Implications for the Regional Economy from Changes in Federal Grazing: Park County, Wyoming

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I. INTRODUCTION AND BACKGROUND

Much has been written about the changing face of the American West, how extractive industries such as mining, timbering and grazing are giving way to travel and tourism, and second home development. Often times this information is presented as either anecdotal or in the form of broad averages that do not focus on the empirical data of this interface. Another way to view these economic changes is as part of a geographic continuum, for where some regions such as Wyoming's Powder River Basin have economies focused on energy development (Coal and coalbed methane), others, such as the so called "Greater Yellowstone region" of Northwestern Wyoming have a foundation on recreation, tourism and second homes.

This paper focuses on Park County Wyoming, which sits along Yellowstone National Park's eastern boundary, particularly, the role of federal grazing in the local economy and how changes in permitted use may affect not only individual agricultural producers, but the local economy as well. Indeed, there is an even larger story here since changes in producer demographics; land use, encroachment on endangered species and wildlife migration patterns all come into play, making Park County a nexus for many of the issues that face the West today.

This paper is an outgrowth of a project funded by the Park County Commissioners. The project was designed to give the commissioners input for planning purposes about the economic importance to the county of federal grazing leases and how changes in the number of permitted AUM's (Animal Unit Months) might affect the local economy.

Background

Park County's 4.5 million acres of land are characterized by a diversity of ownership patterns. The 2002 Equality State Almanac indicates that federal government agencies manage nearly 80 percent of the county's land area (Table 1). The three largest of these federal land agencies are the U.S, Forest Service (1.7 million acres), the National Park Service (1.1 million acres), and the Bureau of Land Management (561,566 acres). A combination of three state agencies (State Lands Commission, Recreation Commission,

and Game and Fish Department) manages slightly more than 5 percent of the county's land area (229,702 acres). County government, city governments, school districts, and colleges account for slightly more than 0.1 percent of the county's land area or about 6,000 acres. Altogether approximately 85 percent of Park County's land area is in non-private ownership. This leaves only 15 percent (698,094 acres) in private ownership.

Table 1. Land ownership in Park County, 2002.

	Acres	Percent
U.S. Forest Service	1,699,791	37.6%
National Park Service	1,093,009	24.2%
Bureau of Land Management	561,566	12.4%
Bureau of Reclamation	236,854	5.2%
Total Federal Government	**3,591,220**	**79.4%**
State Lands Commission	212,095	4.7%
Recreation Commission	11,498	0.3%
Game and Fish	6,109	0.1%
Total State Government	**229,702**	**5.1%**
County Government	536	<0.1%
City Governments	2,409	<0.1%
Schools and Colleges	2,962	<0.1%
Total Local Government	**5,907**	**0.1%**
Total Public Lands	3,826,829	84.6%
Total Private Lands	698,094	15.4%
Total Surface Land Area	**4,524,923**	**100.0%**

Source: 2002 Equality State Almanac

The dominant private land use in Park County is agriculture. The 2002 Wyoming Department of Revenue Annual Report indicates that there was about 678,200 acres classified as agricultural lands for tax purposes in Park County in 2002. Presumably all this land is privately owned. This means that 97 percent of the total private land in Park County is in agricultural use. Because of its dominance, what happens to agriculture in the county has important implications for private land use in Park County, particularly in terms of maintaining open space, preserving wildlife habitat on private lands, and the cost providing local government services.

Agriculture is also economically important to Park County. In 2002, gross agricultural receipts for the county totaled $72.4 million, down from $74.9 million in 2001 (U.S. Department of Commerce, 2004). Agricultural production directly supported 815 jobs in

the county and generated $10.3 million in labor earnings in 2002. The average earnings per job for agricultural proprietors in the county for 2002 were $9,673. For hired agricultural labor the average earnings per job were $29,088. The earnings per job for proprietors were substantially lower because many proprietors are only involved in agricultural production on a part-time basis, earning the majority of their income from other sources.

Livestock production, especially ranching, is a major component of agriculture in Park County. The Department of Revenue's Annual Report indicates that 83 percent of the agricultural land in Park County is classified as rangeland (563,414 acres). This implies that more than 80 percent of the total private land in Park County is used for ranching. From an economic perspective, 60 percent of the cash receipts from agriculture marketing are from livestock production (U.S. Department of Commerce). The Census of Agriculture estimates that there were 221 agricultural operations with beef cows and 60 agricultural operations raising sheep in Park County in 2002. Most of the livestock production in Park County occurs on fairly large operations. Nearly three-fourths of the cattle were on ranches with 200 head or more of cows. The average size for these 200 plus cow ranches was 570 head. Over 80 percent of the sheep were located on ranches with 1,000 or more sheep and lambs. The average size for these 1,000 plus sheep ranches was 2,280 head.

Because the federal government manages nearly 80 percent of the land area in Park County, management decisions made by federal land management agencies can have important implications for Park County. As an example, 82 percent of the agricultural land in Park County is controlled by an agricultural operation holding a grazing permit (1997 Census of Agriculture). Three-fourths of these permits are for either Forest Service or BLM grazing. Because these federal grazing permits are generally part of a ranch's overall grazing system involving other sources of forage including state and private land, a change in federal grazing can affect the operation of the entire ranching enterprise. As a result what happens to federal grazing can have important implications for private agricultural land and private land use in Park County.

The loss of ranchland is a concern in Park County. Census data indicates that more than 60 percent of the county's population growth between 1990 and 2000 occurred in rural areas. In addition, the number of second homes in the county (which are not counted in the population numbers) increased by more than one-third. Much of this second home growth has likely occurred in rural areas of the county. In response to this growth, the acres of developed land in the county increased by an estimated 23 percent between 1982 and 1997 (NRCS 2000).

The American Farm Land Trust (AFT) estimates that almost 75 percent of the private lands in Park County are "prime" ranchlands. The AFT defines "prime" ranchland as high quality land with desirable wildlife characteristics including proximity to publicly owned land, year-round water availability, mixed grass and tree cover, and a variety of vegetation. The AFT also estimates that 50 percent of the prime ranchland in Park County potentially could be developed over the next 20 years. This represents more than

334,000 acres of ranchland and ranks Park County 15th among all counties in the Western United States in terms of acres of prime ranchland that could potentially be developed. Travis et al (2004) found that over 178,000 acres of ranchland changed hands in Park County between 1990 and 2001. While, only a small portion of these lands were sold directly to developers, Travis et al. note that "…the current transition in ranchland probably implies a long period of instability in ranchland status and uncertainty over the role that ranchland will play." Conversion of ranchland to alternative land uses has important implications not only for ranching operations but also for open space, lifestyles, wildlife habitat, and the cost of providing community services.

II. IMPLICATIONS OF FRAGMENTATION FOR WILDLIFE

"Wyoming ranchers have left a priceless gift of open space, a legacy with profound ramifications on the state's economy and character."
– Samuel Western

The importance of livestock operations in Park County, Wyoming spans both economics of commodity production and the environmental values that draw people to the west to visit and live. Livestock operations in the Rocky Mountain West need both public and private grazing resources to remain economically viable and generate income and jobs in the local economy (See section IV). Private and public are a joint resource for agriculture (and many other activities). This section illustrates a second aspect to that joint relationship. An important part of the local economy is wildlife and recreation related activity. That activity ranges from non-consumptive activities such as wildlife watching to more consumptive activities such as hunting and fishing. These activities themselves occur primarily on public lands. However, the object of these activities, big game and other wildlife, reside on public and private lands. Statewide a recent study estimated that even though most wildlife related activities occur on public lands, private lands supported these activities by providing winter and other seasonal habitat outside of the hunting seasons (Coupal et al, 2002). The study indicated that seasonal range on private lands then contributed over $120 million in hunter expenditures. Wildlife watching contributed even more, (though the exact location of wildlife watching is not reported or monitored.) This analysis will detail the distribution of big game seasonal range across land use types and ownership categories, and estimate the economic importance by ownership and land use categories for Park County, Wyoming.

The habitat where animals reside is more important than the actual interaction between the recreationist and the animal. Regardless of where a hunter kills an elk or deer, or where a recreationist photographs an animal, there is very likely a certain time period when the animal resided on someone's private land. If that land was not available because of land use activities not conducive to wildlife, then there is a lower likelihood that a recreationist or hunter will enjoy the species.

This analysis relates more explicitly to the ranch viability analysis detailed in the following section. As long as ranches are economically viable there is less likelihood that private agricultural land will be converted to rural residential development. (Though

because of the differences in value between residential land and agricultural land, even ranch economic viability will not completely insure against conversion to rural residential use.)

Land use ownership and structure in Park County, Wyoming

Land ownership in Park County, Wyoming like many Rocky Mountain counties has a high concentration of federal lands. Over 80 percent of the county is managed by a federal land management agency (Figure 1, State of Wyoming Economic Analysis Division, 2005). The county serves as the east entrance into Yellowstone National Park with 24 percent within the Park itself. The Shoshone National Forest Service occupies approximately 1.7 million acres (38 percent of the total). Private land totals 698,094 acres. Agricultural land represents the largest component of land use on private land and comprises 97 percent of private land.

Park County like many other counties located in West and like all the counties in the Greater Yellowstone Area has seen substantial growth in population and second home development. Park County's population increased by 11.3 percent from 1990 to 2000 with the majority of that increase in the non-incorporated areas. The county also experienced a 33.9 percent increase in the number of second homes. Almost 7 percent of the housing units in the county are second homes. This growth has occurred primarily by converting agricultural land.

Land in Park County used by residents and visitors are also home to a wide array of wildlife, big game and non-game species. Unlike human use, wildlife pays little attention to land ownership, and indeed needs portions of private and public land to maintain populations during different times of the year. The type of land use can affect the viability of the habitat. Biologists studying the relative impacts of rural housing versus agriculture generally argue that rural subdivisions have a negative impact on big game herds and other wildlife (Vogel 1989, Knight 1998). However, many of these species are also part of the economic drivers of the local economy through hunting or wildlife watching.

For this analysis we focus on four species: elk, mule deer, whitetail deer, and pronghorn antelope. All these species are very popular hunting species and a destination attraction for non-local hunters (non-local is defined as being from out of county, but not necessarily out of state). It is important to note that there are many other species of wildlife that residents and non-locals hunt or watch. However data on where the animals reside and where recreationists interact is not available. The analysis estimates the quantity of seasonal range by ownership categories and private land categories. Seasonal range categories follow Wyoming Game and Fish categories. Estimates are summarized in Table 2. The geographical distribution of seasonal ranges is presented in Figures 2, 3 and 4. In interpreting the table and maps, it is important to recognize the overlapping ranges for the four species. Thus seasonal range acreages cannot be added together for a total aggregate range.

Agricultural land is an important source of winter range for elk, mule deer and antelope. It is also and important source of year-long range for white-tail deer and pronghorn antelope.

Figure 1. Park County land ownership

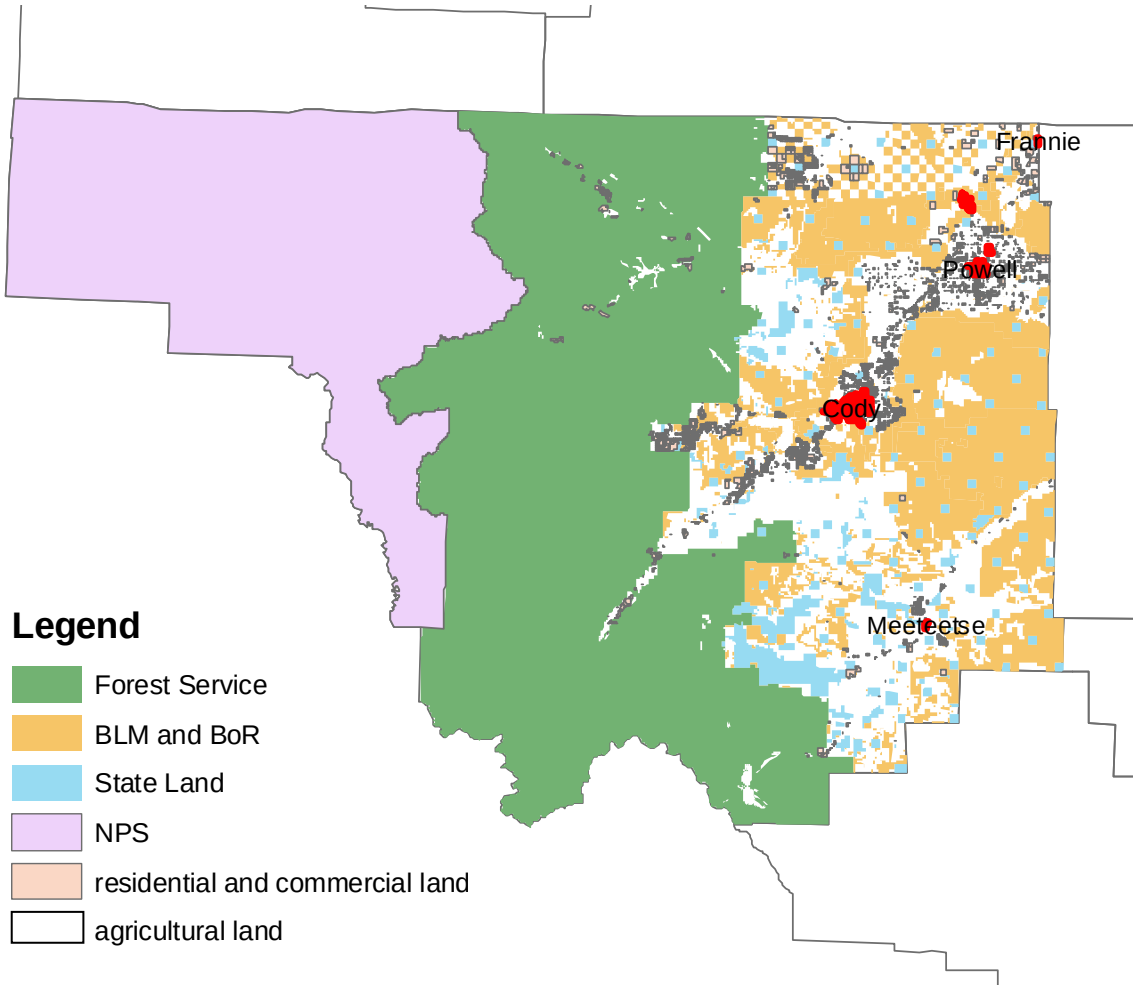


Figure 2. Elk seasonal range and migration corridors overlaid on land ownership in Park County, Wyoming.

