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THE ECONOMIC VALUE OF
GRAZING PUBLIC LANDS
IN WESTERN SOUTH DAKOTA

by

Martin K Beutler*

Economics Department
Staff Paper 89-9**

December, 1989

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SUMMARY

Martin K Beutler*

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.

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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 re-allocations of traditional uses are made to accommodate expected future non-grazing 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 re-introducing 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 non-agricultural 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.

Multipliers in Economic Studies

The total impact of a dollar produced or spent in a community is often measured through the use of a "multiplier." Much confusion exists however, over the proper usage of multipliers and just how they fit in an economic analysis.

Multipliers are commonly used in economic studies which attempt to show how important one business or industry is to a given geographic region or community. Multipliers are numbers which measure the magnitude of the direct and indirect effects that a given amount of production or expenditure has on a region or community. There are multipliers for total output, income, and employment.

A direct effect is equivalent to the initial impact of the original production or expenditure. For example, the direct effect of \$1.00 spent on some good or service in a community is 1. Indirect effects measure the additional effects the original purchase may have as that expenditure "turns-over" within the region or community.

For example, lets assume that we want to know the total impact that money received from the sale of a market steer has on a community. The direct effect represents the money received from the sale of the steer as it is used to pay for all the inputs used in the production of that steer as well as provide income for

the rancher to whom the steer belonged. The indirect effect represent what happens to the money after it is spent to: (1) pay for inputs used to produce the steer or (2) provide income to the rancher.

Many, of the inputs used in the production of the steer were purchased from various agricultural businesses. Money spent on these inputs are considered gross receipts to those agricultural business which supplied them. These business, in turn, use a portion of the money to pay other businesses for the inputs required to operate their own businesses. Thus, a portion of the money spent in the production of the steer can cycle over and over in the local community as these agricultural businesses purchase and sell items, one with another.

In addition to the expenditures for agricultural inputs above, the rancher uses the income portion of the sale of the steer to purchase goods and services for family living and recreation. Many of these expenditures are to non-ag businesses located in the community. And, as in the ag business example above, these non-ag business use the money they received from the rancher to pay for the inputs required to operate their own business. Thus, the income portion of the money received from the sale of the steer can also cycle over and over within the community.

The magnitude of the indirect effect is dependent upon how much of the goods and services were produced within the local area and how much of them were produced outside. The continuing or multiplier effect of money spent on goods and services produced outside the local area is lost to that economy and no longer contributes to the final size of the multiplier. This is demonstrated in the Figure 1 as "leakage".

The example in Figure 1 assumes that 40 percent of the value of purchases within a community remains in that region. Thus, 40 percent of an initial one

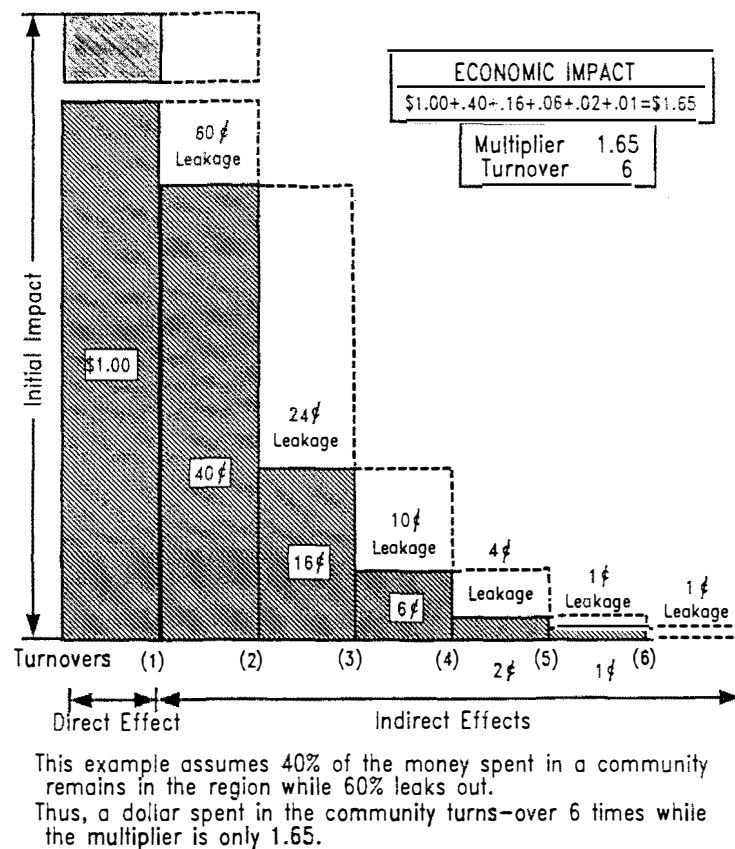


Figure 1. An example of a multiplier.

dollar expenditure remains in the economy each time the money turns-over in the region. The term "Turnover" represents the number of times portions of the initial impact cycles in the economy. People often confuse turnover with multiplier. The number of times an initial impact turns-over in an economy is not equivalent to the size of the final impact as represented by the value of the multiplier. Thus, hearing that a dollar spent in any given industry in a community turns over 7 times does not imply that the multiplier is 7. The money may turn-over 7 times, but 7 is not the multiplier.

