



Regional Economic Impacts of Current and Proposed Management Alternatives for Charles M. Russell National Wildlife Refuge



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By Lynne Koontz, Natalie Sexton, Asuka Ishizaki, and John Ritten

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By Lynne Koontz, Natalie Sexton, Asuka Ishizaki, and John Ritten¹

Introduction

The National Wildlife Refuge System Improvement Act of 1997 requires all units of the National Wildlife Refuge System to be managed under a Comprehensive Conservation Plan (CCP). The CCP must describe the desired future conditions of a refuge and provide long-range guidance and management direction to achieve refuge purposes. Charles M. Russell (CMR) National Wildlife Refuge, located in north-central Montana, is in the process of developing a range of management goals, objectives, and strategies for the CCP. The CCP for the Refuge must contain an analysis of expected effects associated with current and proposed refuge-management strategies.

For refuge CCP planning, an economic analysis provides a means of estimating how current management (No Action Alternative) and proposed management activities (Alternatives) affect the local economy. This type of analysis provides two critical pieces of information: (1) it illustrates a refuge's contribution to the local community; and (2) it can help in determining whether economic effects are or are not a real concern in choosing among management alternatives.

It is important to note that the economic value of a refuge encompasses more than just the impacts on the regional economy. Refuges also provide substantial nonmarket values (values for items not exchanged in established markets) such as maintaining endangered species, preserving wetlands, educating future generations, and adding stability to the ecosystem (Carver and Caudill, 2007). However, quantifying these types of nonmarket values is beyond the scope of this study.

This report first presents a description of the local community and economy near the Refuge. Next, the methods used to conduct a regional economic impact analysis are described. An analysis of the final CCP management strategies that could affect stakeholders and residents and the local economy is then presented. The refuge management activities of economic concern in this analysis are:

- Refuge purchases of goods and services within the local community;
- Refuge personnel salary spending;
- Grazing operations;
- Spending in the local community by refuge visitors; and
- Revenues generated from Refuge Revenue Sharing.

Regional Economic Setting

Encompassing 1.1 million acres of land and water, including the 245,000-acre Fort Peck Reservoir, the CMR National Wildlife Refuge is the largest refuge in Montana and the second-largest

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refuge in the continental United States. The Refuge includes native prairies, forested coulees, river bottoms, and badlands so often portrayed in the paintings of Charlie Russell, the colorful western artist for whom the refuge is named (U.S. Fish and Wildlife Service, 2009). Extending 125 miles along the Missouri River, the Refuge spans six counties (McCone, Garfield, Fergus, Phillips, Petroleum, and Valley) in the north-central part of the State.

For the purposes of an economic impact analysis, a region (and its economy) is typically defined as all counties within a 30- to 60-mile radius of the impact area. Only spending that takes place within this regional area is included as stimulating changes in economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. The six-county area is large (15.3 million acres) and remote; much of the regional economic activity is confined within the six-county area. The 1.1-million-acre refuge boundary accounts for 7 percent of total land and water within the six-county area including 11.6 percent of Garfield County, 8.7 percent of Phillips County, 6.6 percent of Valley County, 5.3 percent of Petroleum County, 5.1 percent of McCone County, and 2 percent of Fergus County. Based on the relative self-containment in terms of retail trade, the surrounding six counties comprise the local economic region for this analysis.

During the last century, ranching, farming, mining, natural gas development, and the railroad have all been important factors in the social and economic history of the area. More recently, outdoor recreation and tourism have been increasingly important contributors to the local economies. The next sections describe the socioeconomic characteristics and trends in the six-county area.

Population and Demographic Characteristics

Population and Density

Table 1 summarizes the population estimates and trends for Montana and the six counties surrounding the Refuge. In 2008, there were 25,287 residents in the local six-county area, accounting for approximately 2.6 percent of the state’s population while covering 16 percent of the state’s land area. In 2008, Fergus County had the largest population in the six-county area with 11,195 residents, while McCone was the least populated county with 1,676 residents. While Montana’s population grew

Table 1. National and regional population estimates.

Area estimated	Population (2008) ¹	Percent change from 2000 ¹	Persons per square mile ¹	Percentage of expected population growth (2000–2030) ²
United States	304,059,724	8.0	80.1	
Montana	967,440	7.2	6.6	34.2
Fergus County	11,195	5.9	2.6	-1.6
Garfield County	1,184	-7.4	0.2	-14.8
McCone County	1,676	-15.2	0.6	-23.6
Petroleum County	436	-11.6	0.3	-20.9
Phillips County	3,904	-15.1	0.7	-21.5
Valley County	6,892	-10.2	1.4	-23.0
Six-County area	25,287	-9.4	1.1	-13.3

¹Source: U.S. Census Bureau, 2008: Population Estimates, GCTT1 and DPI.

²Source: NPA Data Services Inc., 2007; U.S. Census Bureau, 2008.

by more than 7 percent from 2000 to 2008, all six counties experienced a population decline during that time, ranging from a 5.9 percent decline in Fergus County to a 15.2 percent decline in McCone County.

As shown in table 1, all six counties have substantially lower densities (0.3–2.6 persons per mi²) compared to that of Montana (6.6 persons per mi²). Nearly half of the residents in Fergus County live in the city of Lewistown, creating a local density of 3,055 persons per square mile. Similarly, more than 40 percent of Valley County’s residents reside in the city of Glasgow, resulting in a local population density of 2,075 persons per square mile. The higher local densities in these major communities indicate that rural areas outside of these communities are more sparsely populated than the county densities shown in table 1.

Communities near the Charles M. Russell National Wildlife Refuge

Lewistown, the county seat of Fergus County, is the largest city in the six-county area, with a total of 5,954 residents in 2008 (U.S. Census Bureau, 2008). Located in the geographic center of Montana, Lewistown has historically been an important regional trade center for the surrounding farms and ranches (Destination Lewistown, Montana, 2009). Recently, there has been a great deal of growth and diversification in the local economy including recreation, tourism and a variety of small manufacturing- and service-sector businesses (Destination Lewistown, Montana, 2009).

Established as a railroad town in the 1880s, Glasgow, the county seat of Valley County, is the second largest city (2,921 residents in 2008) near the Refuge. The construction of Fort Peck Dam (approximately 18 miles southeast of Glasgow) and the establishment and subsequent closure of Glasgow Air Force Base have been important historical events for the Glasgow economy.

Other communities near the Refuge include the agricultural community of Malta (1,801 residents in 2008), the Phillips County seat. The terrain between the towns of Jordan (336 residents), the Garfield County seat, and Circle (542 residents), the McCone County seat, offers numerous recreational opportunities and is well known among paleontologists for its fossil beds (Travel Montana, 2009). The agricultural town of Winnett, the Petroleum County seat with 163 residents in 2008, was formerly an oil boom town with more than 2,000 residents in the 1920s (Travel Montana, 2009).

Population Projections

As shown in table 1, Montana’s population is projected to increase by 34 percent from 2000 to 2030. Based on recent trends, most of the increase in statewide population can be expected to come from the in-migration of new residents who are aged 30–49 and have children or are older than 50 and retired, and those who are attracted to the wilderness and mountains (Young and Martin, 2003). However, most of the increase in population is expected to occur in western Montana. In contrast, the six-county area surrounding the Refuge is expected to continue to lose population in the next 20 years. Much of the loss in eastern Montana is expected to come from the emigration of people aged 20–29 leaving the region for better opportunities (Young and Martin, 2003). By 2030, McCone, Petroleum, Phillips, and Valley Counties are expected to lose more than 20 percent of their population compared to 2000 (table 1). Garfield County is expected to lose 15 percent by 2030, while Fergus County is expected to lose 4 percent by 2010 but is expected to regain some of its population for an overall loss of approximately 2 percent by 2030. Overall, the six-county area surrounding the Refuge is expected to lose approximately 13 percent between 2000 and 2030, with most of the loss occurring by 2020 (NPA Data Services, 2007).