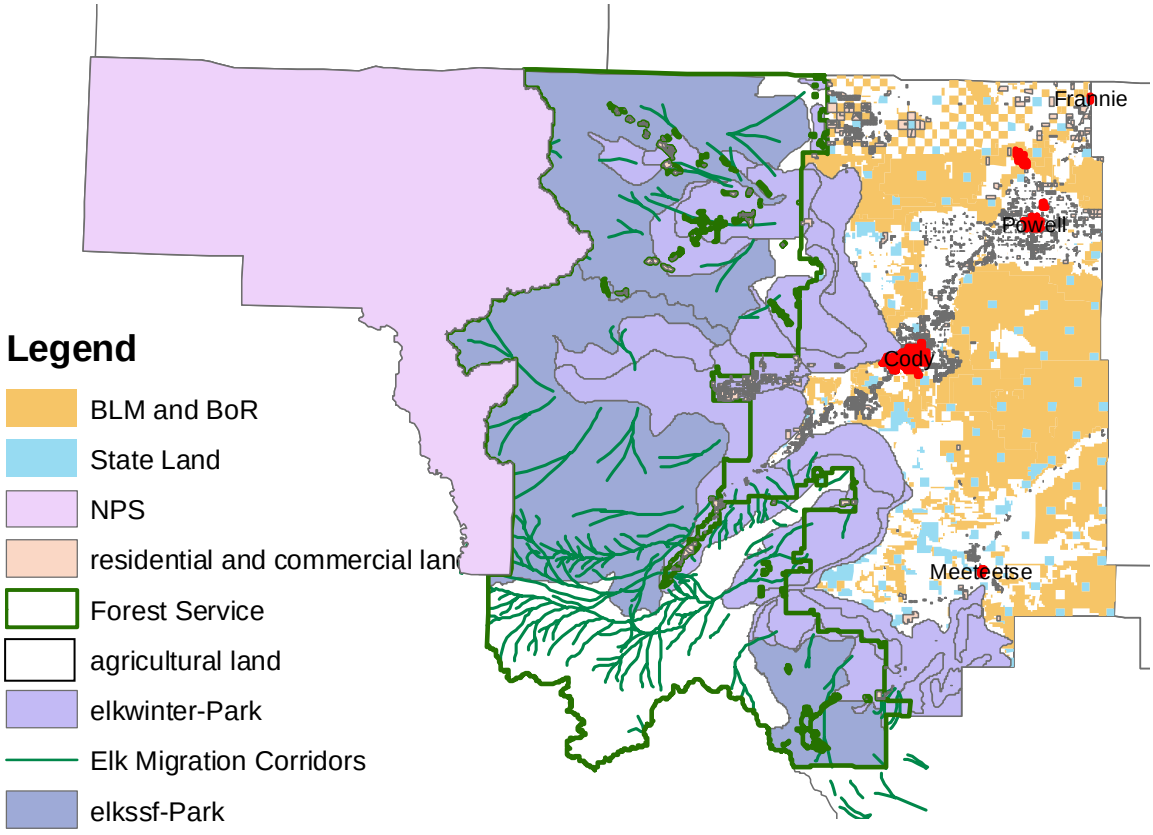


Figure 3. Whitetail and mule deer seasonal range and migration corridors overlaid on land ownership in Park County, Wyoming

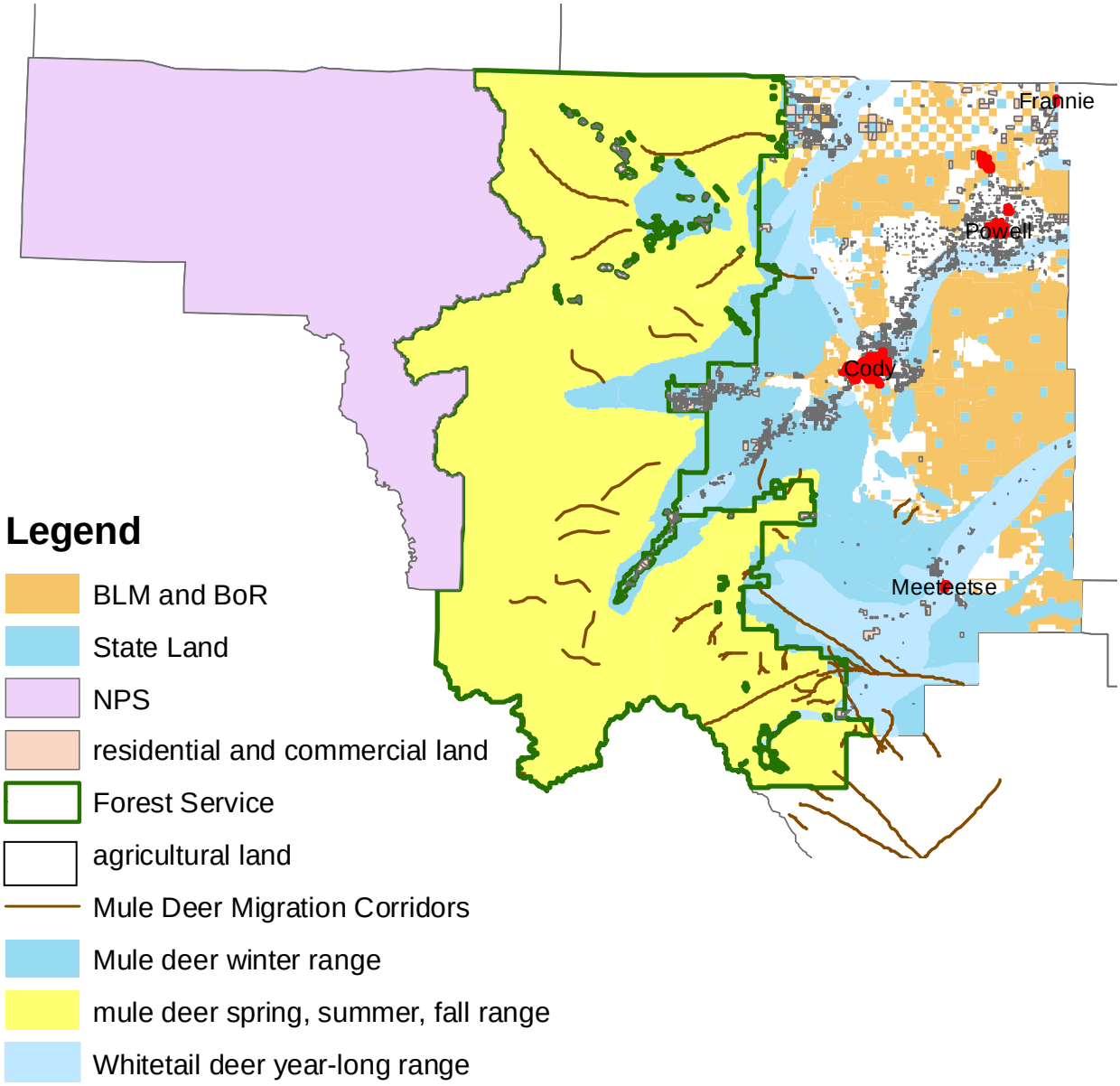


Figure 4. Pronghorn antelope seasonal range and migration corridors overlaid on land ownership in Park County, Wyoming

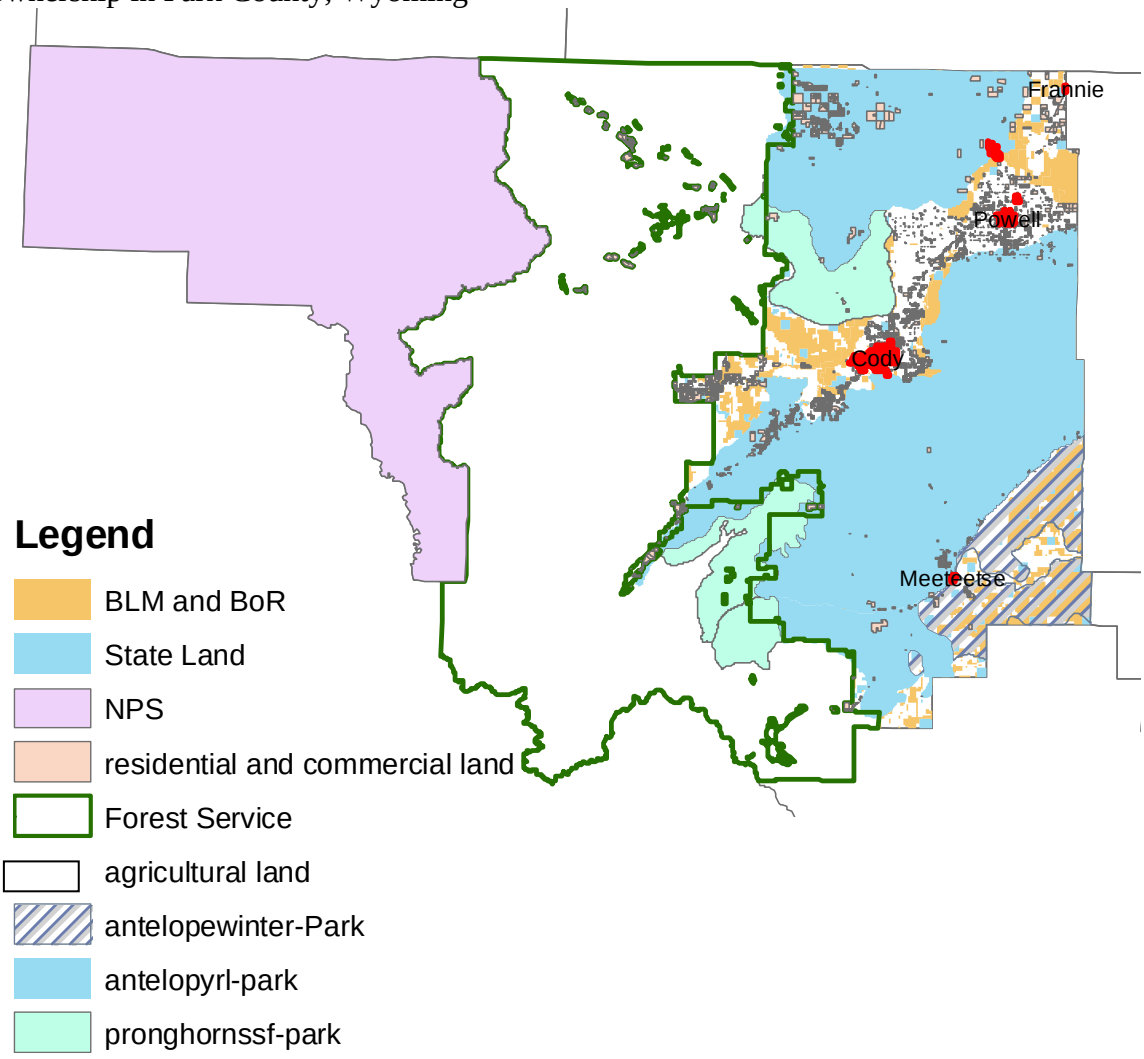


Table 2. Estimated acres of seasonal range by species, seasonal class, and land use / ownership category in Park County, Wyoming.

		Agricultural land	Residential / commercial	BLM	Forest Service
Elk	**Spring, summer, fall**	1,126	1,181	0	893,523
	Winter	232,621	15,996	94,693	433,134
	Year-long	0	0	0	342,298
Mule Deer	**Spring, summer, fall**	11,912	3,020	11,579	1,516,502
	Winter	354,541	29,581	170,229	170,304
	Year-long	0	0	0	0
Whitetail deer	**Spring, summer, fall**	0	0	0	0
	Winter	0	0	0	0
	Year-long	174,122	0	49,180	4,029
Pronghorn Antelope	**Spring, summer, fall**	50,954	703	28,881	95,649
	Winter	53,475	1,243	80,084	0
	Year-long	389,300	28,937	460,022	36,730

Economic Impacts

The acreages estimated above are used to allocated hunter expenditures and corresponding economic impacts associated with the land use categories and land ownership. The results estimate the relative importance of each land category to the overall economic impacts of hunting in the county. The first step in estimating economic impacts is to calculate hunter expenditures from Wyoming Game and Fish hunter–day data. Hunter-days were separated into two groups: Local residents and non-local residents (Table 3) for each species (Mule deer and whitetail deer are aggregated.).