In our example, the money turns-over 6 times. However, when the indirect effects are added to the direct effect, the total (or multiplier) equals 1.65. Recent studies estimating multipliers have indicated that, especially for smaller communities, multipliers range between 1 and 3, and are more normally under 2.

When comparing two economic studies which employ multiplier analysis one should not be overly concerned with the exact size of the multipliers which are

presented. What is more important is to determine if the multiplier from one study is comparable to the multiplier of another. To answer this, the assumptions of each study, their model designs, and other considerations must be taken into account. The origins of both multipliers must be compared before emphasis is placed on their exact sizes. Multipliers above 2 should be viewed with some skepticism.

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 non-grazing 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 does presents information which may need to be considered when reallocations are made in grazing permits to accommodate increases in non-grazing uses of public rangelands in South Dakota.

METHOD USED TO DETERMINE GRAZING VALUES

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 on was obtained from South Dakota Department of Game, Fish, and Parks (SDGFP) and the USFS.

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 non-grazing 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 Eat, Drink, and Lodging, 1.86; Trade (Tourists), 2.09; Manufacturing, 1.41; and Small Grains, 1.78.

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

Data collected on the actual number of AUMs harvested from South Dakota public rangeland are presented in Table 1. Actual AUMs harvested have followed a downward trend from the early 1970's (Figure 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 drought years. The Buffalo Gap National Grasslands provides 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 "non-use" by permittees. "Non-Use"

Table 1. AUMs Harvested from South Dakota Public Lands, Summary of Grazing Districts and Direct Permit Areas, 1973-1988.¹

GRAZING DISTRICT	Number of Permittees	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
WALL	26	29147	29947	26877	23977	22398	15486	15620	15502	14989	15298	15750	15324	14003	12187	14251	13554
CENTRAL	49	70300	71723	67878	47168	38189	57945	61308	56979	55990	64842	65345	64819	64393	56903	59883	58125
EASTERN PENN.	32	25127	25187	22428	23959	22112	20172	21792	21143	18116	19202	19219	20471	18768	21558	23505	22230
WHITE RIVER	50	39668	39073	39396	37711	39166	33673	33693	30796	28149	29759	32090	35199	32488	29390	34233	33062
SOUTH DIRECT	20	3927	3815	3770	3976	3986	3854	3854	3955	3926	3926	4081	4163	4163	4162	4217	3485
NORTH DIRECT	41	15371	17502	17891	18615	19319	19477	19788	18817	19470	19742	20305	20552	19034	18118	17001	20008
COTTONWOOD	26	10222	10880	10835	10522	10867	10722	11357	12450	12419	13428	13745	13892	14768	12903	12316	14445
PIONEER	60	31414	31483	30450	30504	30585	30737	30739	29923	28394	28817	31184	31043	29173	28169	26167	30674
INDIAN	17	9488	10100	10000	10699	11884	11428	10345	8969	11063	11102	11964	12182	10760	10996	11876	11156
GRAND RIVER	112	70077	73214	74386	75996	75736	76724	77941	78466	46191	79390	80410	81420	81157	80620	81118	80028
CUSTER	46	18351	19687	18515	17759	22576	20420	19952	21078	20931	21829	20946	19679	17568	15849	16609	21049
ELK MOUNTAIN	48	25389	27237	25616	24569	31233	28252	27013	28688	30038	29166	28341	29455	22803	22793	23843	23789
HARNEY	29	18273	19603	18437	17683	22480	20334	19227	21514	20989	21953	22167	21342	19040	16707	17504	17038
NEMO	34	8979	9632	9059	8689	11046	9991	7945	11406	11051	11443	11376	11176	9706	9172	10330	7772
PACTOLA	16	6801	7296	6861	6581	8366	7568	9746	7449	5671	7245	7446	7284	5340	4747	4998	5131
SPEARFISH	24	14583	15644	14713	14112	17939	16227	16369	16876	15973	16326	16466	16603	16273	12071	10196	11881
BLM PERMITS	425	66503	66503	66503	66503	66503	66503	66503	66503	63549	69457	72706	75117	76628	61052	63516	35115
TOTAL	1055	463621	478526	463614	439023	454386	449513	453192	450514	406909	462926	473541	479722	456065	417397	431563	408542

Summary by Land Agency

Buffalo Gap	272	164364	167987	161647	159963	160318	145550	147188	141555	136526	141275	148338	152827	143157	137483	143566	148614
Ft Pierre	49	70300	71723	67878	47168	38189	57945	61308	56979	55990	64842	65345	64819	64393	56903	59883	58125
Grand River	112	70077	73214	74386	75996	75736	76724	77941	78466	46191	79390	80410	81420	81157	80620	81118	80028
Black Hills	197	92376	99099	93201	89393	113640	102791	100252	107011	104653	107962	106742	105539	90730	81339	83480	86660
BLM	425	66503	66503	66503	66503	66503	66503	66503	66503	63549	69457	72706	75117	76628	61052	63516	35115

¹Source: Direct communication with U.S. Forest Service and Bureau of Land Management.
Does not include Custer National Forest land near Camp Crook, SD.

