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Economic Impact of Livestock Grazing and Recreation on the Ft. Pierre National Grasslands

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ECONOMIC IMPACT OF LIVESTOCK GRAZING
AND RECREATION ON THE
FT. PIERRE NATIONAL GRASSLANDS

by

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Economics Department
Staff Paper 92-4**

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INTRODUCTION

As a result of the Coordinated Resource Management (CRM) effort on the Ft. Pierre National Grasslands (FPNG), I was asked to provide an economic analysis of livestock grazing and recreation and demonstrate the importance of each to the Ft. Pierre region.

Data used in this analysis consist of actual Animal Unit Months (AUMs) of grazing on the Ft. Pierre National Grasslands as provided by the Central South Dakota Cooperative Grazing District, and information from reports published by the U.S. Forest Service, U.S. Fish & Wildlife Service, and the S.D. Crop and Livestock Reporting Service.

The model used to determine the impact of grazing in the area was the Input/Output model IMPLAN developed by the U.S. Forest Service, Bureau of Land Management, and Federal Emergency Management Agency. The data base for this model consisted of 1985 data which was adjusted for inflation and significant market structure changes between 1985 and 1990.

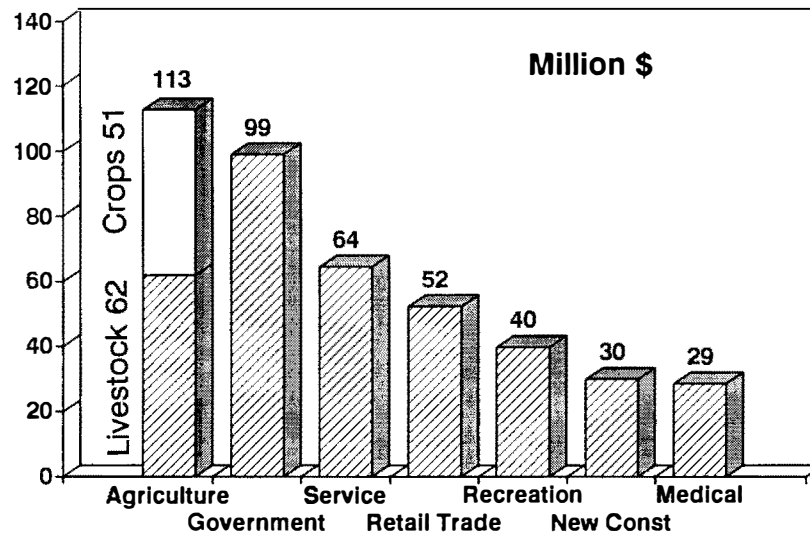
GENERAL CHARACTERISTICS OF THE FT. PIERRE REGION

The Ft. Pierre region was defined as the following four counties: Jones, Lyman, Stanley, and Hughes. The following are estimates of economic output generated from industries located within this region.

Economic Impact of Selected Industries

The impact of various industries in the Ft. Pierre region are given in Figure 1. Agriculture is the area's largest industry at \$113 million (\$62 million in livestock, \$51 million in crops). Government is the next largest sector at \$99 million. Recreation is the area's fifth largest industry at \$40 million.

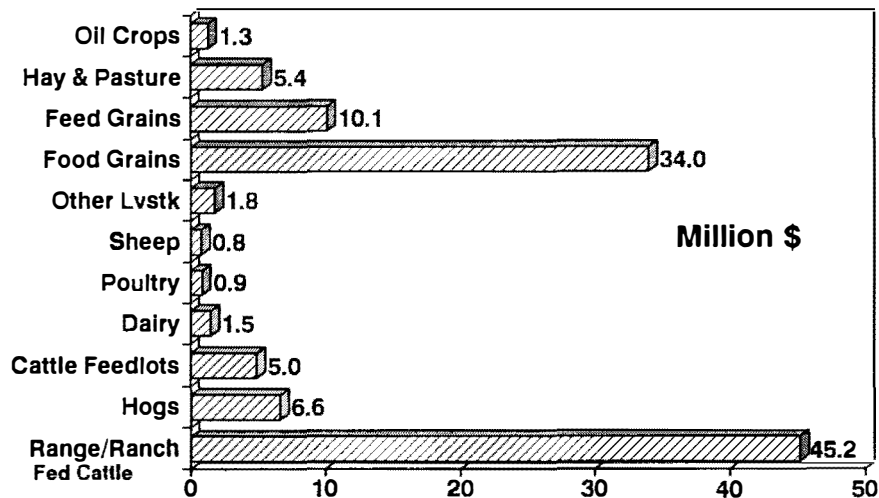
Figure 1. Economic Impact of Selected Industries in the Ft. Pierre Region - 1990