The next step is to assign expenditures to hunter-day estimates above. Data for hunter-day expenditures are taken from Wyoming Game and Fish studies on hunter expenditures by species (Responsive Management, 1998). The estimates break out hunter expenditures by major category of on-site and off-site category. Hunter day estimates are presented in Table 4.

Economic impacts are estimated by linking the expenditure category with the appropriate industry. (The same modeling framework that is used to calculate agricultural impacts in section III.) The analysis only estimates the impact on the local economy of non-local hunters because this is considered “new money” brought in from the outside, which increases the size of the economy. Local resident hunters spending (who very probably highly value the wildlife resources in the county) are not bringing new dollars into the communities.

Economic impacts of non-local resident hunting of the four species analyzed are presented in Table 5. Total labor income generated from the activity is $1,397,788 per year with almost 92 total jobs. It is important to recognize that this does not include all huntable species, nor does it include wildlife watching (which could be significant source of expenditures in the county given its proximity to Yellowstone National Park.)

Table 3. 2003 Big game species hunter-days for Park County residents and non-county residents.

	Hunter-days	Percent of Total
Elk		
total number elk hunter-days in Park County	30,239	
elk hunter-days by Park County residents in Park County	13,344	44.13
elk hunter-days in Park County by non-county residents	16,895	55.87
Deer		
total number deer hunter-days in Park County	18,923	
deer hunter-days by Park County residents in Park County	7,682	40.60
deer hunter-days in Park County by non-county residents	11,240	59.40
Pronghorn Antelope		
total number antelope hunter-days in Park County	1,411	
antelope hunter-days by Park County residents in Park County	784	55.59
antelope hunter-days in Park County by non-county residents	627	44.41

Source: Wyoming Game and Fish Zip code data, 2004.

Table 4. Hunter-day expenditures for resident and non-resident in Park County (2002 Dollars)

	Resident			Nonresident		
	Antelope	**Deer**	**Elk**	**Antelope**	**Deer**	**Elk**
Lodging	$0.98	$2.02	$3.39	$19.66	$20.75	$16.40
Eat & Drink	$3.48	$4.52	$4.03	$20.05	$15.66	$16.84
Groceries/Liquor	$4.98	$8.33	$11.64	$10.04	$7.93	$11.66
Gasoline	$13.14	$13.30	$12.26	$21.42	$11.62	$13.34
Motor Vehicle Repairs	$1.67	$4.39	$4.42	$11.77	$2.81	$2.75
Outfitters & Guides	$0.04	$0.00	$0.05	$40.61	$54.36	$82.95
Access Fees	$1.62	$0.50	$0.17	$9.41	$6.02	$5.26
Campground Fees	$0.13	$0.15	$0.15	$0.97	$0.56	$0.73
Entertainment	$0.10	$0.15	$0.25	$1.67	$0.78	$1.59
Meat Processing	$10.62	$5.28	$6.97	$10.00	$5.03	$6.86
Taxidermy	$14.17	$9.64	$3.73	$11.56	$6.06	$4.01
Gifts & Souvenirs	$0.04	$0.64	$0.48	$7.10	$7.49	$9.60
Local Transportation	$0.06	$0.01	$0.16	$3.41	$3.12	$1.68
Other Licenses	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Minor Equipment	$12.11	$12.04	$7.23	$4.71	$3.60	$4.54
Major Equipment	$0.00	$0.00	$0.00	$3.68	$3.17	$3.06
Total	$63.14	$60.97	$54.93	$176.06	$148.95	$181.26

Source: Responsive Management (1998).

Agricultural land supported the largest economic impacts on private land and Shoshone National Forest supported the largest economic impacts on public lands. Out of a total of $1.397 million in labor income and 92 jobs, approximately 30 percent is supported by agriculture in the county.

Table 5. Non-resident hunter-days and economic impacts attributable to land habitat ownership and use category.

	Agricultural land	BLM	Forest Service	Residential/ commercial	Total
Total Non-resident Hunter-days					
Antelope	568	655	152	36	1,411
Deer	17,551	5,611	14,411	272	37,845
Elk	3,509	1,421	25,051	258	30,239
Total	21,628	7,687	39,614	565	69,495
Total Labor income generated from non local hunters					
Antelope	$6,490	$7,479	$1,740	$406	$16,115
Deer	$340,534	$108,860	$279,602	$5,278	$734,274
Elk	$75,117	$30,430	$536,332	$5,520	$647,399
Total	$422,140	$146,769	$817,674	$11,204	$1,397,788
Total Jobs generated from non-local hunters					
Antelope	0.5	0.6	0.1	0.0	1.2
Deer	22.0	7.0	18.1	0.3	47.5
Elk	5.0	2.0	35.5	0.4	42.9
Total	27.5	9.6	53.7	0.7	91.6

Summary

This section documents the importance of agriculture and other land use or ownership categories to particular aspects of public land recreation. The analysis focused on the primary hunting species: elk, deer, and antelope. Wildlife resides in multiple habitats over a year that can cross ownership categories. Agriculture is an important part of many species' seasonal range. Agricultural land accounts for 30 percent of elk winter range, almost 40 percent of antelope winter range, 76 percent of whitetail deer yearlong range, and 49 percent of mule deer range. Such large percentages suggest that agricultural land in Park County has a dual role of both providing commodity export base, and facilitates attracting hunters.

It also suggests that public land and private land together have another complementary relationship in supporting this local industry. Spring, summer, and fall range, which concentrates more on public land are complementary to winter range which is concentrated on private land, most of which is agricultural land. As in the livestock analysis in the preceding section, policies that affect private land operations that support seasonal range can also affect the management objectives on public land. Estimated

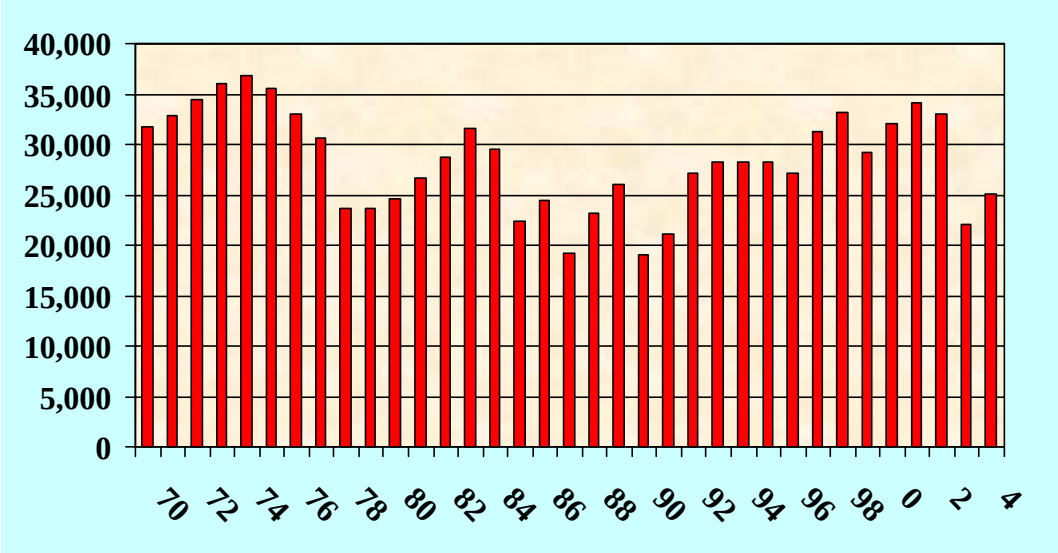
economic impacts of non-local hunting in Park County total $1.398 million in labor income and 92 jobs. Agriculture supports approximately 30 percent of these impacts.

III. Historic livestock industry trends

Cattle production

Beef cattle production in Park County has had significant fluctuations over the past 30 years. As shown in Figure 5, the beef cow inventory in the county has ranged from a high of 36,870 head in 1974 to a low of 19,100 head in 1990 (USDA, various). Much of the fluctuation can be attributed to the "cattle cycle" which regularly generates expansions and contractions of the cattle inventory at the national level. These cycles also affect cattle production in Park County. For example the peaks in county cattle inventory in 1974, 1983, and 1998 roughly correspond with the peaks in the national cattle cycle. In recent years the effects of drought can also be seen in terms of the substantial reductions in cattle numbers in 2003 (a 33 percent reduction from 2002) and 2004 (a 24 percent reduction from 2002).

Figure 5. Park County beef cattle inventory, 1970-2004.

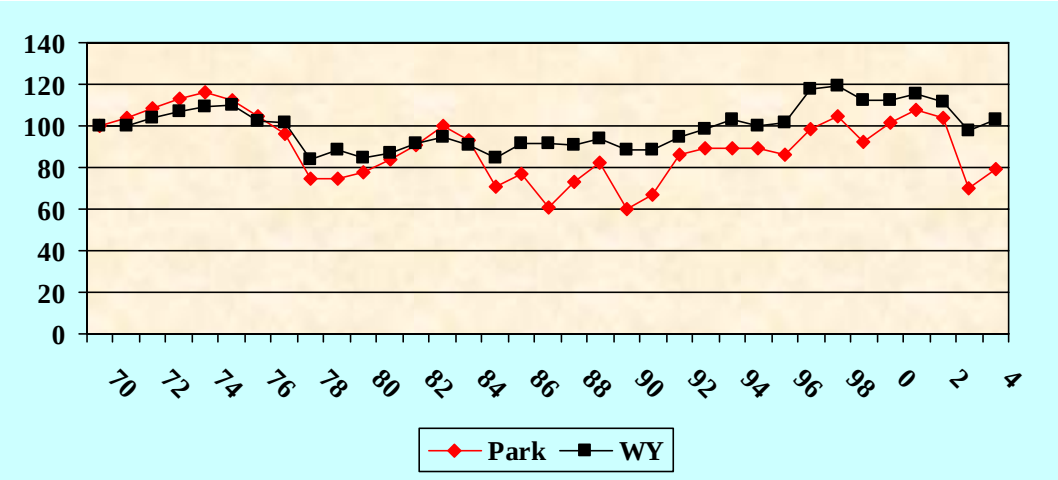


Source: Wyoming Agricultural Statistics

Due to the fluctuations in cattle numbers, it is difficult to observe a trend in cattle numbers for the county from Figure 5. However, the fact that the peaks in 1998 (33,200 head) and 1983 (31,600 head) were lower than the peak in 1974 (36,870) suggests some overall decline in cattle numbers over time. If beef cow inventory numbers for Park County are compared with similar numbers for Wyoming, there is also an indication of a decline in cattle production in the county. As shown in Figure 6, the beef cow inventory index for Park County tends to track fairly closely with the Wyoming index through 1983. However, since 1983 the county index has been below that for the state. This gap suggests a decline in cattle production in the county relative to what would be expected based on beef cattle numbers at the state level. While this gap has ranged as high 9,775 head in 1987, it has averaged about 5,000 head since 1983. In the twenty years since

1983, this represents the loss of about 104,000 head-years of cattle production. The cause of this reduction is unclear; however it does suggest a structural change in the county's cattle production following the liquidation portion of the 1979-1990 cattle cycle that began in 1983. It should be noted that some of this apparent loss in cattle production could be at least somewhat offset by increases in weaning weights over time.

Figure 6. Park County beef cow index, 1970-2004.

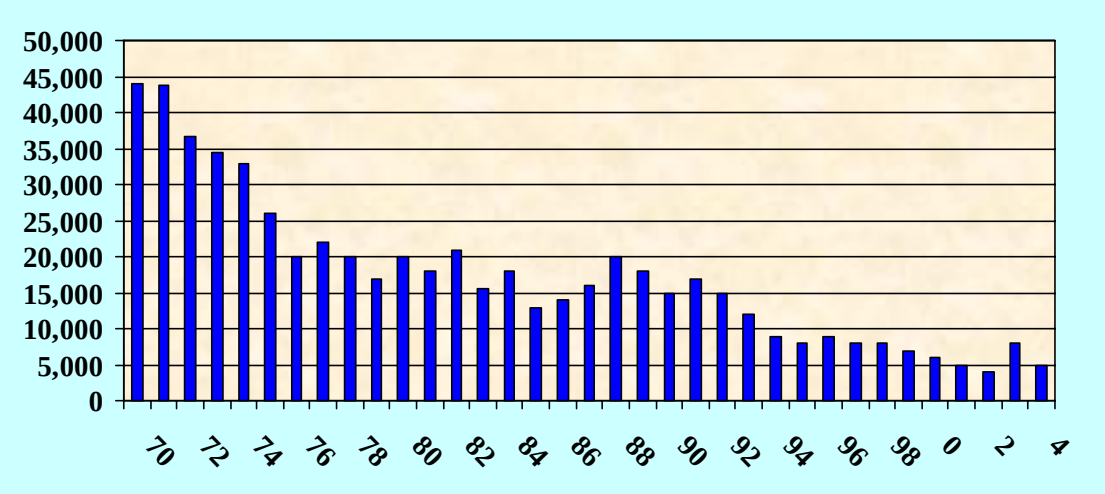


Sheep production

Unlike the fluctuations seen in cattle numbers, there has been a general decline in sheep production in Park County over time (Figure 7). In 1970 there were an estimated 44,000 breeding sheep in the county (USDA, various). By 2004 the number of breeding sheep had declined to 5,000 head (USDA, various). This trend in sheep production is not unique to Park County. Statewide, the number of breeding sheep has declined from 1.7 million head in 1970 to 340,000 head in 2004. There are several factors that have contributed to the decline in sheep production including competition from synthetic fibers, foreign imports, changes in consumer tastes and preferences, predator problems, and labor availability.