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 non-use to take advantage of the available grazing. In drought years non-use 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 (Figure 3).

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 2). The second highest number of cow/calf pairs (AUs) was 92,231 in 1984.

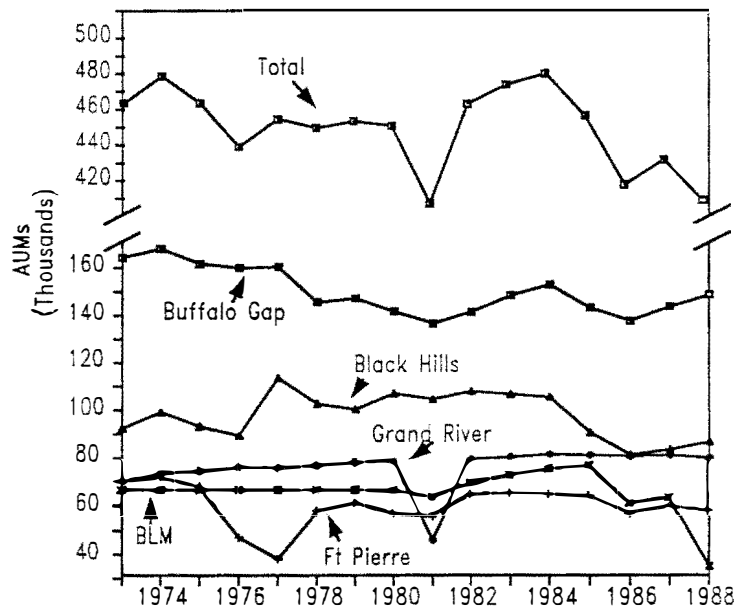


Figure 2. AUMs harvested from South Dakota public rangeland and jointly administered private land, 1973-88.

Table 2. Estimated Number of Animal Units (AUs) Utilizing South Dakota Public Lands by Grazing District and Direct Permit Area, 1973-1988.

GRAZING DISTRICT	Months of Grazing	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
WALL	5	5829	5989	5375	4795	4480	3097	3124	3100	2998	3060	3150	3065	2801	2437	2850	2711
CENTRAL	5	14060	14345	13576	9434	7638	11589	12262	11396	11198	12968	13069	12964	12879	11381	11977	11625
EASTERN PENN.	5	5025	5037	4486	4792	4422	4034	4358	4229	3623	3840	3844	4094	3754	4312	4701	4446
WHITE RIVER	5	7934	7815	7879	7542	7833	6735	6739	6159	5630	5952	6418	7040	6498	5878	6847	6612
SOUTH DIRECT	4.59	856	831	821	866	868	840	840	862	855	855	889	907	907	907	919	759
NORTH DIRECT	4.77	3222	3669	3751	3903	4050	4083	4148	3945	4082	4139	4257	4309	3990	3798	3564	4195
COTTONWOOD	5.48	1865	1985	1977	1920	1983	1957	2072	2272	2266	2450	2508	2535	2695	2355	2247	2636
PIONEER	5.2	6041	6054	5856	5866	5882	5911	5911	5754	5460	5542	5997	5970	5610	5417	5032	5899
INDIAN	5.78	1642	1747	1730	1851	2056	1977	1790	1552	1914	1921	2070	2108	1862	1902	2055	1930
GRAND RIVER	6	11680	12202	12398	12666	12623	12787	12990	13078	7699	13232	13402	13570	13526	13437	13520	13338
CUSTER	4.75	3863	4145	3898	3739	4753	4299	4200	4437	4407	4596	4410	4143	3699	3337	3497	4431
ELK MOUNTAIN	4.75	5345	5734	5393	5172	6575	5948	5687	6040	6324	6140	5967	6201	4801	4799	5020	5008
HARNEY	4.75	3847	4127	3881	3723	4733	4281	4048	4529	4419	4622	4667	4493	4008	3517	3685	3587
NEMO	4.25	2113	2266	2132	2044	2599	2351	1869	2684	2600	2692	2677	2630	2284	2158	2431	1829
PACTOLA	4.75	1432	1536	1445	1386	1761	1593	2052	1568	1194	1525	1568	1533	1124	999	1052	1080
SPEARFISH	4	3646	3911	3678	3528	4485	4057	4092	4219	3993	4082	4117	4151	4068	3018	2549	2970
BLM PERMITS	6	11084	11084	11084	11084	11084	11084	11084	11084	10592	11576	12118	12520	12771	10175	10586	5853
TOTAL	5.24	89483	92479	89359	84311	87825	86622	87267	86907	79253	89192	91125	92231	87276	79826	82530	78909