Age and Racial Composition

The six-county area surrounding the Refuge has an aging population beyond that of the State of Montana as a whole. Whereas the median age of Montana in 2007 was 37.5 years, the six CMR counties

had a median age ranging from 40.8 to 42.4 years (U.S. Census Bureau, 2009). In addition, the six-county area had substantially higher proportions of residents between the ages of 65 and 84 (14.9–17.7 percent) compared to the entire State (11.7 percent), and substantially lower proportions of residents between the ages of 25 and 40 (26.8–8.0 percent) compared to the state (33.7 percent). The aging trend in the six-county area is likely driven by the trend of the young generation (particularly between ages 20–29) emigrating out of eastern Montana (Young and Martin, 2003) in addition to the aging baby-boomer generation. The impact of retirement-aged people on a community can be complex, but can include bringing in other sources of income and the desire for different types of recreation or amenities. For example, as the older recreation user groups increase, more hunters may request increased vehicle access to retrieve game and may rely on off-highway vehicles or motorboats as a means to access remote hunting areas.

In 2000, the proportion of white persons not of Hispanic or Latino origin in Phillips County (89.4 percent) and Valley County (88.1 percent) was close to the State average (90.6 percent) while Fergus County (97.1 percent), Garfield County (99.1 percent), McCone County (97 percent), and Petroleum County (99.2 percent) averages were greater than the State (U.S. Census Bureau, 2008). The percentage of residents identifying themselves as American Indian or Native Alaskan was 6.2 percent for the State, while Phillips and Valley Counties were higher than the State average, 7.6 percent and 9.4 percent respectively, due to the presence of Indian Reservations (U.S. Census Bureau, 2008). The percentage of residents identifying themselves as American Indian or Native Alaskan was significantly lower than the State average for the remaining counties, ranging from 0.2 percent for Petroleum County to 1.2 percent for Fergus County.

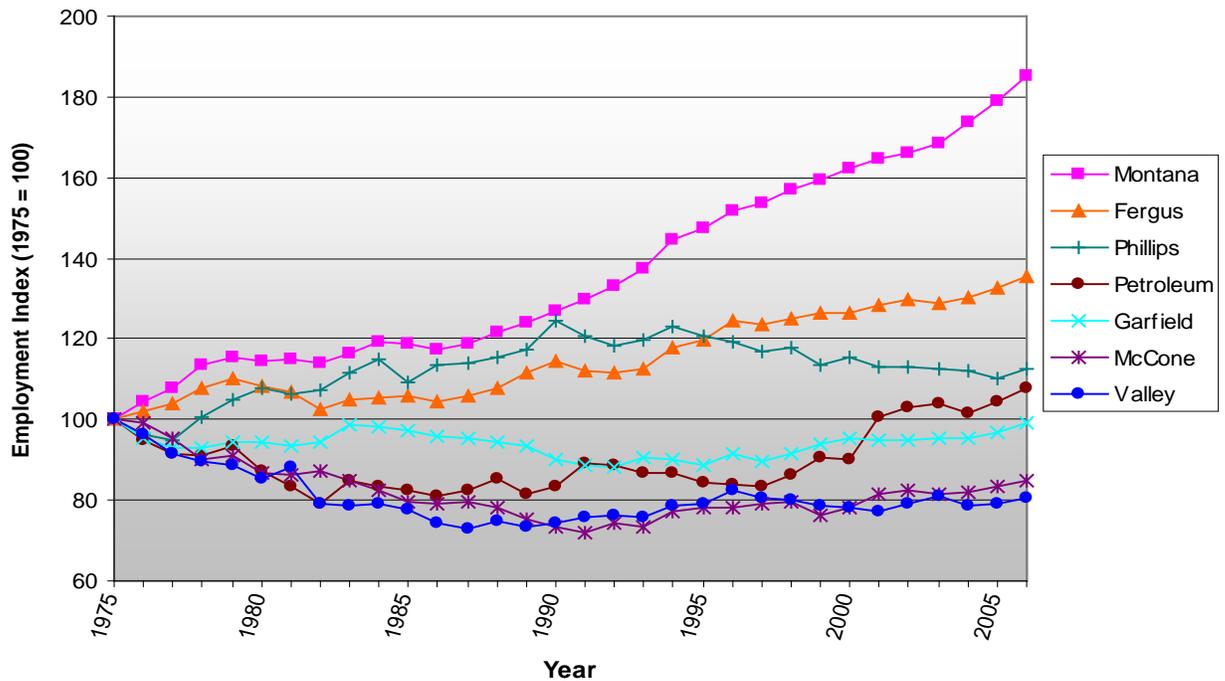
Employment and Income

Employment Trends

Employment trends in the six-county area from 1975 to 2006 are shown in figure 1. During the 30-year period, the State as a whole experienced a substantial increase in total employment. Fergus County was the only county that followed the State trend with a steady increase in employment since the early 1980s. Petroleum, McCone, and Valley Counties declined in total employment until around 1990, and have been experiencing a steady recovery since. Phillips County increased in employment between 1975 and 1990, but its current total employment has been declining since the 1990 peak level. Garfield County's employment has remained relatively stable compared to the other counties in the region.

Based on the long-term trend data for employment by industry (U.S. Department of Commerce, 2009), several trends explain the total employment fluctuations seen in figure 1. Decline in total employment observed in most counties before 1990 is largely attributed to the decline in farm employment as well as some rapid declines in the manufacturing industry (Valley County). Phillips County's boom and bust in employment was largely attributed to the rise and fall of the mining industry, creating a sudden decline in employment in mining as well as associated services after the gold mine closures in the 1990s. Fergus County also experienced a short boom and bust in the mining industry around 1990, but the loss of employment from the mining industry did not negatively affect total employment in the county due to the presence of other stronger industries (such as retail trade, services, and construction) that grew during the same time period. The employment trend data suggest that counties with higher dependency on farming, (Garfield, McCone, and Petroleum Counties) may be more likely than others to be affected by Refuge-management practices that influence surrounding counties' farming practices.

Total Employment Index



Source: U.S. Department of Commerce, CA25, 2009.

Note: Total employment includes all jobs filled within each area. Full-time and part-time jobs are counted at equal weight, and those holding two or more jobs are counted multiple times. The trend data for each of the counties and Montana are presented as an index, and are standardized with 1975 as the base year.

Figure 1. Total employment index for Montana and counties surrounding Charles M. Russell National Wildlife Refuge, 1975–2006.

Overall, employment in all counties in the area except Phillips County has been steadily increasing since the mid-1990s. This increase is not easily explained by the area’s population trend (table 1) or the trend in employed labor force (number of persons 16 years and older who are employed, Montana Department of Labor and Industry, 2009) because both population and labor force have mostly declined in the six-county area during the same timeframe. It is likely that the recent increase in employment in the six-county area is explained by an increase in people with multiple jobs. The increase in people with more than one job is likely attributed to small farmers and ranchers who require supplemental income, as many are unable to make enough profit from their crops or livestock (Gruenert, 1999).

Table 2 shows the percentage of total employment in Montana and the six-county area for 2005 and the percent change from 1995 to 2005. Employment is broken out by wage and salary employment (people who work for someone else) and proprietors (self-employed—includes sole proprietorships, partnerships, and tax-exempt cooperatives). In 2005, all six counties surrounding the CMR had substantially higher proportions of proprietors (39.0–65.5 percent) compared to the State as a whole (27.1 percent, table 2). Approximately one-half of all proprietors in the six-county area are farm proprietors (those who are self-employed and operate a farm and are producing or expected to produce at least \$1,000 worth of crops and livestock in a typical year), whereas that of the entire State is substantially lower.

Table 2. Employment by type for Montana and counties surrounding the refuge.