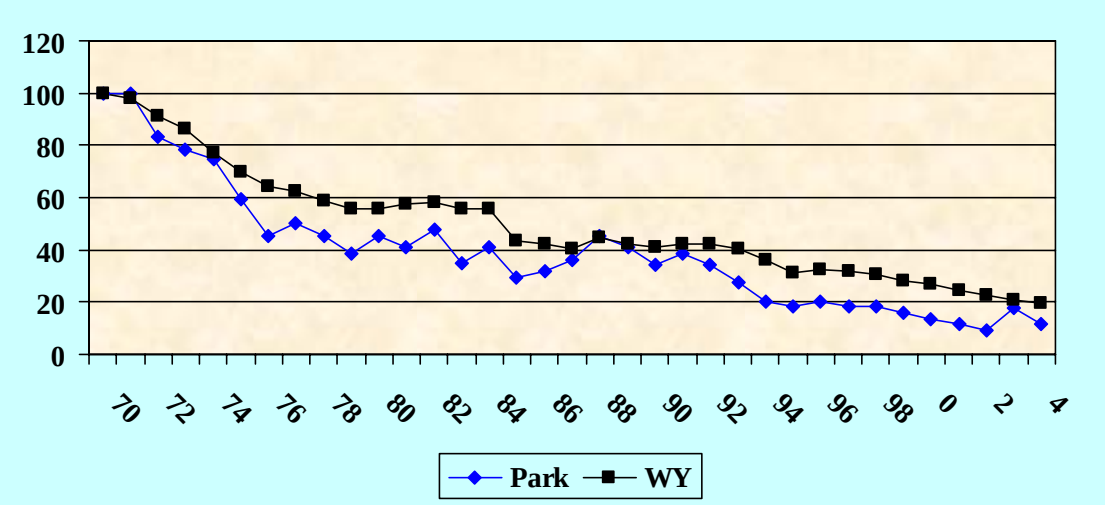
A comparison of breeding sheep numbers in Park County with similar numbers for Wyoming indicates that the decline in sheep numbers in the county has been somewhat greater. As shown in Figure 8, the county's breeding sheep inventory index has tended to be below the Wyoming index for most of the time between 1970 and 2004. This gap suggests that the decline of sheep production in Park County has been greater than what would have been expected based on sheep numbers at the state level. Although it varies by year, this gap has averaged about 4,440 head per year between 1970 and 2004. This represents the loss of about 155,000 head-years of sheep production over the time period

Figure 7. Park County breeding sheep inventory, 1970-2004.



Source: Wyoming Agricultural Statistics

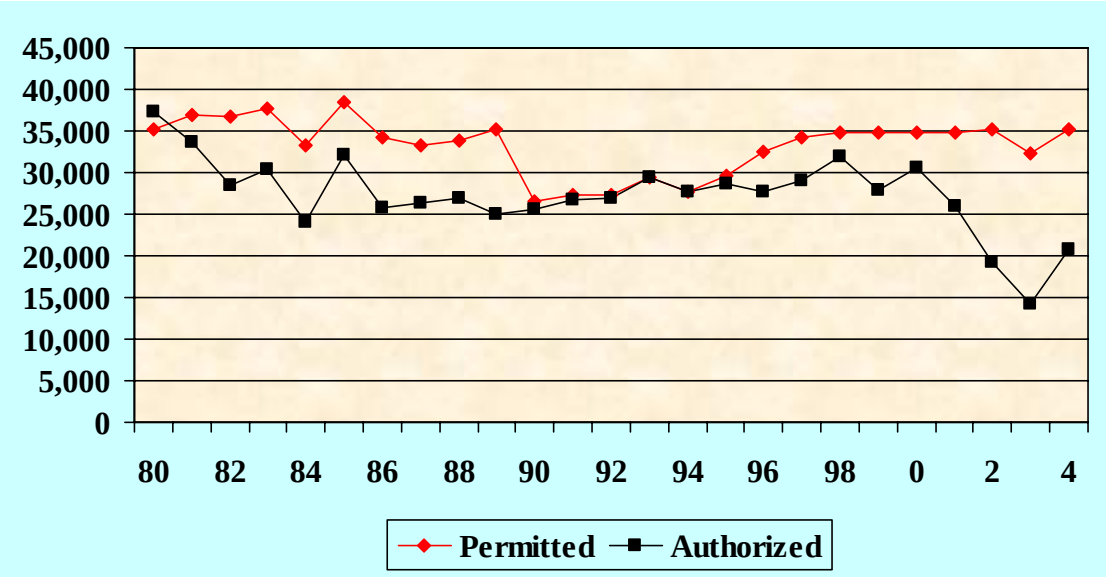
Figure 8. Park County breeding sheep index, 1970-2004.



USFS livestock grazing

Animal Unit Months (AUM) of permitted and authorized livestock grazing for the Northern Shoshone National Forest for the years 1980 through 2004 are summarized in Figures 9 and 10. This information was compiled from allotment reports provided by the Shoshone National Forest for the Clarks Fork, Greybull, and Wapiti Ranger Districts. Between 1980 and 1989, permitted cattle and horse grazing on the northern part of the Forest was fairly stable averaging 35,490 AUMs per year (Figure 9). From 1990 through 1995, permitted cattle and horse grazing on the Forest declined by more than 20 percent, averaging 27,966 AUMs per year during this time period. Between 1996 and 2004 permitted cattle and horse grazing increased to near the 1980-89 levels averaging 34,291 AUMs between 1996 and 2004 (this was about 97 percent of the 1980-89 average). The reason for the decline permitted grazing from 1990 through 1995 is unclear, but appears to have been fairly close to the authorized use during that time period.

Figure 9. USFS cattle and horse AUMs, 1980-2004.

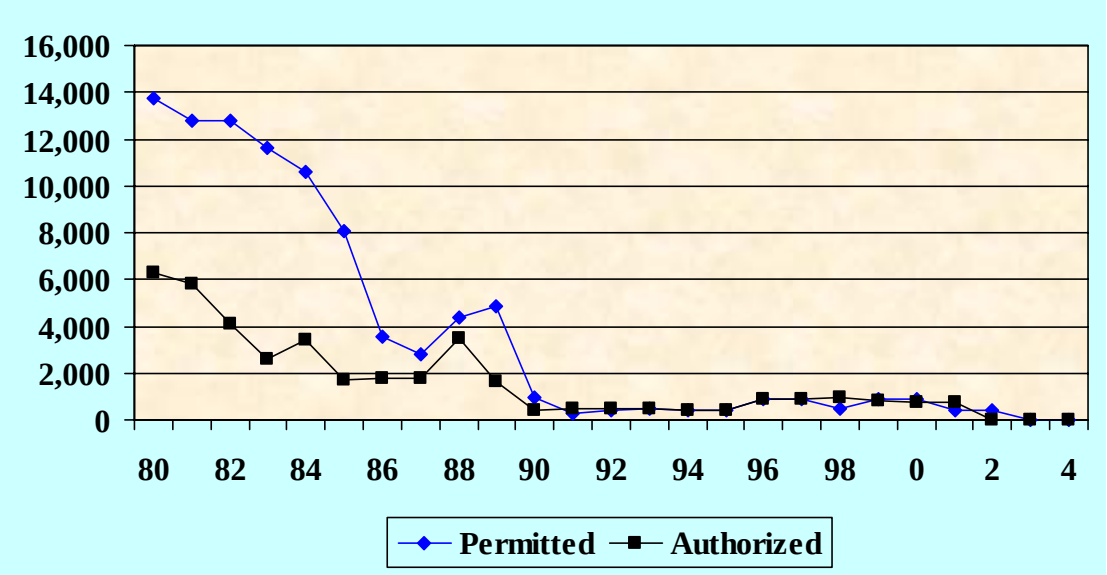


Source: USDA Forest Service

While permitted use represents the potential grazing available on the Forest in any given year, authorized use is a closer measure of actual grazing that occurred in that year. As shown in Figure 9, authorized use for cattle and horses has tended to be below permitted use. There are a number of reasons for this difference including management decisions by both the Forest Service and the permittees. Between 1980 and 1989 authorized cattle and horse grazing averaged 29,051 AUMs or about 82 percent of permitted use during this time period. From 1990 through 1995 authorized cattle and horse grazing declined by 5 percent, averaging 27,503 AUMs. This was 98 percent of reduced permitted use during this time period. Between 1996 and 2004 authorized cattle and horse grazing decreased, averaging 25,246 AUMs. This was 13 percent below the 1980-89 average and only 74 percent of permitted use. However, if 2001 through 2004 are excluded as drought years, authorized cattle and horse grazing averaged 29,397, which was nearly 86 percent of permitted use. Permittees with 500 or more AUM's of grazing on the forest represented over 80 percent of the grazing permitted. The average permittee with 500 or more AUM's held permits for 1,870 AUM's.

Figure 10 summarizes permitted and authorized sheep and goats grazing on the Forest. Between 1980 and 2004 permitted grazing for sheep and goats declined from 13,711 AUMs in 1980 to 0 AUMs in 2003. Similarly, authorized grazing for sheep and goats declined from 6,296 AUMs in 1980 to 0 AUMs in 2001. Currently the allotment reports indicate that there is no sheep or goat grazing either permitted or authorized on the Forest. This decrease is consistent with the decline in the sheep industry in Park County.

Figure 10. USFS sheep and goat AUMs, 1980-2004.

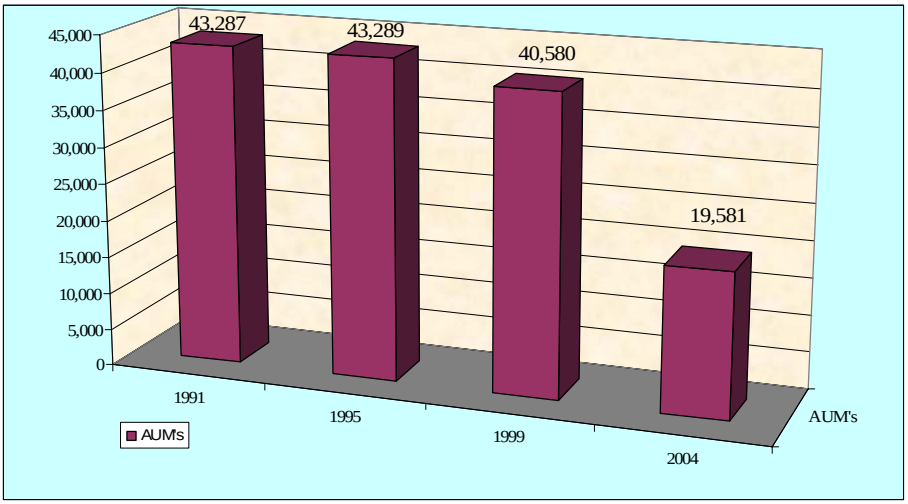


Source: USDA Forest Service

BLM livestock grazing

Data for livestock grazing on Bureau of Land Management (BLM) land in Park County was not as complete as for the Forest Service, so a direct comparison was not possible. Billed AUM's for Park County were obtained from the BLM Cody Field Office for the years shown are presented in Figure 11. Little change in number of AUM's is seen prior to 2004. The 52 percent dip in billed AUM's in 2004 is attributed to the persistent drought of the last several years.

Figure 11. Cody Field Office billed AUM's for Park County.



Source: BLM

In 2004, there are approximately 51,180 permitted AUM's on 540,704 acres of BLM land in Park County (BLM, 2005). Permittees with 500 or more AUM's of BLM grazing

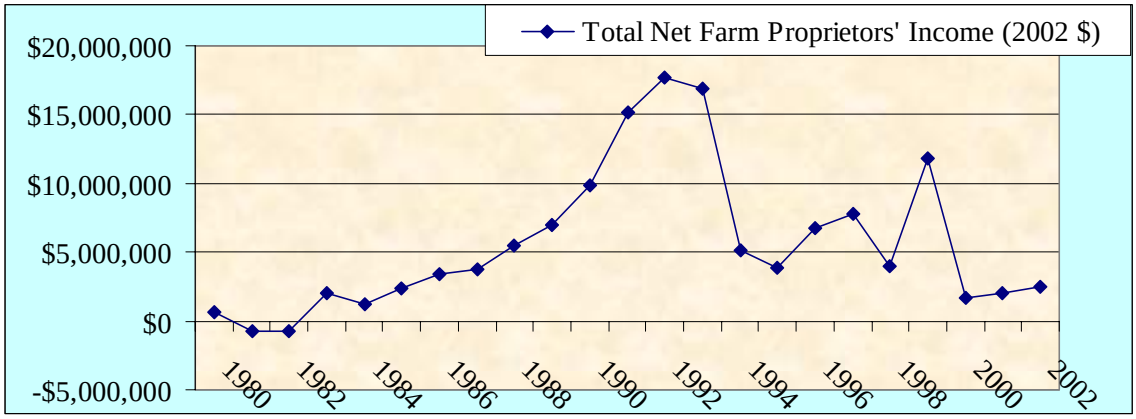
represented nearly 85 percent of the grazing permitted on BLM lands in Park County. The average permittee with 500 or more AUM's held permits for 1,987 AUM's.