Summary by Land Agency

	weighted average																
Buffalo Gap	5	32414	33129	31875	31535	31575	28634	28983	27873	26829	27759	29133	30027	28116	27006	28215	29188
Ft Pierre	5	14060	14345	13576	9434	7638	11589	12262	11396	11198	12968	13069	12964	12879	11381	11977	11625
Custer	6	11680	12202	12398	12666	12623	12787	12990	13078	7699	13232	13402	13570	13526	13437	13520	13338
Black Hills	4.6	20246	21719	20426	19592	24906	22528	21949	23477	22936	23657	23404	23151	19984	17828	18233	18906
BLM	6	11084	11084	11084	11084	11084	11084	11084	11084	10592	11576	12118	12520	12771	10175	10586	5853

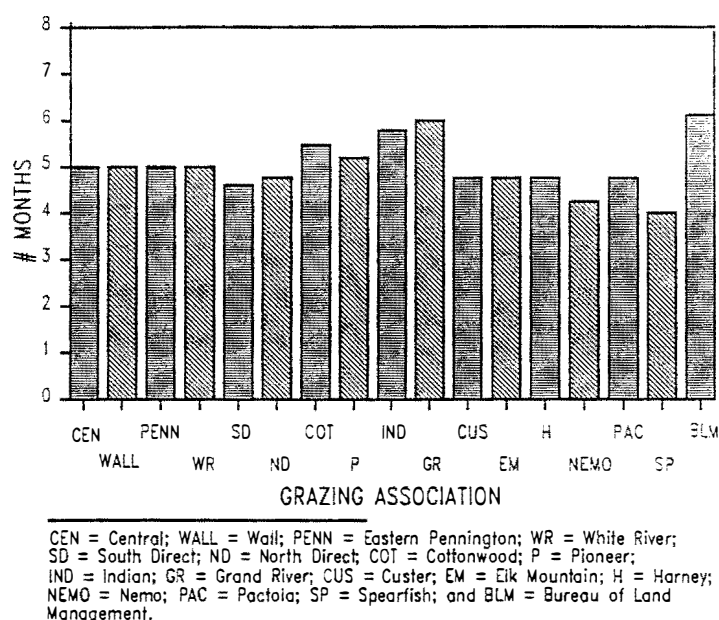


Figure 3. Average length of time cattle are permitted to graze SD public land by grazing district or land agency.

Estimated Value of Livestock Sold

The estimated value of livestock sold per animal unit from livestock which graze both public and private rangeland for 1988 is presented in Table 3. These values were computed as the total sales of 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, one calf dies, 44 steers and 33 heifers are available for sale (77 total), 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 4).

Table 3. Estimated Gross Production per Animal Unit Grazing South Dakota Public Lands, 1988.*

	Weight cwt		Price, \$		Percent		Total, \$
Calves	4.69 cwt	x	\$101	x	77%	=	\$364.74
Cull Heifers	8.50 cwt	x	\$70	x	02%	=	\$11.90
Cull Cow	10.00 cwt	x	\$46	x	15%	=	\$69.00
Total Income							\$445.64

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

Table 4. October Calf, November Cull Cow and Cull Heifer Prices, Dollars per Cwt, 1973-1988.¹

YEAR	CALVES	CULL COWS	CULL HEIFERS
	October Prices	----- November Prices -----	
1973	60.03	30.00	43.30
1974	31.00	17.30	30.60
1975	32.00	20.70	38.40
1976	37.50	21.80	36.30
1977	42.00	24.30	39.90
1978	74.50	39.80	56.00
1979	95.60	45.00	71.80
1980	83.20	45.20	71.20
1981	64.10	36.90	59.40
1982	63.20	35.80	59.20
1983	60.60	36.60	57.20
1984	65.10	36.00	60.50
1985	65.80	32.60	60.20
1986	69.40	35.60	60.90
1987	88.90	44.10	73.90
1988	101.00	46.00	70.00

¹Source: South Dakota Agricultural Statistics. South Dakota Agricultural Statistics Service, Sioux Falls, SD.

The total sales from livestock which grazed both public and private land in South Dakota are shown by grazing district in Table 5. A graphical representation of the summary data in Table 5 is given in Figure 4. All values have been adjusted for inflation to 1988 values. In Figure 4, 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 non-use 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.