Ft. Pierre Region Crop & Livestock Industries

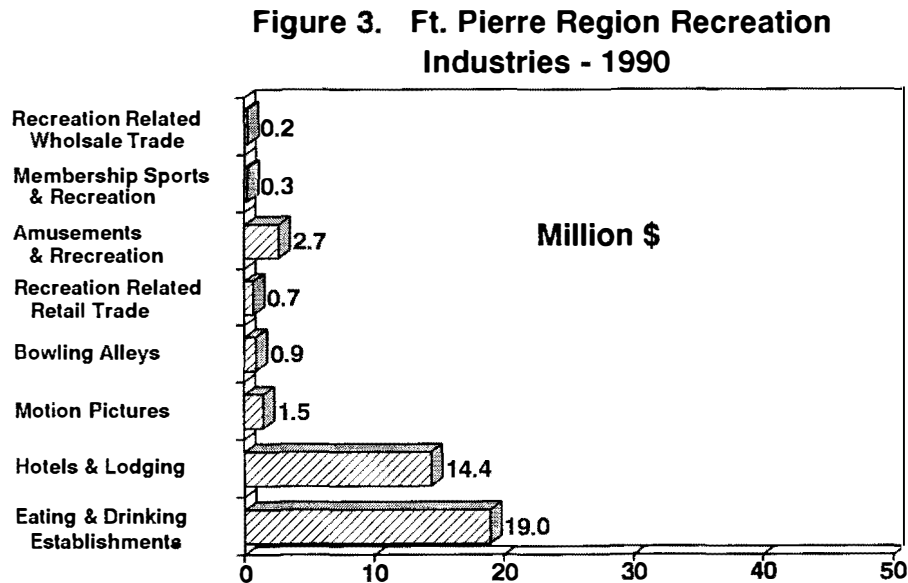
The largest sector of the agricultural industry in this region is range/ranch fed cattle at \$45.2 million (Figure 2). Food grains is second at \$34 million followed by feed grains (\$10.1 million), hog production (\$6.6 million), forage production (\$5.4 million), and cattle feedlot operations (\$5 million).

Figure 2. Ft. Pierre Region Crop & Livestock Industries - 1990



Ft. Pierre Region Recreation Industries

Eating and drinking establishments lead other sectors in the Ft. Pierre region's recreation industry at \$19 million (Figure 3). Hotels and other lodging is second at \$14.4 million.



ESTIMATE OF GRAZING'S IMPACT ON THE FT. PIERRE REGION

The value of production per cow for 1990 and 1991 are given in Table 1. Actual weaning weights of calves from livestock operations which graze on the FPNG were not available. Estimates were taken from Dooley, et. al, 1982; with prices from South Dakota Crop & Livestock Reporting Service reports for 1990 and 1991 respectively.

Actual use of the Ft. Pierre National Grasslands is reported at 45,070 AUMs in 1990 and 45,095 AUMs in 1991. Given that grazing animals utilize public land for approximately 5 months of the year, this implies that 9,014 Animal Units (AUs) utilized FPNG in 1990 and 9,019 AUs in 1991.

Table 1. Output Value per Animal Unit Grazing the Ft. Pierre National Grasslands.

| Value per AU in 1990 | | | | |
|----------------------|--------|-------|----|----------|
| | weight | price | % | Total \$ |
| calf | 4.69 | 101 | 77 | 364.74 |
| cull heifer | 8.5 | 85.9 | 2 | 14.60 |
| cull cow | 10 | 48.8 | 15 | 73.20 |
| Total | | | | \$452.54 |
| ===== | | | | |
| Value per AU in 1991 | | | | |
| | weight | price | % | Total \$ |
| calf | 4.69 | 97.8 | 77 | 353.19 |
| cull heifer | 8.5 | 80.5 | 2 | 13.69 |
| cull cow | 10 | 45.2 | 15 | 67.80 |
| Total | | | | \$434.67 |
| ===== | | | | |

Total Impact of Grazing from Animal Units Which Grazing the FPNG

Total output from the AUs utilizing FPNG was estimated by multiplying the number of AUs by the production per AU. Thus, the FPNG contributed in the production of \$4.1 million of direct livestock industry output in 1990 and \$3.9 million in 1991.