Operator demographics and size of operation trends

Park County's livestock industry is under pressure for change from the same forces as the rest of the state and for that matter the nation. Rising productivity, as a result of mechanization and improved technology such as hybridization, has allowed producers to produce more and bring down the cost of production. Yet, increased levels of production have put downward pressure on prices, which have reduced the overall profitability of ranching and has also reduced the labor requirements for agricultural production. This in turn has led to fewer of the next generation choosing (or being able to choose) an agricultural career. Figure 12 shows total net farm proprietor's income (in thousands of dollars) for Park County from 1980 to 2002, adjusted for inflation to 2002 dollars. The graph shows the volatility inherent in the industry, buffeted by the cattle cycle, high interest rates and weather. Data from the last two years are not yet available, but prices for cattle have improved due to fluctuations in the cattle cycle and improved demand bringing some relief to producers. These trends have been tempered, however by drought, brucellosis and BSE (Bovine Spongiform Encephalopathy, *mad-cow* disease).

In addition to profitability issues, increasing land values in the region present a barrier to entry for aspiring ranchers without adequate financial support and incentives for existing producers to sell out. Average ranch prices, per AU (animal unit) increased 166 percent (from $1,255 per AU to $3,340 per AU) in western Wyoming from 1989 to 2001 (Bastian et al, 2001).

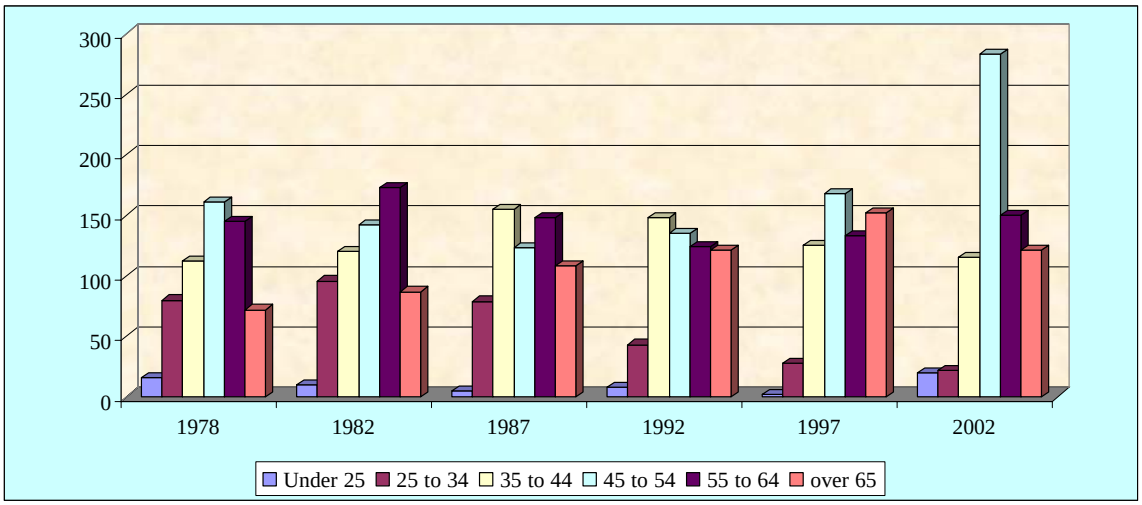
Figure 12. Total net farm proprietor's income, Park County, Wyoming. 1970 to 2002.



Source: Bureau of Economic Analysis

All these factors are combined in Figure 13, which shows the number of Park County agricultural operators by age group for the agricultural census years 1978 through 2002. The most obvious feature in Figure 13 is the large growth in the number of operators in the age group 45 to 54 in the year 2002. This represents a 68 percent increase from 1997 and a 76 percent increase from 1978. Beyond that, there are some more subtle features worth noting.

Figure 13. Age distribution of agricultural operators, Park County, Wyoming 1982 - 2002.



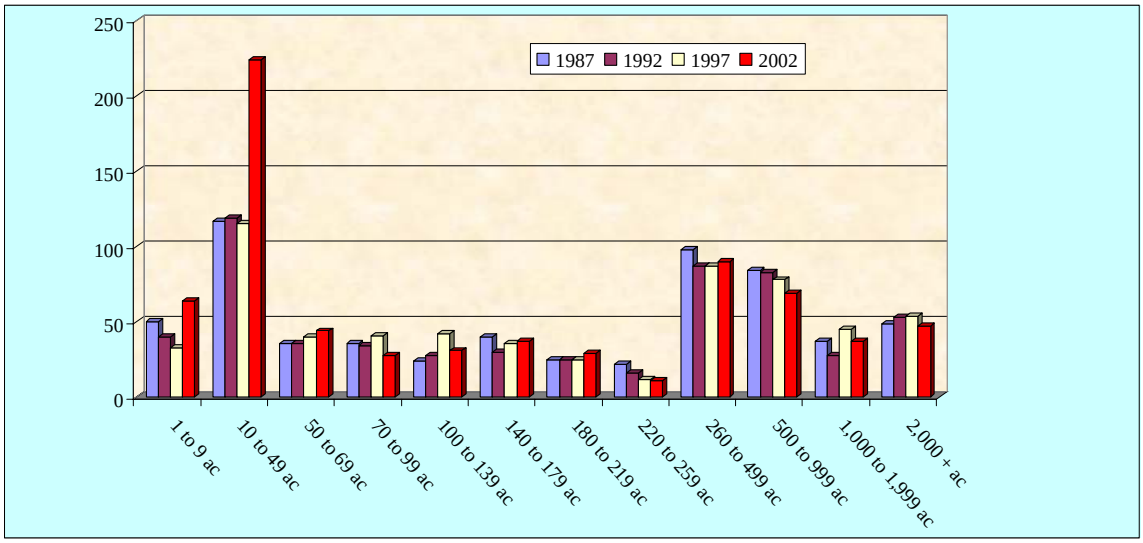
Sources: Census Bureau and USDA Census of Agriculture

In a static industry, one would expect the graph to have a fairly normal appearance. That is, with about the same number of people leaving the industry as entering at any given time. Structural change has been affecting agriculture for many decades now, but for Park County in the year 1978, the demographic structure appears fairly normal. Moving through time, toward 1997, the years take on a more blocky appearance as the number of operators in the older age groups increases while the number of younger operators stays low. In other words the distribution has shifted to the right by an older population of operators. For the time period presented, 1997 is the culmination of this right-shifting phenomenon.

Two thousand and two is a departure from earlier years not only in the tremendous increase in the 45 to 54 year old category, but also in the fact that the number of older operators (over 65) actually decreased from 1997 while the number of very young operators (under 25) increased. So what is happening here and why are these changes occurring all at once? To try and understand this, it is first necessary to be somewhat familiar with the trends in size of operation in Park County.

Figure 14 shows the number of agricultural operations by size for the agricultural census years 1987 to 2002 (earlier data was not comparable with the new categories). The most notable feature is the large increase, 91 percent, in the number of farms (the census of ag does not distinguish between farms and ranches) in the 10 to 49 acre category for 2002. The 1 to 9 acre category also had a large increase, 28 percent. Note that all categories over 500 acres lost numbers, even so, farms over 2,000 acres still account for 80 percent for land in farms in 2002. Also when measured from a land area perspective, these larger operations lost land area. This rules out consolidation into larger operations as being the cause of the reduced numbers of larger operations, and points to fragmentation for rural residential development.

Figure 14. Size of operation distribution, Park County Wyoming, 1987-2002.



Sources: Census Bureau and USDA Census of Agriculture

Taken together, Figures 13 and 14 indicate that there may have been a decline in the number of larger, commercial livestock operations and an increase in smaller lifestyle enterprises. As previously shown in the section on livestock production, the number of sheep in Park County has been trending lower over the past several decades. The number of cattle has also trended marginally lower. It is likely that some operations have switched from sheep to cattle and that some smaller, lifestyle enterprises have come into existence on smaller property, broken out of larger ranches. At least some of the proprietors will fall into the 45 to 54 year old category. So the growth in the 45 to 54 year category could indicate a combination of the naturally aging population of agricultural operators plus the addition of new entrants to the industry on smaller properties.

IV. LIVESTOCK ECONOMICS

GAMS model description

In order to estimate the economic impact of changes in federal grazing, some sort of model framework was required. The authors used a linear programming model built in the GAMS (General Algebraic Modeling System) software format. GAMS is an optimization program for solving simultaneous equations. For this project a hypothetical, model ranch was developed for Park County, Wyoming. It was modeled on the concept of having a typical ranch complement for the county in regards to production and practices for its size. The researchers assembled a panel of Park County producers to help them understand typical operations and size in the region. This information was supplemented with data from the Census of Agriculture for Park County. The census lists beef cow inventories for agricultural operations in Park County in categories ranging in size from 1 to 9 cows to 500 or more cows. However, modeling and time constraints dictated that the project modeled a single representative ranch. In order to model economic impact, the project focused on commercial agricultural operation where agricultural production is the primary source of income and most of the agricultural production occurs. The 2002 Census of Agriculture indicates that ranching operations

with 200 or more head of cows accounted for nearly three-quarters of the cow inventory in Park County. The average size for those operations was 570 cows. Furthermore, ranches with over 1,800 AUMs of federal grazing permits (BLM and USFS) account for about 75 percent of the federal grazing AUMs. Therefore, a 600 head cow herd with Forest Service and BLM summer grazing was chosen based on production numbers.

The model used for Park County was originally developed by Dr. Alan Torrell (University of New Mexico) and Dr. Larry Van Tassell (University of Idaho) to model federal grazing and BLM dependency in Wyoming for the W-192 regional research project. This project has modified the model specifically for Park County. The model reflects a cow-calf operation that maintains 504 head of brood cows and about 95 replacement heifers each year. The land base for the ranch is shown in Table 6.

Table 6. Land base for Park County model ranch

	Amount	Productivity assumptions
State lease	538 aum's	
BLM	1,882 aum's	
USFS	1,883 aum's	
Private lease	500 aum's	
Deeded range	1,076 aum's	
Total forage AUMs	5,379 aum's	
Hay meadow	793 acres	1.5 tons/acres

A Monte Carlo simulation was used for the cattle prices to simulate the effects of price variability from the cattle cycle. The model simulates 40 years of production, with 100 iterations per year for a total of 4,000 iterations. This helps to minimize the effect of fluctuating livestock prices when a policy change is made in the model. Hay grown on the ranch can either be sold or fed to livestock. All parameters are set to reflect the type of production practices prevalent in Park County.

The project uses scenarios to model different levels of available federal forage. A base model was developed to evaluate current conditions, including herd size, AUMs of available forage for both private and public grazing, and measures of profitability such as gross returns, net livestock returns and ranch profits. Additional scenarios were developed to reflect reductions from current conditions. For this project, five scenario models were developed. Each scenario reduces federal grazing alternatives, both BLM and Forest Service by a set amount. These include a base, or 100 percent scenario and reduction scenarios of 10 percent, 25 percent, 50 percent and 100 percent.

GAMS model results/economic impact

The base model assumes that the ranch is operating at full capacity. Gross returns for the model ranch over the 40 year analysis period average $241,960 per year, while net returns average $67,697 per year. Net returns include fixed costs of $37,350. Fixed costs will be incurred regardless of the level of ranch production. Ranch profits represent net returns minus fixed costs. The main revenue sources for the ranch are the sale of

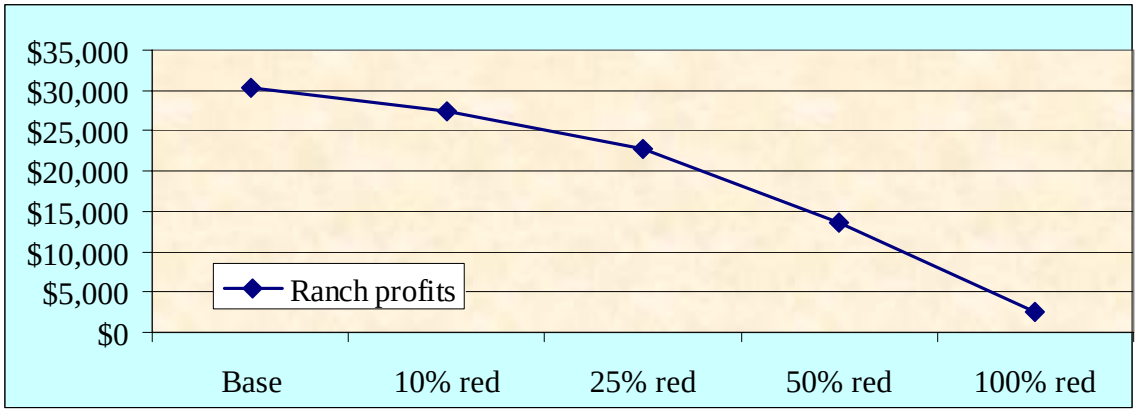
approximately 287 steer calves and 175 heifer calves, plus 182 tons of hay per year. Table 7 shows the returns and output sales for the base and reduction scenarios. Ranch profits for the base scenario are estimated to be $30,347, given a herd size of 504 brood cows. This represents returns to management and capital beyond both fixed and variable costs.