Type of employment	Montana		Fergus County		Garfield County		McCone County		Petroleum County		Phillips County		Valley County	
	2005	Percent change (1995–2005)	2005	Percent change (1995–2005)	2005	Percent change (1995–2005)	2005	Percent change (1995–2005)	2005	Percent change (1995–2005)	2005	Percent change (1995–2005)	2005	Percent change (1995–2005)
Total employment	615,864	22	7,654	11	872	9	1,283	7	345	24	2,645	-9	4,706	0.1
Wage and salary	73	19	61	6	48	-1	51	-1	35	-3	58	-16	65	-2
Proprietors	27	29	39	19	52	20	49	15	66	45	42	4	35	4
Nonfarm	23	34	27	27	25	44	19	30	36	151	23	4	20	2
Farm	4	8	12	6	27	4	30	8	30	-4	19	5	15	6

Source: U.S. Department of Commerce, CA30, 2009.

As shown in figure 1, five out of six counties surrounding CMR have been experiencing increases in total employment since the mid-1990s. During that time, Montana also had an increase in total employment, with the majority of the increase coming from wage and salary employment (table 2). However, in the six-county area, wage and salary employment has declined in many of the counties and much of the loss has been compensated by the increases in proprietor employment, particularly in the nonfarm sector. These data indicate that, unlike the State as a whole, the six-county area is becoming more dependent on self-employment as wage- and salary-employment decline. In addition, while farm proprietorships have not shown substantial growth and have decreased in some cases, they are still significant components of the economic structure in the six-county area.

Current Employment and Income

Table 3 summarizes industry output, employment, and labor income (employee compensation plus proprietor income) for the six-county area. Industry output, as used here, is the value of an industry's total production expressed as a single dollar figure. The data presented in this section were compiled by the Minnesota IMPLAN Group (Minnesota IMPLAN Group, Inc., 2007) from a number of sources, including Census Bureau economic censuses and Bureau of Economic Analysis output and employment projections developed by the U.S. Department of Labor's Bureau of Labor Statistics.

Consistent with the information presented in the previous section, the six-county area has substantially higher farm and ranch employment (proprietors and salary and wage employment combined) than the State as a whole, indicating that farming is an important sector in the area in terms of employment numbers. Aside from farming and government employment, retail trade and the service sectors also have high employment across all six counties.

During the past 30 years, Montana and the six-county area had a steady increase in total personal income (U.S. Department of Commerce, 2009). This increase was attributed to a steady increase in both labor- and nonlabor-source incomes, but nonlabor-source incomes (transfer payments and dividends-interests-rent) increased at a greater rate than that of labor-source income despite decreasing populations in the area (U.S. Department of Commerce, 2009). Such a trend suggests that there are greater proportions of individuals receiving transfer payments in the form of Social Security, Medicare, and Medicaid in these counties, further indicating the aging trend of the area.

Median household income, average earnings per job, and unemployment data for the region, State, and Nation are listed in table 4. Median household income and earnings per job are below the national average. The unemployment rate is the percentage of the labor force that is not working but which is actively seeking work. In general, the six counties' unemployment rate is similar to or less than the State average (U.S. Department of Labor, 2008). Unemployment rates in all six counties along with Montana have followed a downward trend since 2000. In 2008, unemployment rates were lower for Montana and the six-county area than the national average. McCone and Garfield Counties have the lowest unemployment rates in the region despite having lower average earnings per job than all but one of the other counties in the region. The lower median income, earnings, and unemployment in the six-county area compared to the State average aligns with the aging population (fewer people actively seeking work) and the growing number of people with more than one job to supplement their income.

Table 3. Employment by industry for the six-county area surrounding the Charles M. Russell National Wildlife Refuge, 2007.

Industry	Industry output (\$ millions)	Employment (number of full- and part-time jobs)	Labor income (\$ millions)
Agriculture, forestry, fishing, and hunting	368.9	4,093	22.6
Mining	40.5	74	8.3
Construction	147.4	1,206	44.7
Manufacturing	184.2	618	22.8
Transportation and public utility	214.4	578	41.9
Wholesale trade	62.2	586	22.3
Retail trade	78.6	1,402	33.5
Finance, insurance, and real estate	237.3	1,129	32.1
Professional-scientific and technical services	33.3	447	17.1
Health and social services	112.3	1,688	54.4
Arts-entertainment and recreation	12.2	413	3.6
Accommodation and food services	45.6	1,026	12.6
Other services	119.0	1,887	29.2
Government (Federal, State, local, and military)	158.3	2,799	121.2
Total	1814.2	17,945	466.4

Source: Minnesota IMPLAN Group, Inc., 2007.

Note: County-level data are available for employment but are not shown because the new North American Industrial Classification System (NAICS) introduced in 2001 prevents disclosure of employment numbers for many industries in small communities.

Table 4. Income, earnings, and unemployment in the region, State, and Nation.

Area	Median household income (2007) ¹	Average earnings per job (2007)	Unemployment rate (2008) ²
United States	\$50,740	\$48,900	5.8
Montana	\$43,000	\$34,433	4.5
Fergus County	\$37,259	\$28,417	4.2
Garfield County	\$32,694	\$21,053	3.3
McCone County	\$38,535	\$21,135	2.6
Petroleum County	\$28,254	\$17,851	5.3
Phillips County	\$33,798	\$22,685	4.5
Valley County	\$37,019	\$27,091	3.8
Six-county average	\$34,593	\$23,039	4.0

¹Source: State and County QuickFacts, 2007.

²Source: USA Counties, 2008.

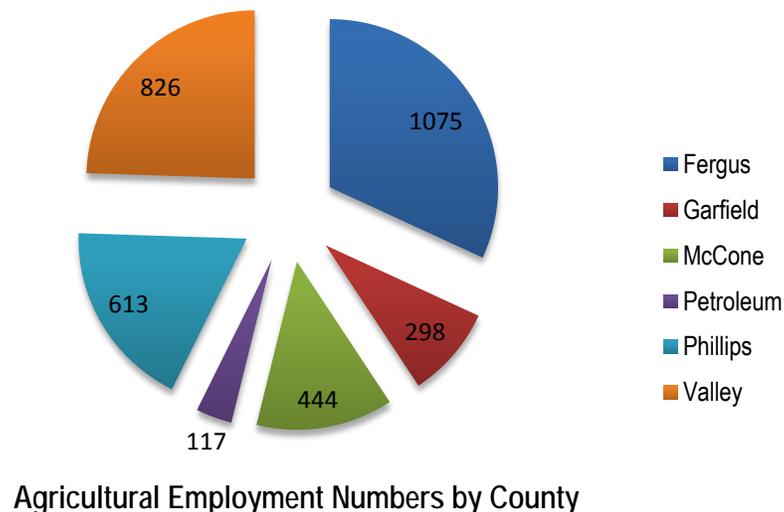
Key Refuge Activities that Affect the Local Economy

The ability of the refuge to influence local economic activity and desired economic conditions is related to U.S. Fish and Wildlife Service (FWS) land-use decisions and associated land uses. Livestock grazing, recreation, and tourism are the prominent, resource-based industries with ties to the Refuge and are described in more detail in the next section.

Livestock Grazing

Farming and ranching are important cultural forces in eastern Montana, including the areas surrounding the Refuge. As shown in table 3, farming is the largest employer in each of the six counties surrounding the Refuge. From 2001 to 2007, agricultural employment in the six-county area has remained fairly stable, averaging 3,408 jobs, with a high of 3,487 in 2002 and a low of 3,373 in 2007 (U.S. Department of Commerce, 2008). In 2007, Fergus County had the highest percentage of agricultural jobs of the six counties surrounding the Refuge: 1,075 jobs, or 32 percent of total farm employment. As shown in figure 2, Valley County had the second highest farm employment: 826 jobs, or 25 percent of the total for the area. Phillips County had 613 jobs (18 percent), McCone County had 444 jobs (13 percent), and Garfield County had 298 jobs (9 percent). Petroleum County had the fewest farm jobs with only 117, or 3 percent of total agricultural employment of the six-county total.