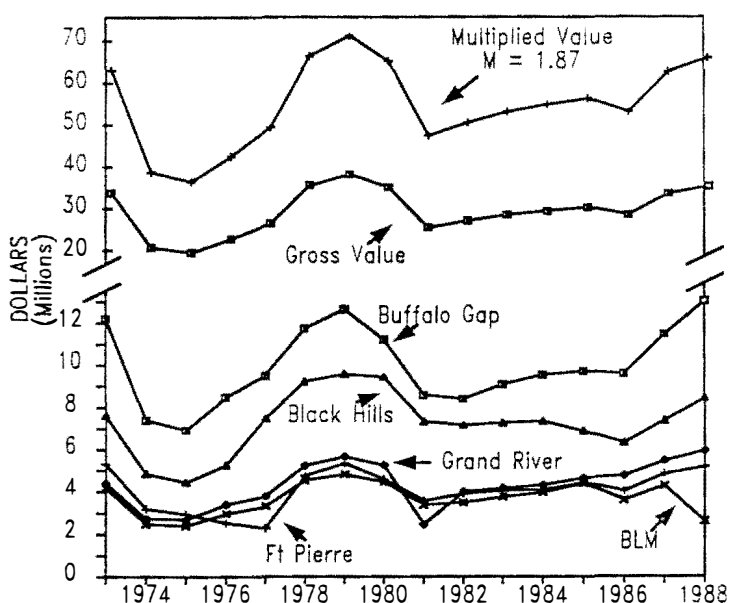


Figure 4. Estimated value of calves sold from herds grazing both SD public and private rangeland by land agency, adjusted to 1988 dollars, 1973-88.

The "Multiplied Value" line in Figure 4 as well as the data in Table 6 represents the estimated total economic activity generated from the gross sales of livestock grazing both public and private land. These multiplied values 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 livestock sales

Table 5. Estimated Value of Calves Sold From Herds Grazing Both SD Public and Private Rangeland by Grazing District,
Adjusted to 1988 Dollars, 1973-1988.

GRAZING DISTRICT	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
-----in \$1000-----																
WALL	2197	1339	1169	1288	1345	1268	1362	1245	957	925	980	972	964	864	1156	1208
CENTRAL	5300	3207	2953	2533	2294	4746	5344	4577	3575	3920	4067	4111	4434	4034	4856	5181
EASTERN PENN.	1894	1126	976	1287	1328	1652	1900	1698	1157	1161	1196	1298	1292	1528	1906	1981
WHITE RIVER	2991	1747	1714	2026	2352	2758	2937	2474	1797	1799	1997	2233	2237	2083	2776	2947
SOUTH DIRECT	323	186	179	233	261	344	366	346	273	259	277	288	312	321	372	338
NORTH DIRECT	1215	820	816	1048	1216	1672	1808	1584	1303	1251	1325	1366	1374	1346	1445	1869
COTTONWOOD	703	444	430	516	596	801	903	913	724	741	780	804	928	835	911	1175
PIONEER	2277	1354	1274	1575	1766	2421	2576	2311	1743	1675	1866	1893	1931	1920	2040	2629
INDIAN	619	391	376	497	617	810	780	623	611	581	644	668	641	674	833	860
GRAND RIVER	4403	2728	2697	3402	3791	5237	5662	5253	2458	4000	4170	4304	4657	4762	5481	5944
CUSTER	1456	927	848	1004	1427	1761	1831	1782	1407	1389	1372	1314	1273	1183	1418	1975
ELK MOUNTAIN	2015	1282	1173	1389	1975	2436	2479	2426	2019	1856	1857	1967	1653	1701	2035	2232
HARNEY	1450	923	844	1000	1421	1753	1764	1819	1411	1397	1452	1425	1380	1247	1494	1598
NEMO	796	507	464	549	781	963	815	1078	830	814	833	834	786	765	985	815
PACTOLA	540	343	314	372	529	652	894	630	381	461	488	486	387	354	427	481
SPEARFISH	1374	874	800	947	1347	1661	1784	1695	1275	1234	1281	1316	1401	1070	1033	1324
BLM PERMITS	4178	2478	2411	2977	3329	4539	4831	4452	3382	3499	3771	3970	4397	3606	4292	2608
TOTAL	33731	20678	19438	22642	26376	35473	38035	34907	25304	26961	28355	29250	30046	28293	33461	35165

\$ VALUE PER PUBLIC

AUM GRAZED	72.76	43.21	41.93	51.57	58.05	78.92	83.93	77.48	62.19	58.24	59.88	60.97	65.88	67.78	77.53	86.07
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Summary by Land Agency, (in \$1000)

Buffalo Gap	12219	7408	6934	8469	9482	11726	12632	11195	8566	8391	9065	9523	9679	9572	11439	13007
Ft Pierre	5300	3207	2953	2533	2294	4746	5344	4577	3575	3920	4067	4111	4434	4034	4856	5181
Custer	4403	2728	2697	3402	3791	5237	5662	5253	2458	4000	4170	4304	4657	4762	5481	5944
Black Hills	7632	4856	4443	5262	7480	9226	9566	9430	7323	7151	7282	7342	6880	6319	7392	8425
BLM	4178	2478	2411	2977	3329	4539	4831	4452	3382	3499	3771	3970	4397	3606	4292	2608

Table 6. Estimated Economic Value of Calves Sold From Herds Grazing Both SD Public and Private Rangeland by Grazing District, Adjusted to 1988 Dollars, (Multiplier = 1.87), 1973-1988.