Table 7. Results from GAMS model simulation, 600 head ranch, Park County.

	Base	10% red	25% red	50% red	100% red
Gross returns	$241,960	$233,567	$219,865	$194,898	$145,346
Net returns (includes fixed costs)	$67,697	$64,856	$60,173	$50,997	$39,813
Ranch profits	$30,347	$27,506	$22,823	$13,674	$2,463
Total animal units	762	725	666	559	352
Brood cows	504	480	441	369	229
Steer calves sold	287	273	251	210	133
Heifer calves sold	175	167	154	129	79
Grass hay sold (tons)	182	230	309	450	705

The four reduction scenarios in Table 7 represent the simulation results on ranch output and profitability due to an equal reduction in USFS and BLM grazing AUM's by the specified amount. For example, a 10 percent reduction in both USFS and BLM grazing AUMs corresponds to a 9.4 percent reduction in ranch profits from over $30,000 to about $27,500. Correspondingly, the cow herd would be reduced 4.8 percent from 504 head to 480 head. Net returns include fixed costs ($37,350), which remain unchanged regardless of the amount of federal grazing. These are costs which the ranch must bear regardless of the number of animals grazed.

Figure 15. Estimated ranch profits for model ranch simulation scenarios.



As the number of AUMs withdrawn from use increases, herd size decreases. The ranch being unable to graze as many cattle during the summer is forced to reduce herd size. With the reduction in herd size, more hay is sold. Hay sales increase 288 percent from the

base scenario to the 100 percent reduction scenario where no federal grazing is available. However the fixed cost of operating a ranch this size and the lower returns of hay over cattle cause annual ranch profits to decline. Figure 15 shows this decline at various levels of reductions. With a 100 percent reduction in Federal grazing ranch profitability approaches zero.

Economic importance of federal grazing

Federal grazing is an important part of livestock production in Park County. The 1997 Census of Agriculture found that 111 ranches in the county held grazing permits with over 75 percent of these permits being from the Forest Service or the Bureau of Land Management (BLM). These ranches represent about 50 percent of the ranching operations in the county. These ranches are particularly important because they manage a total of nearly 832,000 acres of land including private, state, and isolated federal leases. This represents 82 percent of the total agriculture land in the county.

Although most ranches are typically only partially dependent on federal land grazing for forage, this forage source is a critical part of their livestock operation. Greer (1994) and Taylor et al (1992) both found that while the reliance of ranchers on forage from federal land grazing can appear relatively unimportant when calculated on an acreage or AUM basis, they become quite important when calculated on a seasonal dependency basis. The rigidity of seasonal forage availability means that the optimal use of other forages and resources are impacted when federal AUMs are not available, Torell et al (2002). Bartlett (1983), Gee (1983), Hahn et al (1989), Bartlett et al (1979), Gee (1981), Perryman and Olson (1975), Rowe and Bartlett (2001), Torell et al (1981), and Van Tassell and Richardson (1998) have all found that potential reductions in income and net ranch returns are greater than just the direct economic loss from reductions in federal grazing.

Results from the ranch level analysis in the previous section quantifies the economic importance of federal grazing to ranching operations in Park County. Because ranching operations have economic linkages with other sectors of the county's economy, changes in federal grazing also have implications for the overall economy in Park County. Results from the ranch level analysis suggest that that there are at least three possible approaches to evaluating the economic importance of federal grazing to local communities: 1) evaluating federal AUMs only, 2) evaluating federal AUMs and the effects on total production, and 3) evaluating federal AUMs and their effect on the economic viability of the ranch operation. Which of these approaches is the most relevant in a particular situation depends on a number of factors including the individual ranch's level of dependency on federal grazing, the magnitude of the proposed change in grazing, the financial solvency of the ranch, the availability of alternative sources of forage, and the desire of the rancher to remain in ranching. The following considers the economic impact of federal grazing in Park County on the local economy under each of the three perspectives.

Impact of federal AUMs only

Allotment information from the Forest Service for the Clarks Fork, Greybull, and Wapiti Ranger Districts of the Shoshone National Forest and the BLM's Cody Field Office

indicates that in 2004 there were 85,594 AUMs of federal livestock grazing permitted for use by ranching operations located in Park County. This total includes 51,518 AUMs from the BLM and 34,076 AUMs from the Forest Service. For purposes of this analysis it is assumed that all these AUMs are for cattle grazing. In any given year the actual grazing use will generally be somewhat less than the permitted use, however the difference will vary by year.

Table 8 summarizes the estimated economic impact of an AUM of grazing for Park County. This information was estimated from the 2002 IMPLAN model that was modified by the authors for Park County. These estimates are based on 2003 average value of production for cow/calf operations in the Basin and Range region of the United States (USDA – ERS), which includes Park County. On a per AUM basis, the 2003 value of production was $37.65. Due to economic linkages between ranching and the rest of the Park County economy, the total economic impact of an AUM of production was estimated to be $73.55. This represents the total economic activity that occurs within the Park County economy as a result of an AUM of livestock production. The relationship between the $37.65 of production and the $73.55 of total economic impact is often referred to as the "multiplier effect". As a result of this economic activity it is estimated that about $20.00 of labor earnings are generated per AUM and 0.000817 jobs are supported in the Park County economy. The 0.000817 jobs represent about one job for every 1,224 AUMs of grazing. Average earnings per job for this employment were $24,492 per year.

From the Federal Grazing Only Perspective, the 85,594 AUMs of federal grazing results in $3.2 million of production, $6.3 million of total economic activity, $1.7 million in labor earnings, and 70 jobs in the Park County economy. This perspective assumes that the only affect on the ranching operation from federal grazing is the direct production associated with the federal AUMs.

Impact of federal grazing on ranch production

As noted in the discussion of ranch level analysis above, estimating the economic impact of federal grazing based solely on federal AUMs in many cases underestimates the actual importance of federal grazing. The results from the Park County ranch model indicate that, in terms of ranch production, one AUM of federal grazing actually generates $82.44 of livestock production. This assumes that since federal AUMs are part of an overall grazing system, a change in federal grazing affects the optimal use of the rest of the forage resources. Under this scenario, the total economic impact of the production associated with a federal AUM of grazing throughout the Park County economy is $161.05. As a result of this economic activity it is estimated that about $43.81 of labor earnings are generated per AUM and 0.001789 jobs are supported in the Park County economy. The 0.001789 jobs represent about one job for about 560 AUMs of grazing. Average earnings per job for this employment were $24,489 per year.

From the Ranch Production Perspective, the 85,594 AUMs of federal grazing results in $7.1 million of production, $13.8 million of total economic activity, $3.7 million in labor earnings, and 153 jobs in the Park County economy. This perspective considers the

change in total ranch production resulting from the change in federal grazing assuming the ranch still remains in operation.

Table 8. Economic Impact of Federal Livestock Grazing in Park County

	Federal Grazing Only	Ranch Production Perspective	Ranch Viability Perspective
Per AUM			
Value of Production	$37.65	$82.44	$184.99
Total Impact	$73.55	$161.05	$361.40
Labor Earnings	$20.01	$43.81	$98.31
Employment	0.000817	0.001789	0.004014
Ave. Earnings/Job	$24,492	$24,489	$24,492
Total AUMs	85,594	85,594	85,594
Value of Production	$3,222,614	$7,056,369	$15,834,034
Total Impact	$6,295,439	$13,784,914	$30,933,672
Labor Earnings	$1,712,736	$3,749,873	$8,414,746
Employment	70	153	344
Ave. Earnings/Job	$24,492	$24,489	$24,492

Impact of federal grazing on ranch viability

Previous research and the results from the Park County ranch model indicate that the availability of federal grazing may be critical to the economic viability of many federal grazing dependent ranches. As was seen in the ranch level analysis, the net profits for federal grazing dependent ranches without federal grazing approaches zero. This finding is consistent with other research conducted in Wyoming and other parts of the western United States.

The results from the Park County ranch model indicate that if changes in federal grazing affects ranch viability, one AUM of federal grazing actually represents $184.99 of livestock production. Under this scenario, the total economic impact of the production associated with the federal AUM of grazing throughout the Park County economy is $361.40. As a result of this economic activity it is estimated that about $98.31 of labor earnings are generated per AUM and 0.004014 jobs are supported in the Park County economy. The 0.004014 jobs represent about one job for about 250 AUMs of grazing. Average earnings per job for this employment were $24,492 per year.

From the Ranch Viability Perspective, the 85,594 AUMs of federal grazing represent in $15.8 million of production, $30.9 million of total economic activity, $8.4 million in

labor earnings, and 344 jobs in the Park County economy. This perspective assumes that the ranch ceases production without the availability of federal grazing.

Summary

The results from this analysis indicates that livestock grazing, as part of Park County's agricultural sector is the dominant form of land use for private land in the county. Federal livestock grazing is an important part of livestock production in terms of the number of producers affected, the acres of land affected, and economic effects on the individual agricultural operations. Federal livestock grazing also has important implications for the overall Park County economy. The total economic impact estimates for federal grazing in Park County range from 70 to 344 jobs and $1.7 to $8.4 million in labor income. Since ranching and related businesses are often family enterprises, this employment and labor income is important not only to the individual owners and employees but to their whole families as well.

Livestock grazing is an important source of employment in the Park County economy. However, in addition to quantity of employment there is the issue of quality of employment. Although there a number of factors that affect the quality of a job, the one that is most readily measurable is the wage rate. As shown in Table 4, the average earnings for jobs directly or indirectly associated with livestock production in Park County were about $24,500. This annual earnings rate was nearly 90 percent of the County average in 2002 - $27,163 (U.S. Department of Commerce, 2005). Figure 16 illustrates the average earnings distribution of employment associated with livestock grazing in Park County. Nearly three-fourths of the jobs are in sectors where the average earnings per job were in the $20,000 to $30,000 range.

Recently, the State of Wyoming released a report with Self-Sufficiency Standards for Wyoming Counties (Pearce, 2005). The report indicates…"Self-Sufficiency Standards measure how much income is needed for a family of a certain composition in a given place to adequately meet their basic needs – without public or private assistance." The second column of Table 5 summarizes the Self-Sufficiency Standards for Park County, expressed in 2002 dollars. They range from $12,776 for a single adult to $36,027 for a single adult with an infant, a preschooler, and a school aged child. The third column of Table 5 indicates the percent of jobs associated with livestock grazing that are in sectors where the average earnings per job meet or exceed the Self-Sufficiency Standard. The Table 9 indicates that in 6 of the 8 family categories 85 percent or more of the jobs meet or exceed the standard. The only two exceptions are a single adult with an infant and a preschooler; and a single adult with an infant, a preschooler, and a school aged child.

Figure 16. Earnings distribution of livestock related jobs in Park County, 2002.

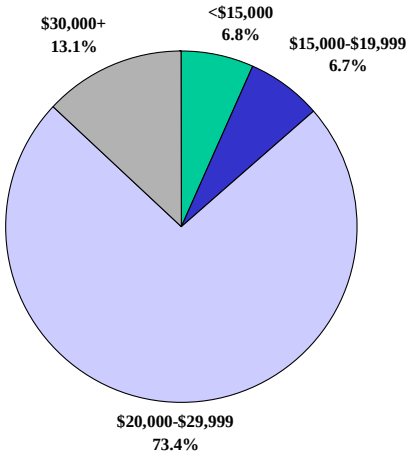


Table 9. Self-Sufficiency Standards for Park County

	Self -Sufficiency Standard (2002$)	Livestock grazing Jobs exceeding
Adult	$12,776	93.8%
Adult + Infant	$20,537	86.5%
Adult + Preschooler	$20,097	86.5%
Adult + Infant + Preschooler	$26,836	15.8%
Adult + School Aged Teenager	$19,576	86.8%
Adult + Infant + Preschooler + School Aged	$36,027	4.9%
2 Adults + Infant + Preschooler (Per Adult)	$17,098	92.3%
2 Adults + Preschooler + School Aged (Per Adult)	$15,790	93.2%

V. Fiscal Base and Impacts in Park County Wyoming

The following analysis evaluates the fiscal drivers of county government in the Park County economy. Government's role is to provide services to local residents and businesses. Residents and respective businesses require government services to live and operate a business (roads, emergency services, etc.) Issues that affect local government's ability to fund services for residents and businesses can in turn affect the viability of businesses and the satisfaction of residents. Fiscal stability of local government therefore is as important to the local economy as the viability and stability of local industry. The two components are linked.

There are two objectives for this section: 1) to evaluate the trends in fiscal capacity for county government, and 2) to evaluate the fiscal impacts to county government from conversion of agricultural lands to residential development. The latter focuses exclusively on the effect of agricultural land and public land grazing on county government fiscal stability. (Other issues such as mineral production, endangered species, etc. are not covered in the study due to data requirements and scope.) Rural land use issues, or open space issues are an increasingly important issue for Wyoming Counties. Previous work on fiscal impacts of exurban development have identified this issue as a growing problem for many counties (Coupal, Taylor, McLeod 2002). On average, conversion of 35 acres of agricultural lands to a residential parcel costs $1.13 in county expenditures for $1.00 of tax revenue. This analysis focuses exclusively on the economic – fiscal relationships for Park County. The model developed is a long run model that measures changes in revenues and expenditures from land use and the overall economic activity in the county.