More U.S. farmers now hold off-farm jobs in addition to their farm operation, and off-farm income now accounts for a larger proportion of the total household income of U.S. farmers (Fernandez-Cornejo, 2007; Gruenert, 1999). This trend is apparent in Montana and in the six-county area. Although the proportion of farm operators primarily employed in farming is higher in the region compared to the state, this proportion has decreased in recent years (table 5). Garfield County has the highest proportion of farmers whose primary occupation is farming, while Valley County has the lowest.



Total is 3,373 jobs.

Source: U.S. Department of Commerce, 2008.

Figure 2. Agricultural employment in the six counties surrounding the Charles M. Russell National Wildlife Refuge.

Table 5. Farm operators whose primary employment is farming.

Year	Montana (percent)	Fergus County (percent)	Garfield County (percent)	McCone County (percent)	Petroleum County (percent)	Phillips County (percent)	Valley County (percent)
2007	51	60	77	69	72	65	58
2002	64	69	84	70	73	72	73

Source: USDA 2007 Agricultural Census, table 46.

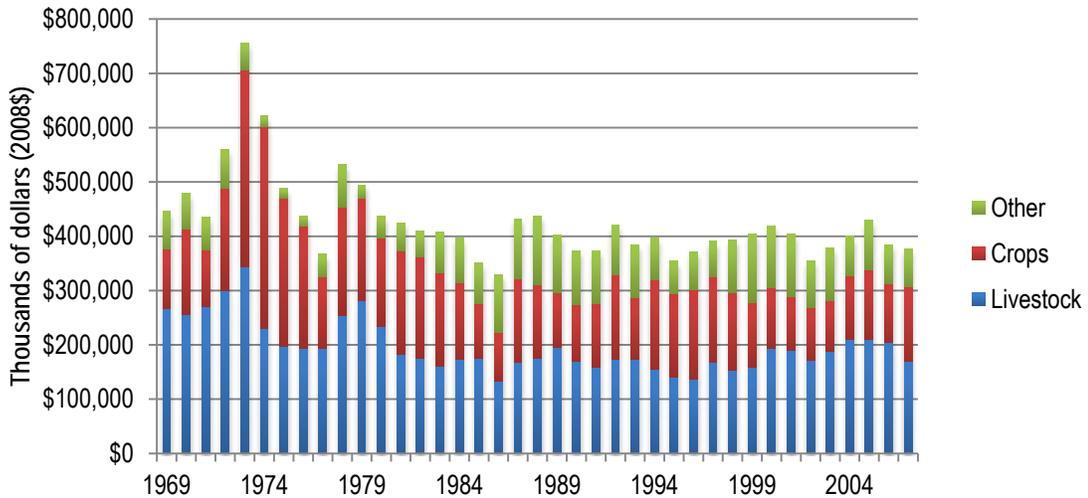
From 2001 to 2007, agricultural earnings in the six counties surrounding the Refuge were fairly stable, with an average of \$17.1 million dollars per year (U.S. Department of Commerce, 2008). The highest value (just over \$18 million) was in 2002, and the lowest (just under \$16 million) was in 2003. In 2007 agricultural earnings totaled just under \$18 million with the largest earnings in Fergus County of \$4.5 million, or 25 percent of total earnings in the six-county area. Phillips County had the second-largest earnings in 2007 with \$4.2 million, or 24 percent of the total. Valley County had \$3.5 million (20 percent), McCone County \$2.6 million (14 percent), and Garfield County \$2.3 million (13 percent). Petroleum County had the lowest agricultural earnings, \$812,000, or 4 percent of the total agricultural earnings in the six-county area, in 2007.

Agricultural Revenues from Livestock

Gross revenues from livestock have averaged about 46 percent of total gross revenue from agricultural operations over the past 40 years (fig. 3). The lowest percentage (37 percent) of livestock revenue was in 1996, while the highest (62 percent) was back in 1971. Gross revenues from crops averaged 35 percent over this timespan, with a low of 24 percent in 1971 and a high of 60 percent in 1974. Other agricultural income averaged 19 percent, with a low of 3 percent in 1974 and a high of 32 percent in 1986. Other sources of revenue for agricultural operations include government payments, value of home consumption, machine hire and (or) custom work, rental income, and income from forest products.

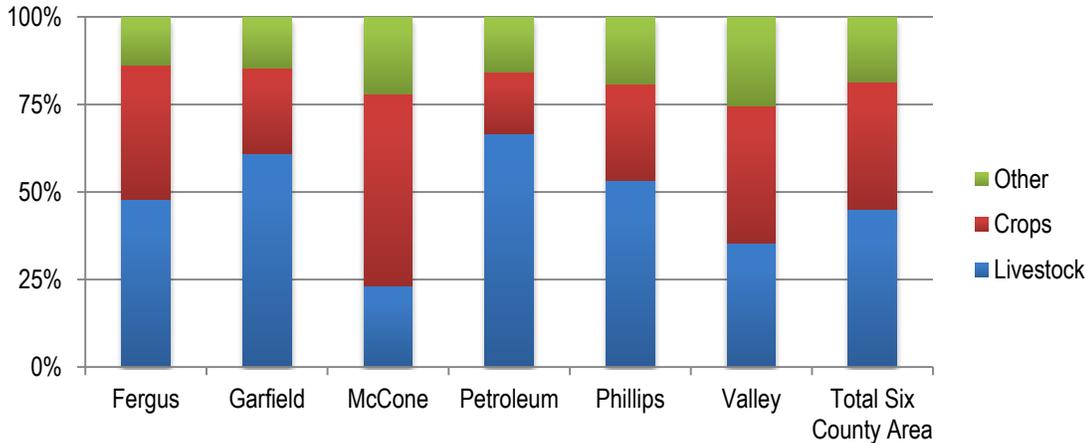
In 2007, gross revenue for agricultural operations in the six counties surrounding the CMR totaled \$364.7 million (Bureau of Economic Analysis, 2008). This total consists of \$164 million (45 percent) from livestock, \$133 million (36.5 percent) from crops, and \$67.7 million (18.5 percent) from other sources. Fergus County had the largest gross revenues from agriculture (\$107.5 million), followed by Valley (\$81.2 million), Phillips (\$64.6 million), McCone (\$56.1 million), and Garfield (\$53.1 million) Counties. Petroleum County had the lowest total gross revenue from agricultural operations with \$14.5 million, or 3.8 percent of the six-county total.

As shown in figure 4, livestock ranged from a low of 23 percent of total gross revenue from agricultural operations in McCone County to a high of 67 percent in Petroleum County. Valley (35 percent) and Fergus County (48 percent) were the only two other counties that had less than 50 percent of total gross revenue from agricultural operations from livestock. In Phillips County, livestock accounted for 53 percent of total gross revenue from agricultural operations, while in Garfield County, it accounted for 61 percent.



Source: U.S. Department of Commerce, 2008. Other sources of revenue for agricultural operations include government payments, value of home consumption, machine hire and (or) custom work, rental income, and income from forest products.

Figure 3. Trends in gross agriculture revenues in the region surrounding the Charles M. Russell National Wildlife Refuge, 1969–2007.