GRAZING DISTRICT	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
-----in \$1000-----															
WALL	4109	2504	2187	2408	2516	2372	2546	2329	1790	1730	1833	1818	1803	1615	2259
CENTRAL	9911	5998	5522	4738	4289	8875	9994	8559	6686	7330	7605	7688	8291	7543	9688
EASTERN PENN.	3543	2106	1825	2406	2484	3090	3552	3176	2163	2171	2237	2428	2417	2858	3705
WHITE RIVER	5592	3267	3205	3788	4399	5157	5492	4626	3361	3364	3734	4175	4183	3896	5510
SOUTH DIRECT	603	348	334	435	488	643	684	647	511	483	517	538	584	601	633
NORTH DIRECT	2272	1534	1526	1960	2275	3127	3381	2963	2437	2339	2477	2555	2569	2517	3496
COTTONWOOD	1315	830	804	964	1114	1498	1689	1706	1353	1385	1459	1503	1735	1561	2197
PIONEER	4258	2532	2382	2946	3303	4527	4818	4322	3260	3132	3489	3540	3612	3590	4916
INDIAN	1157	731	704	930	1155	1514	1459	1165	1143	1086	1204	1250	1198	1261	1608
GRAND RIVER	8233	5102	5043	6361	7089	9793	10587	9822	4596	7479	7798	8048	8708	8906	11115
CUSTER	2723	1733	1586	1878	2669	3292	3423	3333	2631	2598	2566	2457	2381	2211	3693
ELK MOUNTAIN	3768	2398	2194	2598	3693	4555	4635	4536	3776	3471	3472	3678	3091	3180	4174
HARNEY	2712	1726	1579	1870	2658	3278	3299	3402	2638	2612	2715	2665	2581	2331	2989
NEMO	1489	948	867	1027	1460	1800	1524	2016	1552	1522	1558	1560	1470	1430	1524
PACTOLA	1009	642	588	696	989	1220	1672	1178	713	862	912	909	724	662	900
SPEARFISH	2570	1635	1496	1772	2519	3107	3335	3169	2384	2307	2395	2462	2619	2000	2475
BLM PERMITS	7813	4634	4509	5566	6225	8488	9034	8325	6324	6543	7051	7425	8222	6744	4877
TOTAL	63078	38668	36349	42341	49322	66335	71125	65275	47319	50416	53023	54698	56186	52907	65759

\$ VALUE PER PUBLIC

AUM GRAZED	136.05	80.81	78.40	96.44	108.55	147.57	156.94	144.89	116.29	108.91	111.97	114.02	123.20	126.76	144.99	160.96
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Summary by Land Agency, (in \$1000)

Buffalo Gap	22849	13852	12966	15837	17732	21928	23622	20935	16018	15691	16952	17808	18100	17899	21391	24324
Ft Pierre	9911	5998	5522	4738	4289	8875	9994	8559	6686	7330	7605	7688	8291	7543	9080	9688
Custer	8233	5102	5043	6361	7089	9793	10587	9822	4596	7479	7798	8048	8708	8906	10250	11115
Black Hills	14271	9081	8309	9839	13987	17252	17889	17634	13694	13372	13618	13730	12865	11816	13824	15755
BLM	7813	4634	4509	5566	6225	8488	9034	8325	6324	6543	7051	7425	8222	6744	8026	4877

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 three years. Price appears to be the more important than the number of AUMs harvested in determining total value of grazing on public lands.

The values computed for Tables 5 and 6 as well as Figure 4 were adjusted for inflation using the Producers' Price Index livestock (U.S. Dept of Commerce, 1989). All values 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 and in total (Table 7, Figure 5). Public land's contribution, in 1988 dollars, ranges from \$12.6 million to \$22.8 million between 1975 and 1988, respectively. 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. The Black Hills National Forest contributed \$4.8 million.

