1988 is estimated at \$42.6 million. This translates into an economic return per AUM of \$41.93 in 1975 to \$83.93 in 1979. The return per AUM of grazing in 1988 was \$104.17.

#### **Economic Value to Local Economies**

#### Public vs Private Rangeland in South Dakota

The amount of rangeland in each county that has public grazing land is presented in Table 3. There are an estimated 13.7 million acres of rangeland in the 13 western counties that contain almost all of the public grazing land in South Dakota. Of the 13.7 million rangeland acres, 2.3 million (16.6%) are public acres. Lawrence County has the highest percentage of public rangeland at 64.5%. Custer and Pennington Counties have 49.7 and 42.5% public rangeland, respectively.

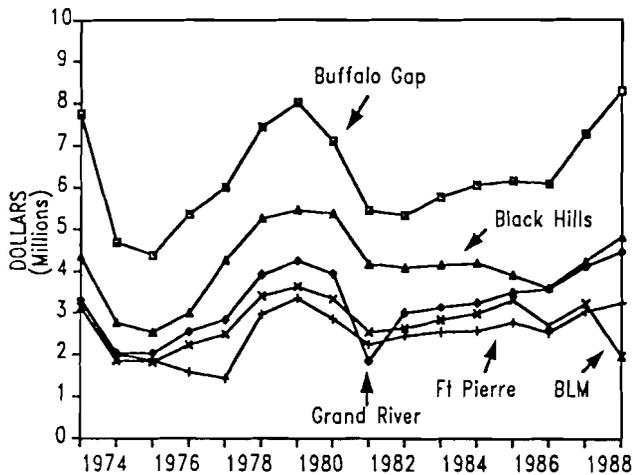


Figure 5. Public land's contribution to the value of calves sold from herds grazing SD rangelands, by land agency, adjusted to 1988 Dollars, 1973-88.

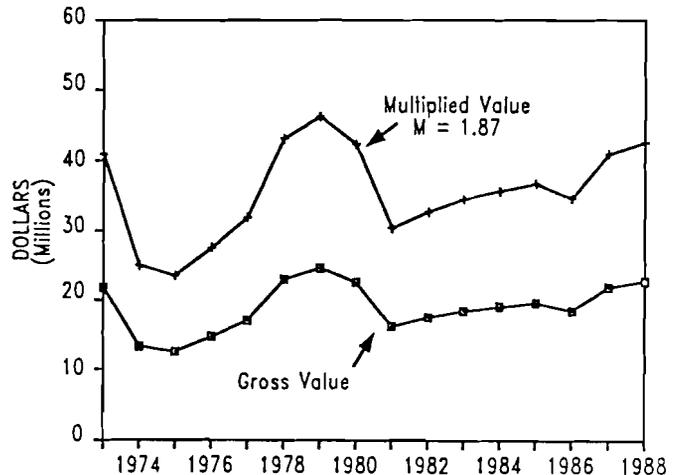


Figure 6. Public land's contribution to the value of calves sold from herds grazing SD rangelands, adjusted to 1988 Dollars, 1973-88.

TABLE 3. COMPARISON OF PUBLIC AND PRIVATE LAND BY COUNTY IN WESTERN SOUTH DAKOTA

County	Private acres	Public acres <sup>a</sup>	Total acres	Percent public
	————— 1000's —————			
Butte	975	146	1121	13.0
Corson	1293	31	1324	2.4
Custer	378	373	751	49.7
Fall River	900	285	1185	24.0
Harding	1364	103	1467	7.1
Jackson	1045	107	1152	9.3
Jones	332	20	352	5.7
Lawrence	151	274	425	64.5
Lyman	564	61	625	9.7
Meade	1687	79	1766	4.5
Pennington	825	609	1435	42.5
Perkins	1240	132	1372	9.6
Stanley	667	52	719	7.3
Total	11423	2273	13696	16.6

<sup>a</sup> Includes public grazing land on the national forests, national grasslands, and Bureau of Land Management land in South Dakota.

### Economic Value by County

Although South Dakota has very little public rangeland as compared to other western states, public grazing can have a major impact on the local communities in which it exists. The value of public land grazing to local communities was estimated for 1988 (Table 4). Table 4 demonstrates how public land's share of the gross value of grazing is distributed by county and by type of public land. Table 5 is similar with the exception that the multiplied or economic value of public land's contribution to the value of grazing was used.

According to this analysis, Pennington County has the highest dollar value of public lands grazing in the state. Pennington County received an estimated \$1.8 million in gross revenue from grazing on the Black Hills National Forest, \$2.8 million from grazing on the Buffalo Gap National Grasslands, and \$123 thousand from grazing on BLM rangeland for a total of \$4.7 million in total gross receipts (Table 4). The total economic value of this grazing amounted to over \$8.7 million in economic activity in Pennington County in 1988 (Table 5).

TABLE 4. VALUE OF GRAZING BY COUNTY AND BY TYPE OF SOUTH DAKOTA PUBLIC LANDS<sup>a</sup>, 1988

County	BH	BG	FP	GR	BLM	Total
	Thousands of Dollars					
Brule					4	4
Butte					1024	1024
Corson				894		894
Custer	1423	800			26	2249
Fall River	213	3224			51	3489
Haakon					10	10
Harding					210	210
Jackson		1499			2	1500
Jones			557			557
Lawrence	1224				38	1262
Lyman			1692		1	1693
Meade	169				294	463
Pennington	1798	2756			123	4676
Perkins				3560	57	3618
Stanley			989		118	1107
Ziebach	—	—	—	3	—	3
Total	4827	8279	3238	4458	1956	22758

<sup>a</sup> BH = Black Hills National Forest; BG = Buffalo Gap National Grasslands; FP = Fort Pierre National Grasslands; GR = Grand River National Grasslands; and BLM = Bureau of Land Management lands.

This table does not include Custer National Forest land in Harding County.

All values in 1988 dollars.

TABLE 5. ECONOMIC VALUE OF GRAZING BY COUNTY AND BY TYPE OF SOUTH DAKOTA PUBLIC LAND<sup>a</sup>, 1988

County	BH	BG	FP	GR	BLM	Total
Thousands of Dollars						
Brule					7	7
Butte					1915	1915
Corson				1672		1672
Custer	2661	1497			48	4206
Fall River	399	6028			96	6524
Haakon					18	18
Harding					392	392
Jackson		2803			3	2806
Jones			1041			1041
Lawrence	2289				71	2360
Lyman			3164		1	3165
Meade	316				550	866
Pennington	3362	5153			229	8744
Perkins				6658	107	6765
Stanley			1849		221	2070
Ziebach	6			6		6
Total	9027	15481	6055	8336	3658	42557

<sup>a</sup> BH = Black Hills National Forest; BG = Buffalo Gap National Grasslands; FP = Fort Pierre National Grasslands; GR = Grand River National Grasslands; and BLM = Bureau of Land Management lands.

This table does not include Custer National Forest land in Harding County. All values in 1988 dollars.

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