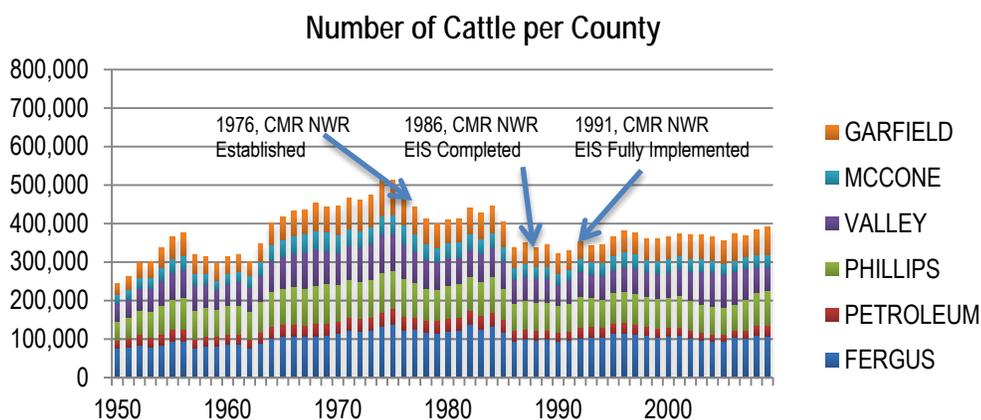


Source: U.S. Department of Commerce, 2008. Other sources of revenue for agricultural operations include government payments, value of home consumption, machine hire and (or) custom work, rental income, and income from forest products.

Figure 4. Breakdown of total gross revenues from agriculture by county, 2007.

Cattle Inventories

Between 1950 and 2009, cattle inventory for the six counties surrounding the CMR has averaged 378,988 head. During this time, the cattle inventory has ranged from a low of 244,100 in 1950 to a high of 513,400 in 1975 (fig. 5). As shown in figure 5, the CMR NWR was established in 1976 when there were 474,700 head of cattle in the six-county area. When the Environmental Impact Statement (EIS) for the Refuge was completed in 1986, cattle numbers in this area were 338,000 head. When the EIS was



Source: http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp

Figure 5. Cattle inventory for six counties surrounding Charles M. Russell National Wildlife Refuge, 1950–2009.

implemented in 1991, cattle numbers were 329,400 head. In 2008, there were 382,400 head of cattle in the six-county area, while the Refuge supplied 18,872 animal unit months (AUMs).

This number has steadily declined from 22,470 AUMs supplied in 2001 to 17,883 AUMs in 2007, with a slight increase to 18,872 AUMs in 2008 (+5.5 percent over 2007 levels, yet -16 percent from 2001 levels). However, over this same time period, total number of cattle in the six-county area increased from 361,400 in 2001 to 382,400 in 2008 (+2.8 percent over 2001 levels).

Animal Unit Month Dependency by County

In 2008, Fergus County had the highest inventory of cattle and calves, while Garfield County had the highest inventory of sheep and lambs (table 6).

Table 6. Animal inventory and Animal Unit Months of feed needed by county, 2007.

County	Cattle and calves inventory ¹	Sheep and lamb inventory	Total AUMs of feed needed ²
Fergus	116,094	6,062	711,113
Garfield	68,390	23,444	466,606
McCone	38,780	6763	248,911
Petroleum	26,155	4032	166,607
Phillips	80,791	10,511	509,972
Valley	71,167	2,184	432,244
Total	401,377	52,996	2,535,452

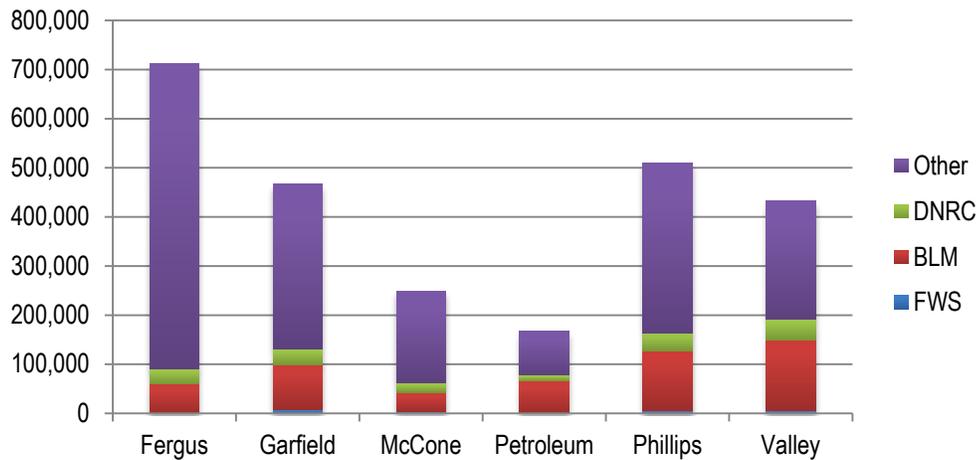
Source: USDA 2007 Census of Agriculture, table 12 and table 17.

¹Cows and calves are each counted as one unit. The Agricultural Census figure is the physical number of animals at the end of December, not the annual average, so is likely an underestimate.

²Calculated as [(cattle and calves inventory/2) x 12 months] + [(sheep and lamb inventory/5) x 12 months].

As shown in table 7, of the Federal agencies supplying AUMs in the six-county region, the Bureau of Land Management (BLM) supplied the largest proportion (21 percent) in 2008, followed by the Montana Department of Natural Resources and Conservation (DNRC) with 7 percent and the Refuge (FWS) with just less than 1 percent. The remaining 72 percent of AUMs in the region were supplied by nonfederal grazing permits or owned and (or) leased land.

As shown in table 7 and figure 6, nongovernment lands supplied the most AUMs (ranging from about 55 percent for Valley County to more than 87 percent in Fergus County) while FWS supplied the least amount (ranging from 0.1 percent for Fergus County to 1.5 percent for Garfield County). Although Valley County had the largest *number* of AUMs supplied by a government agency (143,975 BLM AUMs), Petroleum County had the largest *percentage* of AUMs supplied by a government agency (39.2 percent of BLM AUMs). Valley County had the largest reliance (both in absolute and percentage terms) on DNRC lands, with 44,208 AUMs (10.2 percent of total county AUMs).



Source: 2007 Census of Agriculture.

Figure 6. Total Animal Unit Months by agency by county, 2007.

Table 7. Total Animal Unit Months (AUM) by county, 2008.

County	Total annual AUMs of feed needed	U.S. Fish and Wildlife Service		Bureau of Land Management		Montana Department of Natural Resource Conservation		Other	
		AUMs	Percentage of total AUMs	AUMs	Percentage of total AUMs	AUMs	Percentage of total AUMs	AUMs	Percentage of total AUMs
Fergus	711,113	857	0.1	58,943	8.3	31,160	4.4	620,153	87.2
Garfield	466,606	7,088	1.5	91,961	19.7	32,784	7.0	334,773	71.7
McCone	248,911	2,601	1.0	40,135	16.1	18,951	7.6	187,224	75.2
Petroleum	166,607	501	0.3	65,302	39.2	13,017	7.8	87,787	52.7
Phillips	509,972	6,020	1.2	120,801	23.7	37,475	7.3	345,676	67.8
Valley	432,244	4,514	1.0	143,975	33.3	44,208	10.2	239,547	55.4
Total	2,535,452	21,581	0.9	521,117	20.6	177,595	7.0	1,815,159	71.6

Calculated as [(Cattle and Calves inventory/2) x 12 months] + [(Sheep and Lamb inventory/5) x 12 months].

Dependency: agency AUMs and (or) Total AUMs of Feed Needed.

FWS numbers: 10-year annual average.

BLM Source: Rhodes, B.J., (April) 2009.

DNRC Source: Rooney, C., (April) 2009.

Other: are private and (or) other lands—not on Federal or State lands. This is actually an underestimate, the Ag Census is the physical number at the end of December, not the annual average.