The total economic contribution of the above figures to the Ft. Pierre region (including the direct and secondary effects) amount to \$6.4 million in 1990 (Figure 4) and \$6.2 million in 1991 (Figure 5). Output from AUs which graze the FPNG

Figure 4. Economic Impact of Animal Units Which Graze on the Ft. Pierre National Grasslands - 1991

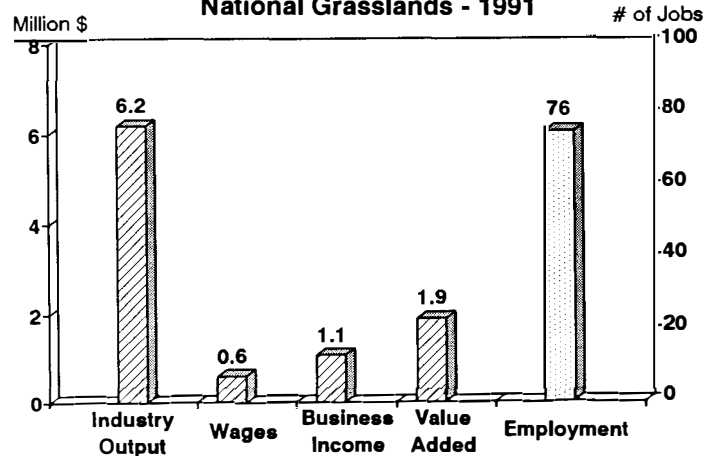
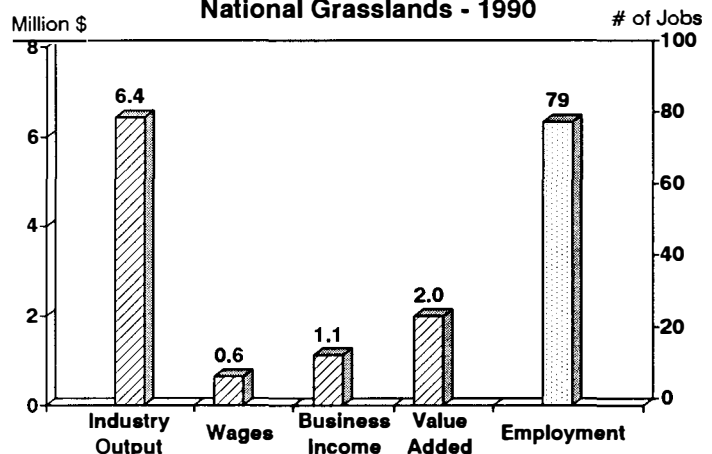


Figure 4. Economic Impact of Animal Units Which Graze on the Ft. Pierre National Grasslands - 1990



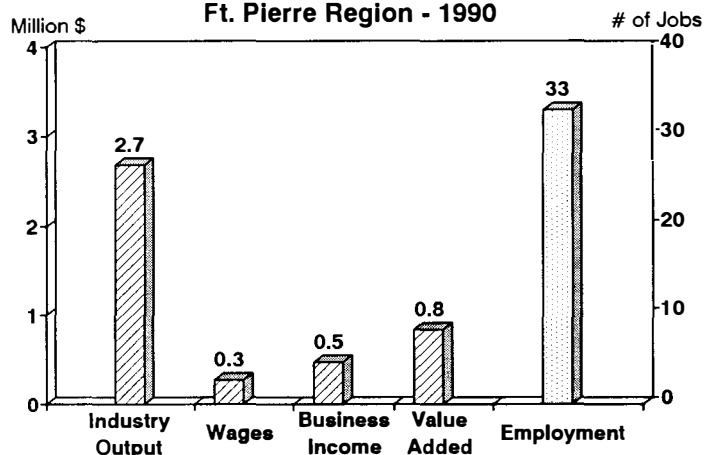
generated an estimated \$600 thousand in wages, \$1.1 million in business income and generated employment for 79 full and part time jobs in all industries within the Ft. Pierre region in 1990. Wage, business income, and employment figures for 1991 are similar and are reported in Figure 5.