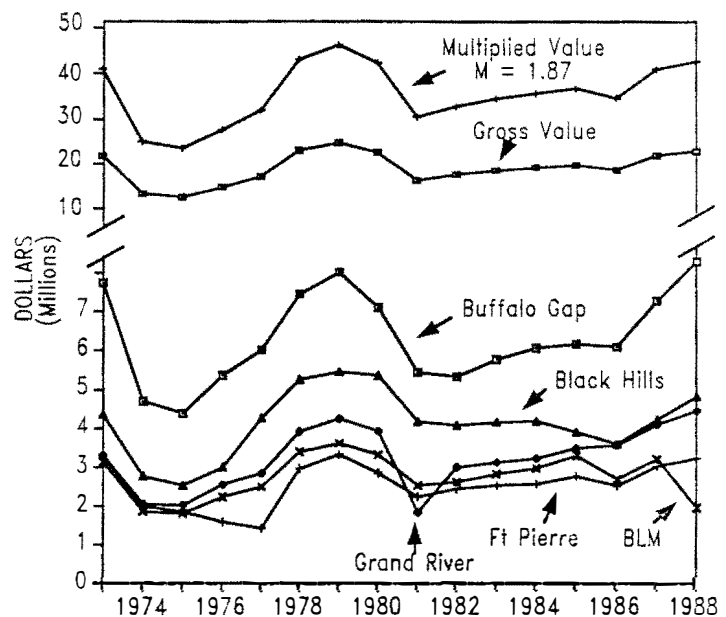


Figure 5. Public land's contribution to the value of calves sold from herds grazing SD rangelands, by land agency, adjusted to 1988 dollars, 1973-88.

Table 7. Public Land's Contribution to the Estimated Value of Calves Sold From Herds Grazing SD Rangelands, by Grazing District, Adjusted to 1988 Dollars, 1973-1988.

GRAZING DISTRICT	Ratio of Time ¹ on SD Public Land	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
		-----in \$1000-----															
WALL	0.62	1373	837	731	805	841	793	851	778	598	578	613	607	603	540	722	755
CENTRAL	0.62	3313	2005	1846	1583	1434	2966	3340	2861	2235	2450	2542	2570	2771	2521	3035	3238
EASTERN PENN.	0.62	1184	704	610	804	830	1033	1187	1062	723	726	748	812	808	955	1191	1238
WHITE RIVER	0.62	1869	1092	1071	1266	1470	1724	1836	1546	1123	1124	1248	1395	1398	1302	1735	1842
SOUTH DIRECT	0.57	185	107	103	133	150	197	210	199	157	148	159	165	179	184	214	194
NORTH DIRECT	0.59	724	489	486	625	725	997	1078	945	777	746	790	815	819	803	862	1115
COTTONWOOD	0.68	482	304	295	353	408	549	619	625	496	507	535	551	636	572	624	805
PIONEER	0.65	1480	880	828	1024	1148	1573	1675	1502	1133	1089	1213	1231	1255	1248	1326	1709
INDIAN	0.72	447	282	272	359	446	585	564	450	442	419	465	483	463	487	602	621
GRAND RIVER	0.75	3302	2046	2023	2551	2843	3927	4246	3940	1843	3000	3128	3228	3492	3572	4111	4458
CUSTER	0.59	865	550	503	596	847	1045	1087	1058	835	825	815	780	756	702	842	1173
ELK MOUNTAIN	0.59	1196	761	697	825	1173	1446	1472	1440	1199	1102	1102	1168	981	1010	1208	1325
HARNEY	0.59	861	548	501	594	844	1041	1047	1080	838	829	862	846	819	740	887	949
NEMO	0.53	423	269	246	292	415	511	433	573	441	432	442	443	418	406	524	433
PACTOLA	0.59	320	204	187	221	314	387	531	374	226	274	290	289	230	210	253	286
SPEARFISH	0.5	687	437	400	474	673	831	892	847	637	617	640	658	700	535	517	662
BLM PERMITS	0.75	3134	1859	1808	2232	2497	3404	3623	3339	2536	2624	2828	2978	3298	2705	3219	1956
TOTAL		21846	13375	12606	14738	17058	23010	24690	22619	16240	17491	18418	19017	19626	18492	21871	22758
\$ VALUE PER PUBLIC																	
AUM GRAZED		47.12	27.95	27.19	33.57	37.54	51.19	54.48	50.21	39.91	37.78	38.90	39.64	43.03	44.30	50.68	55.71
Summary by Land Agency, (in \$1000)																	
Buffalo Gap	0.63	7745	4695	4395	5370	6018	7451	8019	7107	5449	5338	5770	6058	6161	6091	7276	8279
Ft Pierre	0.62	3313	2005	1846	1583	1434	2966	3340	2861	2235	2450	2542	2570	2771	2521	3035	3238
Custer	0.75	3302	2046	2023	2551	2843	3927	4246	3940	1843	3000	3128	3228	3492	3572	4111	4458
Black Hills	0.57	4353	2770	2534	3001	4266	5262	5462	5373	4177	4079	4152	4184	3904	3604	4231	4827
BLM	0.75	3134	1859	1808	2232	2497	3404	3623	3339	2536	2624	2828	2978	3298	2705	3219	1956

¹Total estimated length of grazing season on public and private rangeland = 8 months.