Fiscal Capacity (Revenues)

This portion of the analyses focuses on the overall changes in expenditures and revenues for county government. Three indices of capacity are analyzed: 1) sales tax revenues, 2) assessed valuation, and 3) county expenditures. The results provide a baseline for county fiscal issues.

Park County has a highly diverse economic base for the region. Mineral production is a dominant source of tax revenues, but the county also generates revenues and incurs public expenditures from other sectors ranging from tourism to manufacturing. Each component of the economic base that drives the local economy has its own fiscal characteristics. Like many Wyoming counties, the local fiscal base is dominated by mineral revenues, (Figure 17.) However, since 1990 that base has declined in importance significantly, with residential and commercial sectors increasing. The county's location next to Yellowstone National Park and the high amenity land within its boundaries are conducive to second home growth and businesses for employment in areas with high amenities.

Figure 18 presents total assessed value (local and State assessed valuation by the county over the analysis period). Due to the reliance on oil and gas and due to low energy prices during the mid-nineties, assessed valuation dropped by as much as 44 percent from the early part of the decade, but then began to climb again due in part to the current energy boom. As a result total assessed value for Park County has matched its early nineties levels.

Converting those estimates to a per capita perspective and adjusting for inflation suggests a more complex issue for the county, Figure 19. On a per capita basis assessed valuation has been declining in real terms. As mineral production has leveled off and residential and commercial have increased along with population growth, the tax base for given level of service is being stretched. Without declining levels of government services the county will eventually need to increase its tax rates. An alternative is to rely more heavily on other sources of funding.

Figure 17. Proportion of Assessed Valuation for Property in Park County, Wyoming.

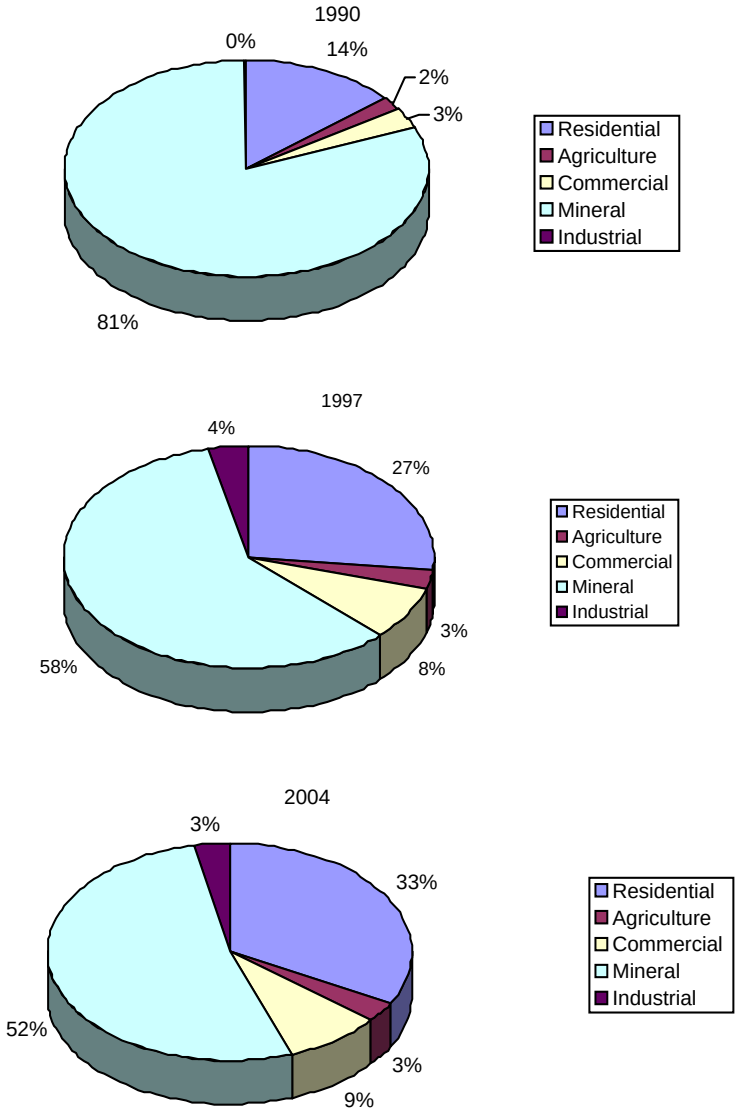
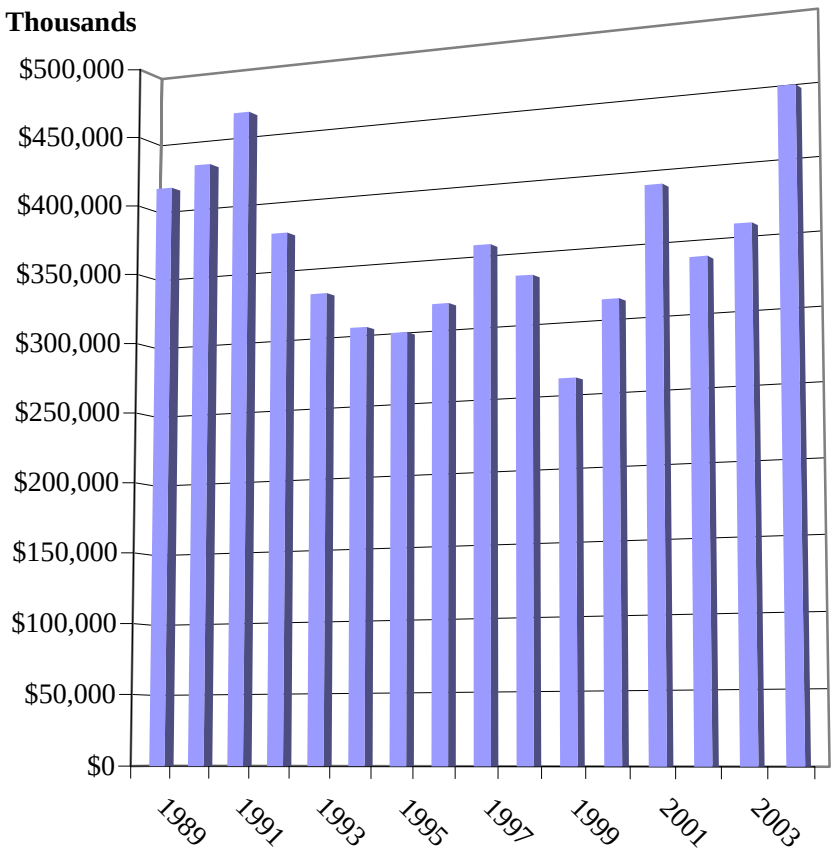


Figure 18. Total Assessed Valuation in Park County, 1989 to 2003.



Sales Tax Capacity

Sales tax collections in Park County totaled over $23 million in FY 2004, of which the state retains about 55 percent (Figure 20). Overall sales taxes increased 10 percent per year in nominal terms and three percent per year in real terms. The retail sector is the largest source with over 54 percent with Services and public administration generating 14.6 percent and 9.5 percent respectively. The growth from FY03 to FY04 was for the most part proportional across industry categories and relates to a 1 percent special purpose tax which became effective April 1, 2003 . Retail collections as a proportion of total remained close to 54 percent. In real terms sales tax collections increased over the period on average of 7 percent per year.

Figure 19. Real assessed valuation per capital for Park County (2003=100).

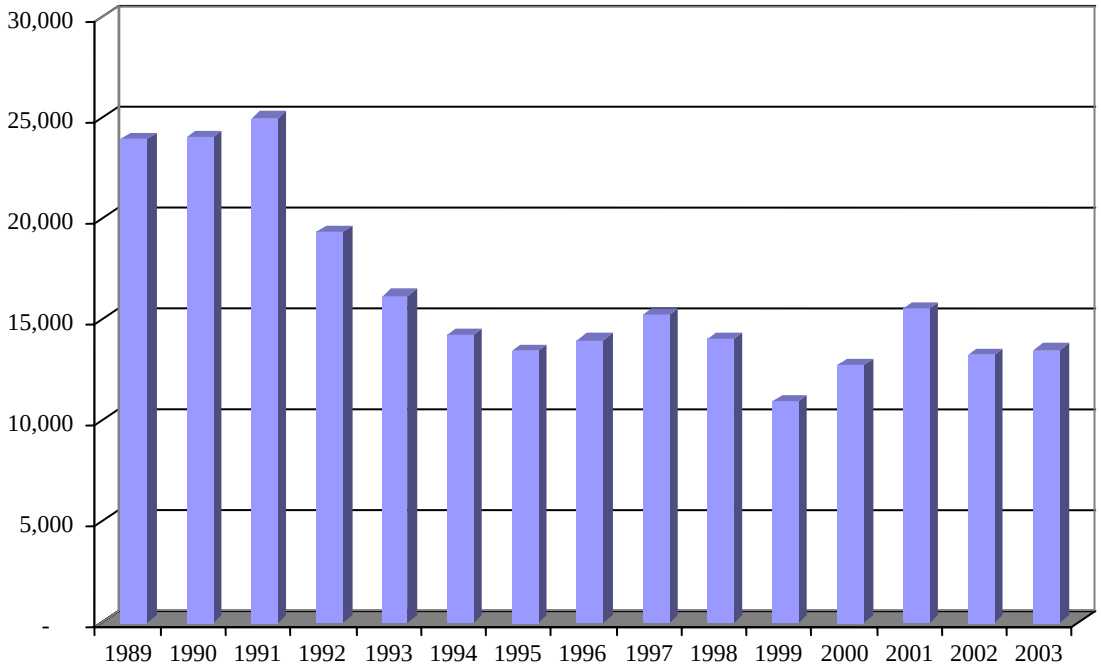
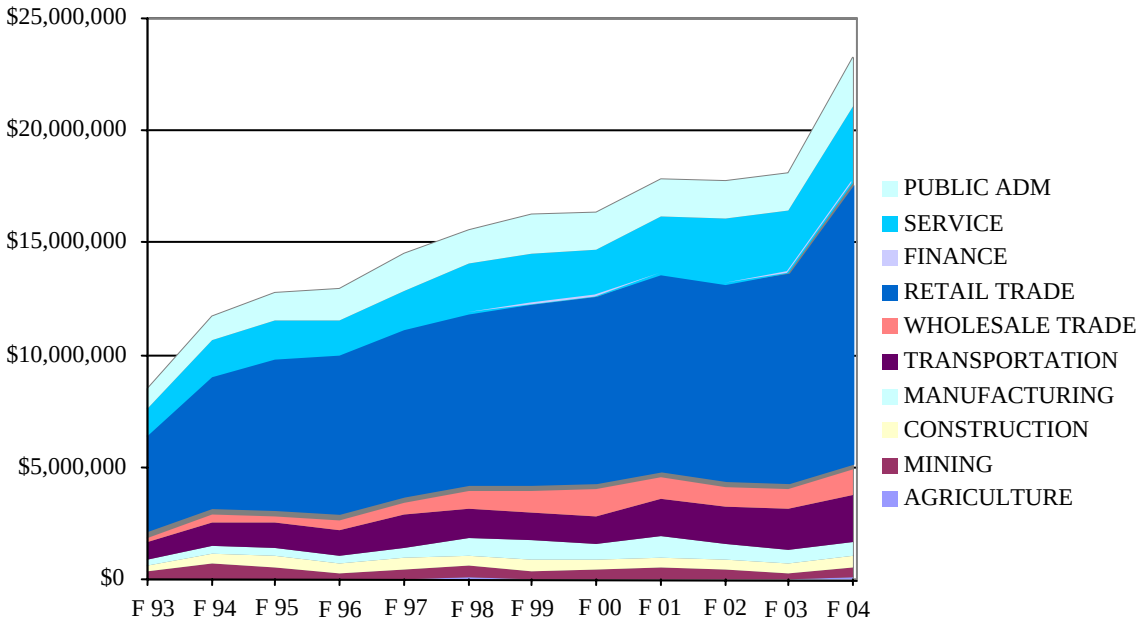


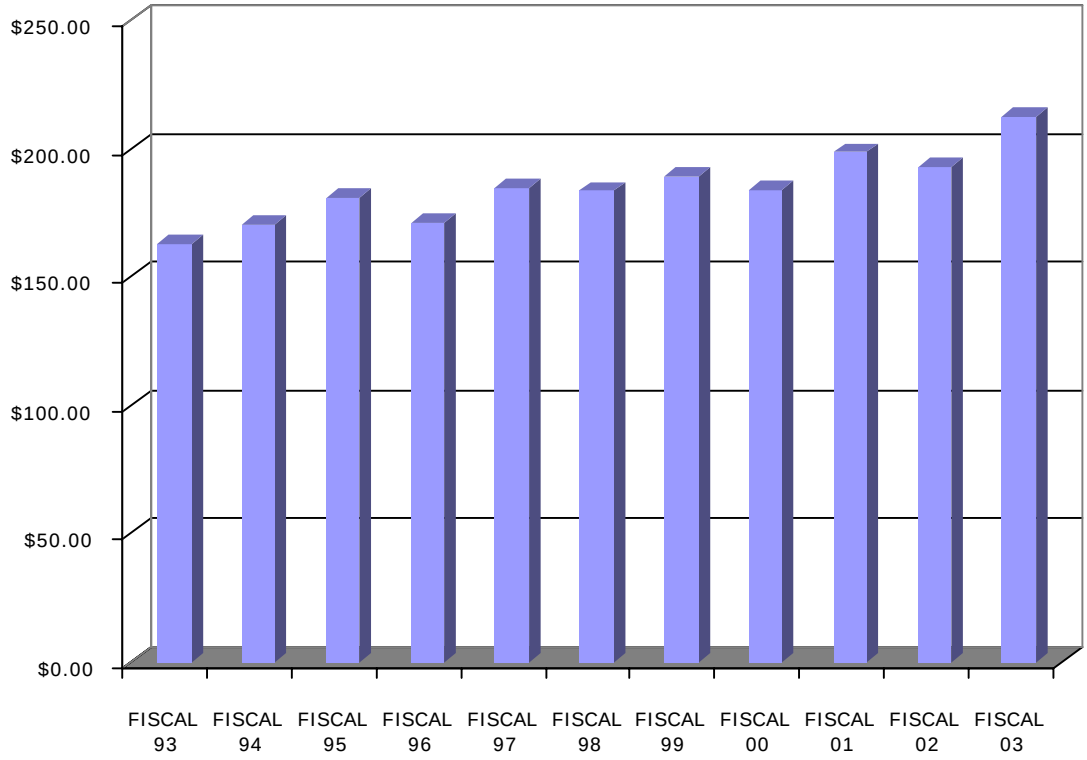
Figure 20. Sales Tax Collections in Park County, F93 – F04.