Contribution of Livestock Grazing on the FPNG

The actual contribution of livestock grazing on the FPNG is somewhat difficult to estimate and is dependent upon assumptions made with respect to a division of the total output generated from the AUs which grazed on the FPNG. For this analysis, the contribution of the FPNG was determined by the ratio of AUMs supplied on public land to the total required by the grazing AUs. Thus, 5/12ths of the output was assumed to have been a result of grazing available from the FPNG.

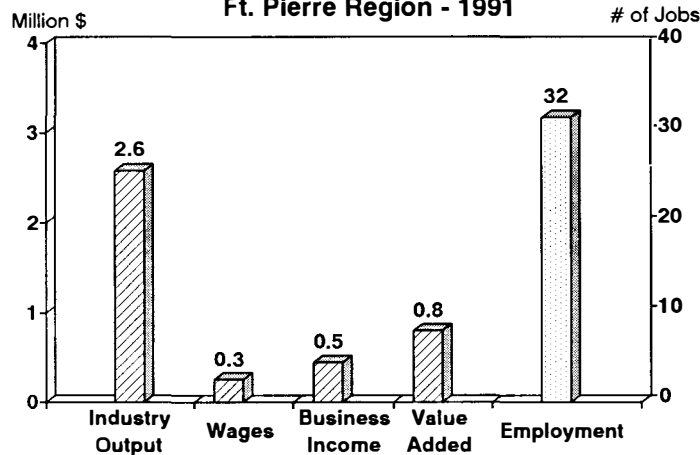
The direct impact of grazing on the FPNG given the above assumption was \$1.7 million in 1990 and \$1.6 million in 1991. The total economic impact on the Ft. Pierre region was \$2.7 million in 1990 (Figure 6) and \$2.6 million in 1991 (Figure 7). Grazing on FPNG in

Figure 6. Economic Impact of National Grasslands Grazing in the Ft. Pierre Region - 1990



1990 is estimated to have generated \$300 thousand in personal income, \$500 thousand in business income, and 33 full & part time jobs (Figure 6). Similar figures for wages, business income, and employment for 1991 are given in Figure 7.

Figure 7. Economic Impact of National Grasslands Grazing in the Ft. Pierre Region - 1991



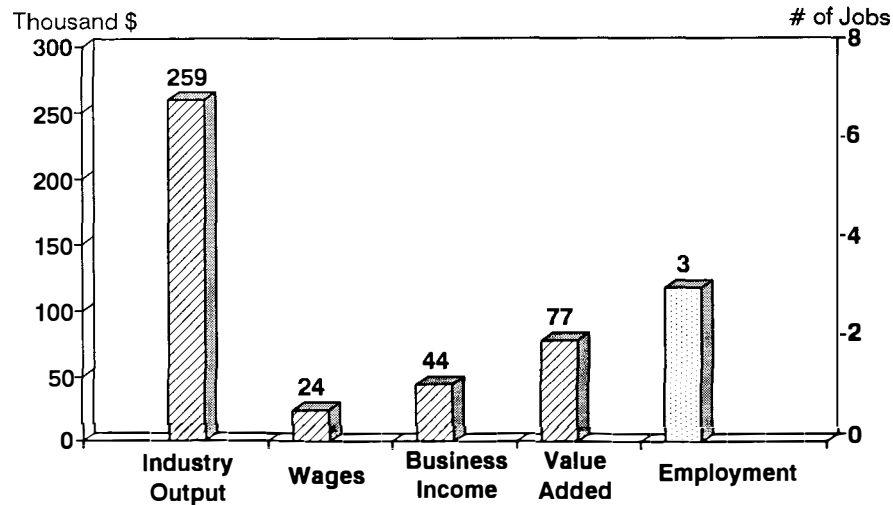
Impact of a 10 Percent Decline in AUMs Available on the FPNG

A 10% decline in the number of AUMs available on the FPNG would not imply a 10% decline in the total output of grazing from AUs involved in grazing the grasslands. For this analysis, only 1990 values were used due to the similarity of the 1990 and 1991 data.

To estimate what impact would occur, the total number of AUMs required for the 9,014 original AUs were reduced by 4,507 AUMs (10% of 1990 AUMs utilized on the FPNG). This reduced the total number of AUMs available from 108,168 to 103,661. The resulting number of AUs which could be operated on the smaller number of AUMs was 8,638 for a loss of 376 AUs. The estimated direct loss in output from the 376 AUs was \$167 thousand.