Tourism and Outdoor Recreation in Montana and Counties Surrounding the Charles M. Russell National Wildlife Refuge

Montana residents and visitors to the State participate in a variety of outdoor recreation activities. According to the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, approximately 950,000 residents and nonresidents participated in wildlife-associated activities in Montana (U.S. Fish and Wildlife Service, 2008a). Of all participants, 31 percent participated in fishing for a total of 2.9 million fishing days, 21 percent participated in hunting for a total of 2.1 million hunting days, and 79 percent participated in wildlife-watching for a total of 3.1 million activity days. Montana residents had the highest per capita hunting participation in the country at 20 percent, and fishing participation was also high at 23 percent. The majority of all anglers (59 percent) and hunters (74 percent) in Montana were State residents, while the majority of away-from-home wildlife watching participants² in Montana were nonresidents (67 percent). These wildlife-associated activities in Montana generated a total of \$1.1 billion in 2006, with \$231 million generated from fishing activities, \$311 million from hunting activities, and \$376 million from wildlife-watching activities.

Tourism and Recreation in Regions Surrounding the Charles M. Russell National Wildlife Refuge

Montana is divided into six travel regions for similar historical, cultural, climatic, and geological features. The six-county area surrounding the Refuge falls into two travel regions. Fergus and Petroleum Counties are included in the Russell Country travel region, which encompasses the north-central part of the State and includes Great Falls. Garfield, McCone, Valley, and Phillips Counties are included in the Missouri River Country, which encompasses most of the Refuge and the northeastern part of the State. While travel, tourism, and recreation contribute significantly to Montana's economy, the majority of these activities occur in the western parts of the State, bringing substantially fewer benefits to Russell and Missouri River Country travel regions compared to the other regions. Among all of the nonresident overnight stays in Montana in 2005, only 8 percent of nights were spent in Russell Country and 3 percent in Missouri River Country (Rademaker and Nickerson, 2006). Similarly, nonresident expenditures in Russell Country accounted for 8 percent of the State total (Oschell and Nickerson, 2006b), while Missouri River Country accounted for 1 percent (Oschell and Nickerson, 2006a). Lodging tax revenue growth was also less in the Russell and Missouri River Country travel regions. Both regions experienced approximately 8 percent growth from 1995 to 2005 (adjusted for inflation in 2005 dollars) while the other four travel regions experienced 19 percent to 39 percent growth during the same time period (Montana Department of Commerce, 2008).

Nevertheless, Russell Country received 976,140 visitors in 2005 who spent a total of \$216.8 million in the travel region for various travel-related expenses (Oschell and Nickerson, 2006b). Travelers to Russell Country participated in activities similar to those visiting Missouri River Country, such as driving for pleasure (55 percent), wildlife watching (40 percent), visiting Lewis and Clark sites (31 percent), recreational shopping (29 percent), day hiking (29 percent), visiting historical sites (26 percent), picnicking (26 percent), and visiting museums (26 percent). The CMR was visited by 8 percent of the Russell Country visitors, and was the sixth most visited site.

Likewise, 283,013 nonresident visitors traveled to Missouri River Country, spending a total of \$32.9 million in the area for expenses such as gas, food, shopping, and lodging (Oschell and Nickerson, 2006a). Visitors to Missouri River Country participated in activities such as driving for pleasure (46

² For the purpose of the National Survey, wildlife watching is categorized into (1) away-from-home (activities taking place at least 1 mile from home); and (2) around-the-home (activities taking place within 1 mile from home). All wildlife watchers to the Refuge would be considered away-from-home participants.

percent), wildlife watching (39 percent), visiting museums (31 percent), day hiking (29 percent), picnicking (28 percent), visiting Lewis and Clark sites (27 percent), visiting historical sites (20 percent), visiting developed camping (20 percent), and fishing (16 percent). Fort Peck Lake, which lies within the Refuge, was the second most visited site among all Missouri River Country nonresident visitors (21 percent), and the Refuge was the fourth most visited site (14 percent).

Land-Use and Ownership Changes Surrounding the Charles M. Russell National Wildlife Refuge

Outdoor recreational amenities are an important factor in attracting and retaining residents and small businesses in the West (Rasker and Hansen, 2000; Rasker, 2006). Migrants to the West have been found to select work and residences based on scenic amenities, access to recreational opportunities, and a desire to escape urban problems (Egan and Luloff, 2000; Rudzitis, 1999; Rudzitis and Johansen, 1989; Salant and others, 1997; Vias, 1999). Rapidly rising land prices in western Montana are also spurring demand, especially among recreational buyers, for large tracts of land in eastern and central parts of the State (Norman C. Wheeler and Associates, 2008). The aging landowner population has further contributed to the turnover of land from production to rural residential development (Johnson, 2004).

Seasonal and Recreational Housing

The number and proportion of housing units designated for seasonal or recreational use can provide insight into the types of landowners in an area, which is important for a number of reasons. Absentee landowners may have different opinions of how the refuge should be managed. Seasonal or part-time residents typically do not generate as much local economic activity, because they make fewer purchases within the region and generate less income tax revenue. However, they will continue to pay property taxes and, because they do not require services year-round, they will typically require fewer local government services over the course of a year compared to full-time residents.

Much of the land surrounding the CMR is owned by the BLM; the remainder is mostly in private ownership. As shown in table 8, the six-county area surrounding the Refuge had an increase in seasonal housing units between 1990 and 2000, which may reflect the recent trend in private property purchases for hunting and other recreational uses in areas surrounding the Refuge (B. Crawford, FWS, oral commun., April 2008). However, the *proportion* of seasonal-use housing units rose only very slightly. Valley and Garfield Counties have the highest number of seasonal units, which can be partly attributed to the presence of leased cabin sites within Refuge recreation areas in those counties. Garfield County has the highest *proportion*, by far, of seasonal housing, which is in line with its designation as a retirement destination, assuming that a significant number of those retirees are only part-time residents of the county.

Historically, property sales in eastern Montana were made primarily by agricultural operators from western Montana seeking to move or expand their operations to a more affordable area. This trend is shifting more toward individuals and investors interested in the recreational amenities such as hunting and fishing. As a result, the number of seasonal units is expected to continue increasing in eastern Montana, including the areas surrounding the Refuge.

Table 8. Seasonal housing in the region surrounding the Charles M. Russell National Wildlife Refuge.

County	Seasonal housing units		Percentage of total housing units (2000)
	2000	Percent change from 1990	
Fergus	187	3	3.4
Garfield	293	12	30.5
McCone	107	-14	9.8
Petroleum	28	-30	9.6
Phillips	264	4	10.6
Valley	376	43	7.8
Six-county region	1,255	3	12.0

Most of the access roads to Refuge lands cross private lands. These predominantly dirt roads are not designated as public roads or do not have right-of-ways or easements owned by local, State, or Federal governments. As a result, some roads on private lands that the public have traditionally used to access the Refuge are being closed by private land owners, and the closures are reducing the number of access roads available to the public (B. Crawford, FWS, oral commun., April 2008). These closures are seen more on lands that have recently been sold to new owners, many of whom have bought land for private hunting access or paleontological resource use.

Changing Land Use near the Charles M. Russell National Wildlife Refuge

Adjacent to the north border of the Refuge near the eastern end of the UL Bend National Wildlife Refuge in Phillips County lies the American Prairie Reserve managed by the American Prairie Foundation (APF). As of 2008, the APF had more than 86,000 acres in deeded and leased land acquired since 2004 for a prairie-based wildlife reserve (American Prairie Foundation, 2008). Within the reserve is a 2,600-acre enclosed bison range that supports a herd of nearly 76 bison (as of November 2009) initially translocated from Wind Cave National Park in South Dakota. The APF plans to continue acquiring land for the preserve, as well as expanding the bison herd and bison range, restoring other native prairie wildlife, preserving human history, and managing the preserve for public use such as hiking, bird watching, camping, and hunting.

A socioeconomic impacts analysis conducted for the APF in 2002 concluded that, under most examined scenarios, the regional economic impacts of eliminating cattle grazing on the proposed prairie reserve would be more than offset by conservation management expenditures (Duffield and Neher, 2002). Other residents fear that the purchases of large acreage of land by nonprofit conservation groups as well as nonresident buyers are replacing family-oriented farms with absentee owners who contribute little to local schools and businesses (Thackeray, 2006).