Table 8. Public Land's Contribution to the Estimated Economic Value of Calves Sold From Herds Grazing SO Rangelands, by Grazing District, Adjusted to 1988 Dollars, (Multiplier = 1.87), 1973-1988.

GRAZING DISTRICT	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
-----in \$1000-----																
WALL	2568	1565	1367	1505	1572	1482	1591	1455	1119	1081	1146	1136	1127	1010	1351	1412
CENTRAL	6194	3749	3451	2961	2681	5547	6246	5350	4179	4582	4753	4805	5182	4714	5675	6055
EASTERN PENN.	2214	1316	1140	1504	1552	1931	2220	1985	1352	1357	1398	1518	1510	1786	2228	2316
WHITE RIVER	3495	2042	2003	2367	2749	3223	3433	2891	2101	2103	2334	2609	2614	2435	3244	3444
SOUTH DIRECT	346	199	192	250	280	369	393	371	293	277	297	309	335	345	400	363
NORTH DIRECT	1354	915	910	1169	1356	1864	2016	1767	1453	1395	1477	1524	1532	1501	1611	2084
COTTONWOOD	901	569	551	661	763	1026	1157	1169	927	949	1000	1030	1188	1069	1167	1505
PIONEER	2768	1645	1548	1915	2147	2942	3132	2809	2119	2036	2268	2301	2348	2334	2480	3195
INDIAN	836	528	508	672	834	1094	1054	842	826	784	870	903	866	911	1125	1162
GRAND RIVER	6175	3827	3782	4771	5317	7344	7940	7367	3447	5609	5849	6036	6531	6679	7688	8336
CUSTER	1617	1029	941	1115	1585	1955	2033	1979	1562	1542	1523	1459	1414	1313	1574	2193
ELK MOUNTAIN	2237	1424	1302	1542	2193	2704	2752	2693	2242	2061	2061	2184	1835	1888	2260	2478
HARNEY	1610	1025	937	1110	1578	1946	1959	2020	1566	1551	1612	1582	1532	1384	1659	1775
NEMO	791	503	461	545	775	956	809	1071	825	809	827	828	781	760	979	810
PACTOLA	599	381	349	413	587	724	993	699	423	512	542	540	430	393	474	534
SPEARFISH	1285	818	748	886	1259	1553	1668	1584	1192	1154	1198	1231	1310	1000	966	1238
BLM PERMITS	5860	3476	3381	4175	4668	6366	6775	6244	4743	4908	5288	5569	6166	5058	6019	3658
TOTAL	40851	25011	23573	27560	31898	43030	46170	42297	30369	32709	34443	35563	36701	34580	40899	42557
\$ VALUE PER PUBLIC																
AUM GRAZED	88.11	52.27	50.85	62.78	70.20	95.72	101.88	93.89	74.63	70.66	72.73	74.13	80.47	82.85	94.77	104.17
Summary by Land Agency, (in \$1000)																
Buffalo Gap	14483	8780	8219	10042	11254	13933	14995	13290	10189	9982	10789	11329	11520	11390	13606	15481
Ft Pierre	6194	3749	3451	2961	2681	5547	6246	5350	4179	4582	4753	4805	5182	4714	5675	6055
Custer	6175	3827	3782	4771	5317	7344	7940	7367	3447	5609	5849	6036	6531	6679	7688	8336
Black Hills	8140	5179	4739	5612	7978	9840	10213	10047	7810	7628	7764	7824	7301	6739	7911	9027
BLM	5860	3476	3381	4175	4668	6366	6775	6244	4743	4908	5288	5569	6166	5058	6019	3658

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 (Table 8, Figure 5 - "Multiplied Value" line). 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 9. 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 percent) are public acres. Lawrence county has the highest percentage of public rangeland at 64.5 percent. Custer and Pennington counties have 49.7 and 42.5 percent public rangeland respectively.

Table 9. Comparison of Public and Private Land by County in Western South Dakota

County	Private Acres	Public Acres ^a	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%

^aIncludes 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 10). Table 10 demonstrates how public land's share of the gross value of grazing is distributed by county and by the type of public land. Table 11 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 10). The total economic value of this grazing amounted to over \$8.7 million in economic activity in Pennington County in 1988 (Table 11).

Table 10. Value of Grazing by County and by Type of South Dakota Public Land,^a 1988.

County	BH	BG	FP	GR	BLM	TOTAL
----- IN 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

^aBH = 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.

Table 11. Economic Value of Grazing by County and by Type of South Dakota Public Land,^a 1988.

County	BH	BG	FP	GR	BLM	TOTAL
----- IN 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
Total	9027	15481	6055	8336	3658	42557

^aBH = 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.

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