The total economic value of 376 AUs in 1990 was \$259 thousand (Figure 8). This includes \$24 thousand in personal income and \$44 thousand in business income. Given a reduction of 376 AUs in the Ft. Pierre area, approximately \$88 thousand would be lost from non-grazing industries including \$74.7 thousand in non-agricultural industries (i.e, medical, service, recreation, other retail sales, etc.)

Figure 8. Economic Impact of a 10 Percent Change in Livestock Grazing on the Ft. Pierre National Grasslands - 1990



Note: the economic activity generated from grazing on the FPNG should not be confused with the value of forage harvested from the grasslands. The figures in this report demonstrate the economic activity generated from larger ranch herd sizes made available by the grazing permits on the FPNG. If grazing on the FPNG was to be reduced, these estimates would represent the resulting decrease in total economic activity in the region.

ESTIMATED ECONOMIC IMPACT OF RECREATION ON THE FT. PIERRE NATIONAL GRASSLANDS

Contribution of Recreation on the FPNG

Information specific to the Ft. Pierre National Grasslands was generated from two publications. The first is the *1980 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, South Dakota*. This publication was published by the U.S. Fish & Wildlife Service and the U.S. Department of Commerce, Bureau of the Census. The second source was the U.S. Forest Services's Rocky Mountain Region publication on *Economic Dependency and Diversity* published in November of 1990.

Data concerning Recreational Visitor Days (RVDs) on the FPNG is provided in Table 2. Dispersed Motor Vehicle Recreation includes off-road vehicle use, snowmobiles, and other

motorized, non highway traffic. Non-Consumptive Wildlife includes time spent in viewing and photographing wildlife. A RVD is defined as "Any part of a day spent participating in a given activity." This implies that if a person spent 2 hours of two separate days viewing wildlife, 2 Non-Consumptive Wildlife RVDs would be counted.

Table 2. Recreational Visitor Days on the Ft. Pierre National Grasslands

| | <u>RVDs</u> |
|------------------------------------|-------------|
| Camping | 1,000 |
| Dispersed Motor Vehicle Recreation | 26,000 |
| Big Game Hunting | 5,000 |
| Small Game Hunting | 7,000 |
| Non-Consumptive Wildlife | 1,900 |
| Fishing | 1,000 |

Source: USFS Rocky Mt. Region 1990 Draft Economic Dependency and Diversity Assessment.

Data used in determining the value of each type of RVD is given in Table 3. 1980 values were adjusted for inflation to represent the value of each type of recreation in 1990. The average value per RVD was used to represent the value of non-hunting RVDs below.

Table 3. Recreational Visitor Day Values in South Dakota

| <u>Type of Recreation</u> | <u>Number of Participants</u> | <u>Average Expenditure Per Person</u> | <u>Number of Days</u> | <u>Average Exp per Day 1980 \$ Value</u> | <u>Average Exp per Day 1990 \$ Value</u> |
|---------------------------|-------------------------------|---------------------------------------|-----------------------|--|--|
| Fishing | 2,175 | \$187.80 | 27,993 | \$14.59 | \$23.14 |
| All Hunters | 1,796 | \$295.10 | 31,187 | \$16.99 | \$26.95 |
| Big Game | 587 | \$209.80 | 4,385 | \$28.08 | \$44.54 |
| Small Game | 1,519 | \$157.41 | 20,032 | \$11.94 | \$18.93 |
| Migratory Birds | 518 | \$127.83 | 4,959 | \$13.35 | \$21.18 |
| Other Hunting | 324 | \$52.33 | 4,974 | \$3.41 | <u>\$5.41</u> |
| Average | | | | | \$23.36 |

Source: 1980 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, South Dakota.