The Nature Conservancy (TNC) manages the 60,000-acre Matador Ranch located north of the Refuge along Highway 191 near Zortman, Montana. The Matador Ranch is leased out to area ranchers at discounted rates, and ranchers agree to take certain conservation actions on their own grazing lands in exchange (Red Lodge Clearinghouse, 2008). As part of the partnership, ranchers protect prairie dog colonies and sage grouse leks, control noxious weeds and agree not to plow their grazing lands during their leases. As a result, many of the ranchers have received the Montana State University's Undaunted Stewardship Certification. The partnership also resulted in the formation of the Ranchers Stewardship Alliance, a community-based conservation group that promotes "ecological, social and economic

conditions that will sustain the biodiversity and integrity of America's northern mixed-grass prairie for present and future generations" (Ranchers Stewardship Alliance, 2008).

A recent report by the World Wildlife Fund (Freese and others, 2009) highlights the expanding function of nature-based economic activities in supporting and diversifying the economic structure in Northern Great Plains communities. The report suggests that:

"...landowners, businesses and local communities may be able to increase and diversify economic activities through three major categories of nature-based economic development: 1) natural amenities, which include those natural features of the landscape that make a place attractive for visiting (for example, ecotourism and hunting) or living, 2) Ecosystem products, which include commercial products harvested from native or semi-native ecosystems, such as native plant seeds and native vegetation, whether harvested directly as hay or indirectly by livestock grazing, 3) Other ecosystem services, which include many services from healthy ecosystems for which no or only quasi-markets exist, such as provisions for clean water, prevention of soil erosion, and carbon sequestration, and nonuse services such as the value people derive from knowing wildlife exists and from conserving wildlife for future generations" (Freese and others, 2009, p. 6)

Attitudes, Values, and Beliefs

As much of the data presented in this report indicate, eastern Montana is a changing landscape. Over the past several years, there have been changes in demographics, changes in prevailing economic sectors, and changes in land use and ownership patterns. Many of these changes are interrelated. When evaluating both historical and anticipated future change, it is important to understand public attitudes, values, and beliefs toward the resources the Refuge aims to protect and the effects of Refuge management on the community. This information provides insight into closely held opinions about quality of life issues not as easily captured with demographic information provided in this report.

Public values toward wildlife are changing across the United States, in particular in the Western United States. A study examining people's views about wildlife in 19 Western States (Teel and others, 2005) identified four types of values people hold toward wildlife, called wildlife value orientations (WVO). These WVOs are related to people's support toward management actions and participation in wildlife-associated recreation. The "Utilitarian" value orientation is associated with the belief that wildlife should be used and managed for human benefit, whether it is for recreational, personal, or economical purposes. On the other hand, the "Mutualist" value orientation is associated with the belief that humans and wildlife are meant to coexist or live in harmony. Those who possess both Utilitarian and Mutualist values are called "Pluralist." The final category, "Distanced," is given to those who have neither a Utilitarian nor a Mutualist orientation, and generally have a lack of interest in wildlife-related issues and less participation in wildlife-related activities compared to the other value orientation types.

Results from the study suggest that the Western United States as a whole is gradually moving away from the more traditional Utilitarian value orientation and moving more toward the less traditional Mutualist value orientation (table 9). In Montana, however, nearly one-half of the State (47 percent) was found to hold the traditional Utilitarian value orientation, while only 19 percent were categorized as Mutualist. Considering that the area surrounding CMR is considerably more rural compared to some of the western portions of Montana, it is likely that even higher proportions of residents around CMR hold Utilitarian value orientations toward wildlife, while those living in urban areas of the State hold more Mutualist value orientations. This suggests that visitors to the Refuge from nearby counties may be more interested in hunting and other consumptive activities on the refuge, while those coming from urban areas may be more interested in nonconsumptive activities such as wildlife watching. This may also affect the type of hunting experience visitors are seeking.

Table 9. Wildlife value orientations (WVO) and proportions in Western States and Montana.

Wildlife value orientations type	Description	Percentage in 19 Western States	Percentage in Montana
Utilitarian	Believe that wildlife should be used and managed for human benefit.	34	47
Mutualist	Believe that humans and wildlife are meant to co-exist or live in harmony.	33	19
Pluralist	Hold both a mutualist and utilitarian value orientation toward wildlife.	20	27
Distance	Distanced from the issue of wildlife. Do not hold either a mutualist or a utilitarian orientation toward wildlife.	13	7

Source: Teel and others, 2005.

In addition to people’s general perceptions about wildlife and natural resources, their attitudes toward the CMR and its management specifically form the basis of their level of support for management actions. The FWS public scoping process revealed several important qualities of the Refuge that residents of the six-county area value. Some people expressed appreciation for the intrinsic values of the Refuge (such as its scenic beauty, remoteness, abundance of wildlife, and unique ecosystem), while others expressed appreciation for the recreational value that the land provides (such as hunting, fishing, and wildlife watching) (U.S. Fish and Wildlife Service, 2008b). In addition to these intrinsic and recreational values, local residents emphasized two other values associated with the Refuge: historical value and economic value. Many residents in the area have had family ties to the land for several generations and strive to maintain unique traditions and a way of life for its historical value. Local communities derive economic value from the Refuge through grazing leases, as well as the money that recreational visitors spend in the region. However, some local residents believe that past management approaches on the Refuge have negatively impacted the local economy, while others believe that increasing visitor numbers to the Refuge will require additional infrastructure maintenance in local communities.

Economic Impacts of Current and Proposed Management Activities

Methods for a Regional Economic Impact Analysis

Economic input-output models are commonly used to determine how economic sectors will and will not be affected by demographic, economic, and policy changes. The economic impacts of the management alternatives for CMR were estimated using IMPLAN, a regional input-output modeling system developed by the USDA Forest Service. IMPLAN is a computerized database and modeling system that provides a regional input-output analysis of economic activity in terms of 10 industrial groups involving more than 400 economic sectors (Olson and Lindall, 1999). The IMPLAN model draws upon data collected by the Minnesota IMPLAN Group from multiple Federal and State sources including the Bureau of Economic Analysis, Bureau of Labor Statistics, and the U.S. Census Bureau (Olson and Lindall, 2009). The year 2007 IMPLAN county-level data profiles for McCone, Garfield, Fergus, Phillips, Petroleum, and Valley Counties were used in this study. The IMPLAN county-level employment data estimates were found to be comparable to the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System data for the year 2007.

Because of the way industries interact in an economy, a change in the activity of one industry affects activity levels in several other industries. For example, if more visitors come to an area, local

businesses will purchase extra labor and supplies to meet the increase in demand for additional services. The income and employment resulting from visitor purchases from local businesses represent the direct effects of visitor spending within the economy. Direct effects measure the net amount of spending that stays in the local economy after the first round of spending; the amount that does not stay in the local economy is termed a leakage (Carver and Caudill, 2007). In order to increase supplies to local businesses, input suppliers must also increase their purchases of inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects of visitor spending within the economy. Employees of the directly affected businesses and input suppliers use their incomes to purchase goods and services. The resulting increased economic activity from new employee income is the induced effect of visitor spending. The indirect and induced effects are known as the secondary effects of visitor spending. “Multipliers” (or “Response coefficients”) capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes, 1998). The sums of the direct and secondary effects describe the total economic impact of visitor spending in the local economy.

For each alternative, regional economic effects from the IMPLAN model are reported for the following categories:

- Local output represents the change in local sales or revenue.
- Employment represents the change in number of jobs generated in the region from a change in regional output. IMPLAN estimates for employment include both full-time and part-time workers, which are measured in total jobs.
- Labor income includes employee wages and salaries, including income of sole proprietors and payroll benefits.