On a per capita basis sales tax distributions (the amount of sales tax collections that come back to the county) have been increasing at a rate of 3 percent per year (Figure 21).

Unlike the per capita assessed valuations, the sales tax base is maintaining capacity given inflation and population increase.

Figure 21. Real Sales Tax distributions per capita (2003=100)



Fiscal Capacity (Expenditures)

The final component of the county's fiscal base is its expenditure capacity. It is important to keep in mind that taxes and revenue generation are for the provision of public services and infrastructure, which are expenditure related. So policies by local government need to be evaluated from the perspective of both the revenue generation effects and expenditure effects.

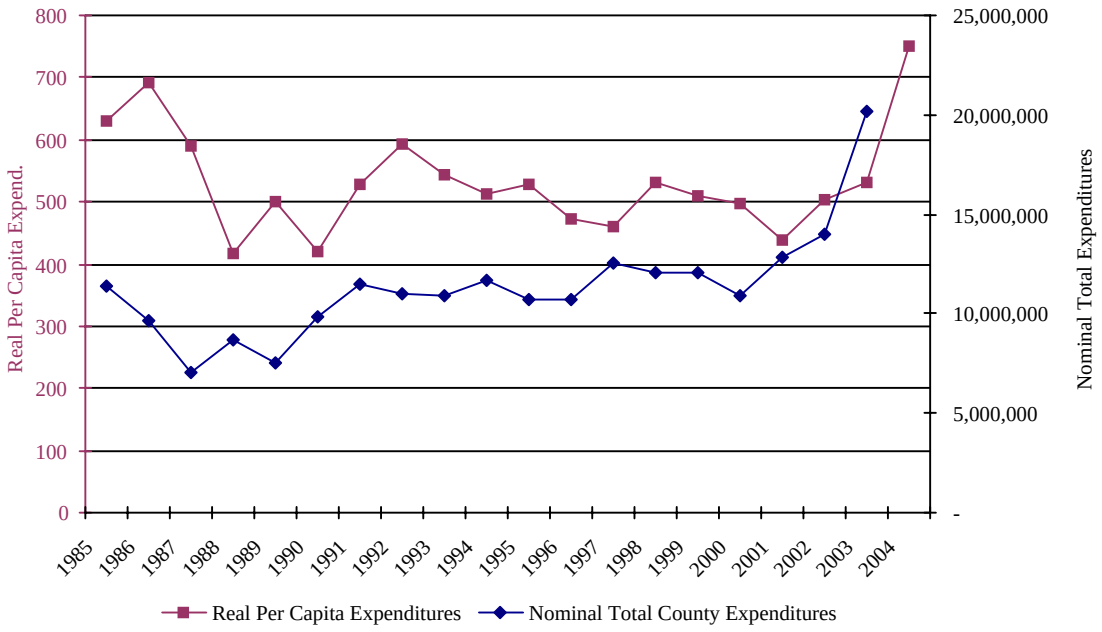
Expenditures have been increasing at a nominal rate of 5 percent per year and totaling almost $14 million in 2003, but then jumped to $20 million in 2004 (Figure 22). The jump in 2004 ended a general slide in the 1990s of per capita expenditures.

Fiscal Impacts of Federal Land Grazing Policy

This section summarizes the results of the statistical analysis of changes in agricultural land use and public grazing land. Previous sections summarized the effects (and importance) of public grazing to the producer and the local economy. We extend this issue now to the local public sector. As discussed above, local government services can be an important part of the viability of local businesses. The provision of public services such as roads, education, security and emergency services can all be instrumental in lowering a firms cost of doing business (or increasing a firms cost of doing business.) Conversely different firms and land uses provide different levels of revenues and expect

different levels of service. This analysis will focus on the issue of conversion of agricultural land to rural residential.

Figure 22. Nominal County Government Expenditures and Real Expenditures per capita for Park County, Wyoming 1985 – 2004.

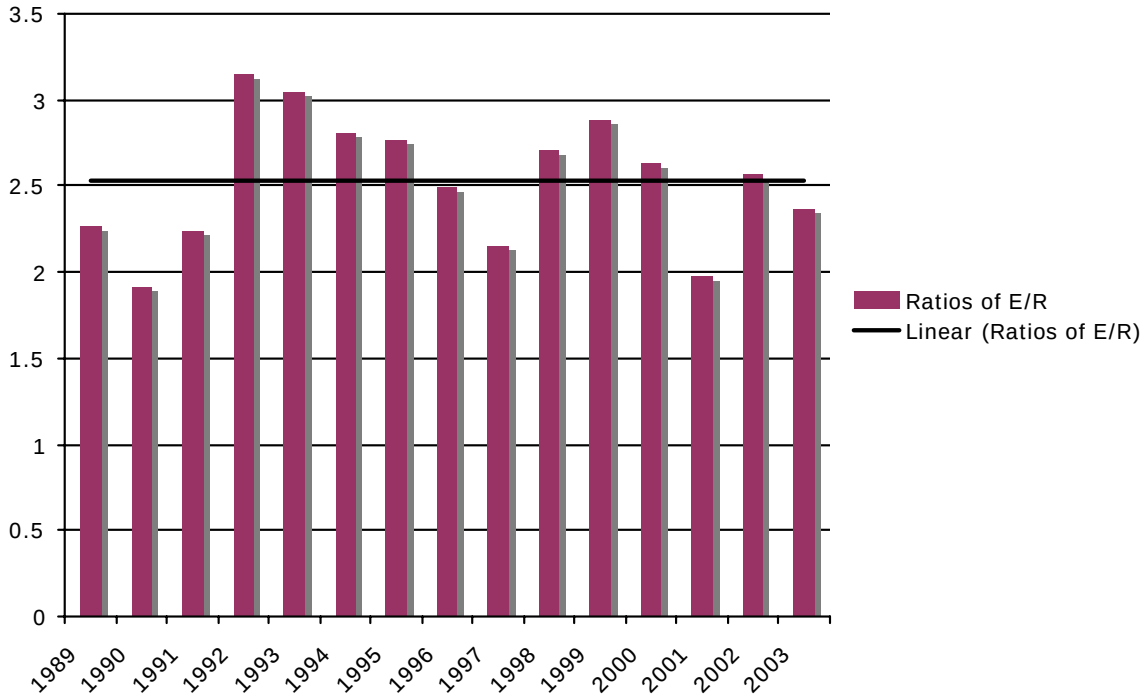


As established in previous sections economic viability of much of ranching in Park County requires public lands grazing resources. Removing those resources can potentially force producers out of business. In high amenity areas private land that is not economically viable as agricultural land can be sold as rural residential lots. So changing public grazing may increase the rate of agricultural land conversion. This conversion can in turn have significant fiscal effects on both revenue and expenditure generation. Previous studies in Wyoming and throughout the West have measured the overall fiscal effects of land conversion in counties. Coupal, Taylor, and McLeod (2002) estimated that conversion of 35 acres of agricultural land to residential use cost the county $1.13 for every dollar in revenue. This study only considered operating expenditures and operating revenues. Statewide estimates are similar. Other studies have been conducted throughout the West, and in other counties in Wyoming, and have all resulted in similar estimates (AFT 2001).

This study extends the analysis over longer time span and incorporates infrastructure expenditures as well. A set of statistically based fiscal impact models were developed to calculate revenue changes and expenditure changes for county government. The models incorporate all categories of county services and all sources of revenues: Property taxes, sales taxes, and intergovernmental transfers. The models are designed to predict total revenues and expenditures as a function of categories of economic activity. These include population change, mineral production (in the form of industry earnings), National Park Service visitation on the eastside, farm earnings or agricultural land, and other sources of

economic activity. In contrast to the earlier study (Coupal, Taylor, McLeod 2002) this model is a long run model, and thereby captures spending or revenue generation that for one reason or another is deferred over a year or two. The study covers the years 1989 to 2003.

Figure 23. Expenditure to Revenue ratios for county government from conversion of 35 acres of agricultural land to one household residence.



Results show that replacing 35 acres of agricultural land with one average size household generates more revenues, but considerably more county expenditures. For every dollar of tax revenue generated an average of $2.53 of expenditures are incurred by the county. An important qualification of this main result is that this is an average and is not an iron clad rule. If rural growth was better planned or was clustered, this ratio could change. It was not in the scope of this project to estimate the fiscal effects of clustering.

Figure 23 presents calculated ratios of county government expenditures to county government revenues for each year of the analysis period. Ratios ranged from a low of 1.9 to a high of 3.1.

Conclusions (Fiscal Base and Impacts)

There are several strengths and challenges in Park County Governments' fiscal capacity. The challenges will require planning, participation, and cooperation by local, state, and federal agencies. The growth in sales tax revenues is an important strength in the County's fiscal base. On a per capita basis sales tax distributions have been growing in real terms. As the economy moves from a commodity-based, natural resource

dependency to a service-based natural resource dependency, sales taxes become a more important source of local public financing. This growth may be limited however, since many services do not pay taxes under the current tax structure.

On an issue that could be viewed as a strength or a challenge depending upon the context, per capita expenditures have declined in real terms. Real per capita expenditures have declined by one percent per year over the last 18 years. As long as the public views the level of services to be sufficient then the decline suggests efficiency gains by county managers.

The challenges will require planning, participation, and cooperation by local, state, and federal agencies. Probably the most important challenge is the decline in real assessed valuation per capita. Ad valorem taxes are the most important source of revenue for local government operations, from schools to roads. The results suggest that population change is outpacing major revenue sources such as revenues derived from mineral production, and that commercial/residential sources of property taxes are not taking up the slack.

The final challenge identified in this study concerns the net fiscal impacts of exurban development. The analysis developed in this study estimates that on average, replacement of 35 acres of agricultural land with one household generates approximately $2.50 in expenditures for every dollar of revenue. So even though revenues increase as land is converted to rural residential use, expenditures on average increase by a greater amount. Over the period of study the ratio of expenditure increases to revenue increases ranged from 1.9 to 3.1.

In summary Park County is like many resource based counties in the West, dependent upon the multiple use of public lands from grazing to mining to recreation. Likewise its tax base is also dependent upon the same mix of economic uses of public lands. Successful land use planning by local government in cooperation with federal agencies is needed to maintain county government services at the current level.

VI. CONCLUSIONS

The authors estimated the importance of federal grazing to the Park County economy. Additionally, an attempt has been made to show the importance of several big game species to the Park County economy and the relationship between these big game species and agricultural land in the county.

The results show that livestock grazing on public lands is important to the economy of Park County from several different perspectives. From a ranch viability perspective, federal grazing contributes approximately $31 million to the Park County economy annually. This generates employment of 344 people and contributes approximately $8.4 million in labor income to the local economy.

Reductions in federal grazing AUM’s could have a significant impact on the economic viability of livestock operations in Park County since for some operations profitability

approaches zero without federal grazing. Agricultural operations manage more than 678,000 acres or 97 percent of the private agricultural land in Park County. This land, remaining in agriculture, contributes open space, valued by the residents of Park County. So while significant rural residential development has occurred, open space is still maintained on large tracts of land by neighboring agricultural operations. These tracts can be enjoyed and are valued by other residents and visitors as well.

Open space is also valued by wildlife. Big game species such as elk, deer and antelope depend on Park County's open space for winter range habitat. In this sense, the open space associated with agricultural land is important to the survival of these species in Park County. Big game species also contribute to the economy of Park County through hunting. This applies to non-resident (out of county) hunters particularly because they bring new dollars into the economy. Elk, deer and antelope hunting contributes approximately $1.4 million annually in labor income to the Park County economy and supports an estimated 92 jobs.

An important conclusion to the subjects of this report (federal grazing and open space) is that because there is a fixed amount of land in Park County, residents, landowners, county planners and public lands managers hold the keys to how this resource will be managed. Whether the land is used for agriculture and remains as open space or is developed for rural residential living depends on some degree how these individuals and institutions react in their communities and the market place in regard to this resource. In essence, it is a balance between agriculture, development and conservation, dictated by the value society and the market place on this land resource. This report hopefully contributes to the debate that society and specifically Park County is having on this subject by attempting to quantify some of the economic values for these activities.

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