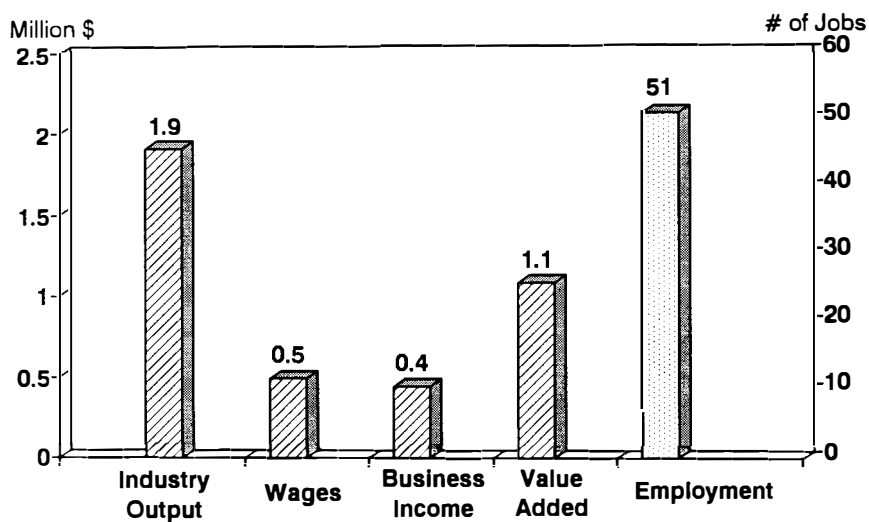
The value of each type of RVD on the FPNG is given in Table 4. The value of Dispersed Motor Vehicle RVDs was the greatest at \$607,327; followed by Big Game and Small Game at \$222,714 and \$132,516 respectively.

Table 4. Value of Recreational Visitor Days on the Ft. Pierre National Grasslands

| | <u>RVDs</u> | <u>Value/ Day</u> | <u>Total Value</u> |
|---------------------------------------|-------------|-----------------------|------------------------|
| Camping | 1,000 | \$23.36 | \$23,359 |
| Dispersed Motor Vehicle Recreation | 26,000 | \$23.36 | \$607,327 |
| Big Game Hunting | 5,000 | \$44.54 | \$222,714 |
| Small Game Hunting | 7,000 | \$18.93 | \$132,516 |
| Non-Consumptive Wildlife | 1,900 | \$23.36 | \$44,382 |
| Fishing | 1,000 | \$23.14 | \$23,142 |
| Total | | | \$1,053,439 |

Recreation on the FPNG is estimated to have contributed a total economic impact of \$1.9 million to the 4 county area. This includes \$500 thousand in personal income and \$400 thousand in business income (Figure 9).

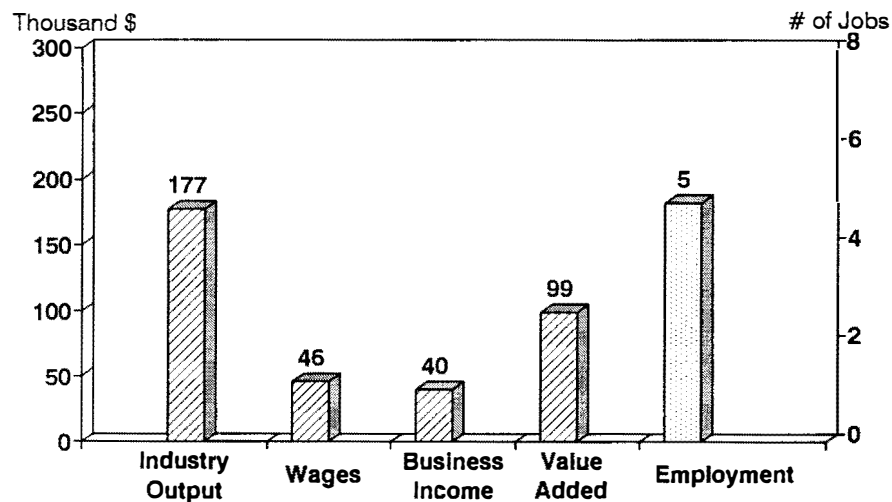
Figure 9. Economic Impact of Recreation on the Ft. Pierre National Grasslands - 1990



Impact of a 10 Percent Change in Recreation on the FPNG

A 10% change in the direct effects of recreation on the FPNG amounts to \$105 thousand. The total economic effect that this increase would have on the Ft. Pierre region is given in Figure 10. Total industry output from the change would amount to \$177 thousand; of this \$64.3 thousand would occur in non-recreation related industries. Wages would increase by \$46 thousand and business income by \$40 thousand. Approximately 5 full and part time jobs would be created.

Figure 10. Economic Impact of a 10 Percent Change in Recreation on the Ft. Pierre National Grasslands - 1990



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