The Comprehensive Conservation Plan (CCP) provides long-range guidance and management direction to achieve refuge purposes over a 15-year timeframe. The economic impacts reported in this report are on an annual basis in 2007 dollars. Large management changes commonly take several years to achieve. The estimates reported for Alternatives B, C, and D represent the final economic effects after all changes in management have been implemented.

Economic Impacts of Alternative A

Impacts from Charles M. Russell National Wildlife Refuge Revenue Sharing

The Refuge boundary encompasses 1.06 million acres, including the CMR and UL Bend National Wildlife Refuges. Only 40 percent of the acreage within the CMR boundary is under the primary jurisdiction of the FWS. The majority of the acreage (51 percent) falls under the primary jurisdiction of the U.S. Army Corps of Engineers, with the FWS having secondary jurisdiction in those areas. The remaining acreages are owned by the Montana Department of Natural Resources and Conservation (DNRC) and private landowners. Under provisions of the Refuge Revenue Sharing (RRS) Act, local counties receive an annual payment for lands that have been purchased by the FWS. Table 10 shows the FWS fee acquisition acreage in each surrounding county.

RRS payments are based on the greater of 75 cents per acre or 0.75 percent of the fair market value of lands acquired by the FWS. The exact amount of the annual payment depends on Congressional appropriations, which in recent years have tended to be less than the amount to fully fund the authorized level of payments. In 2008, the six-county area surrounding the Refuge received RRS payments totaling \$25,684 (table 10). Table 11 shows the resulting economic impacts of RRS payments under Alternative A. Accounting for both the direct and secondary effects, RRS payments for

Alternative A generate total annual economic impacts of about \$32,600 in local output, \$7,000 in labor income, and less than one-third of a job in the local impact area.

Table 10. County acreage of refuge full fee simple acquisition acreage and Refuge Revenue Sharing payments.

County	Full fee simple acquisition acreage	Fiscal year 2008 RRS payment
Fergus	2,512	\$2,626
Garfield	5,952	\$6,819
McCone	2,784	\$1,325
Petroleum	2,981	\$2,360
Phillips	12,715	\$17,347
Valley	6,455	\$4,652
Total	24,935	\$25,684

Table 11. Annual impacts from refuge revenue sharing payments for Alternative A (2007\$).

Types of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$25.5	\$5.0	0
Secondary effects	\$7.1	\$2.0	0
Total economic impact	\$32.6	\$7.0	0

Impacts from Charles M. Russell National Wildlife Refuge Administration

Staff—Personal Purchases

Refuge employees reside and spend their salaries on daily living expenses in communities near the refuge, thereby generating impacts within the local economy. Household consumption expenditures consist of payments by individuals and (or) households to industries for goods and services used for personal consumption. The IMPLAN modeling system contains household consumption spending profiles that account for average household spending patterns by income level. These profiles also capture average annual savings and allow for leakage of household spending outside the region. The current approved refuge staff consists of 28 permanent and 21 seasonal employees for Alternative A (table 12).

Based on fiscal year 2008 salary charts, it was estimated that annual salaries for Alternative A would total more than \$2.3 million. Table 13 shows the economic impacts associated with spending of salaries in local areas by refuge employees under Alternative A. For Alternative A, salary spending by refuge personnel would directly account for about \$1.5 million in local output, 11 jobs, and \$277,200 in labor income in the local economy. The secondary or multiplier effects would generate an additional \$375,200 in local output, four jobs, and \$98,900 in labor income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for Alternative A would generate total economic impacts of about \$1.9 million in local output, 15 jobs, and \$376,000 in labor income.

Table 12. Current approved staff (Alternative A).

CMR Headquarters (Lewistown, Montana)	Sand Creek Field Station	Jordan Field Station	Fort Peck Field Station	UL BEND National Wildlife Refuge
Project Leader	Station Manager	Station Manager	Station Manager	None
Deputy Project Leader	Assistant Station Manager	Assistant Station Manager	Assistant Station Manager	
Pilot-Wildlife Biologist	Assistant Fire Management Officer	Range Technician	Biological Technician	
Wildlife Refuge Specialist	Biological Technician			
Maintenance Worker (2)	Law Enforcement Officer			
Supervisory Wildlife Biologist	Range Technician			
Wildlife Biologist (3)	Maintenance Worker			
Fire Management Officer	Student Trainee			
Administrative Officer				
Administrative Assistant (2)				
Seasonal Employees - 14 fire seasonals and 7 biological technicians				

Table 13. Annual local economic impacts of salary spending by refuge personnel (2007\$).

Type of effect	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$1,502.1	\$277.2	11
Secondary effects	\$375.2	\$98.9	4
Total economic impact	\$1,877.3	\$376.1	15

Work-Related Purchases

A variety of supplies and services are purchased for refuge operations and maintenance activities. Refuge purchases made in the six-county area contribute to the local economic impacts associated with the Refuge. According to Refuge records, approximately 40 percent of the annual nonsalary budget expenditures are spent on goods and services purchased in the six-county area. Major local expenditures include: supplies and services related to building maintenance and construction; auto repairs, parts, and fuel; and utilities. Average annual nonsalary expenditures for Alternative A are anticipated to be \$1.45 million. Table 14 shows the economic impacts associated with work-related expenditures in the six-county area. For Alternative A, work-related expenditures would directly account for almost \$597,000 in local output, two jobs, and about \$59,000 in labor income in the local economy. Accounting for both the direct and secondary effects, work-related purchases for Alternative A would generate total economic impacts of \$670,800 in local output, three jobs and \$79,800 in labor income.

Table 14. Local economic impacts of refuge related purchases for Alternative A (2007\$).

Type of effect	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$596.8	\$58.8	2
Secondary effects	\$74.0	\$21.0	1
Total economic impact	\$670.8	\$79.8	3

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The FWS report “Banking on nature—The economic benefits of National Wildlife Refuges visitation to local communities” estimated the impact of national wildlife refuges on their local economies (Carver and Caudill, 2007). According to the report, more than 34.8 million visits were made to national wildlife refuges in fiscal year 2006, which generated \$1.7 billion of sales in regional economies. Accounting for both the direct and secondary effects, spending by national wildlife refuge visitors generated nearly 27,000 jobs, and more than \$542.8 million in employment income (Carver and Caudill, 2007). Approximately 82 percent of total expenditures were from nonconsumptive activities, 12 percent from fishing, and 6 percent from hunting (Carver and Caudill, 2007).

The Refuge offers a wide variety of year-round accessible recreational opportunities including big game hunting, upland game hunting, fishing, migratory game bird and waterfowl hunting, and nonconsumptive wildlife viewing, education, and photography opportunities. Information on State and regional trends and associated economic impacts of these recreational activities was presented in the previous section. This section focuses on the local economic impacts associated with Refuge visitation. Annual Refuge visitation estimates are based on several refuge statistic sources including: visitors entering the Visitor Center and (or) Office, traffic counters, hunting permits, and general observation by refuge personnel. Annual Refuge visitation estimates are on a per-visit basis. Table 15 summarizes estimated Refuge visitation by type of visitor activity for Alternative A.

Table 15. Estimated annual refuge visitation by visitor activity for Alternative A.

Visitor activity	Total number of visits	Percentage of nonlocal visits	Total number of nonlocal visits	Number of hours spent at refuge	Number of nonlocal visitor days ¹
Consumptive use					
Fishing	60,000	50	30,000	8	30,000
Big game hunting	90,000	70	63,000	8	63,000
Waterfowl and migratory bird hunting	2,900	70	2,030	8	2,030
Upland game hunting	10,000	75	7,500	8	7,500
Nonconsumptive use					
Nature trails, other wildlife observation, office visits	87,100	70	60,970	4	30,485
Total	250,000		163,500		133,015

¹One visitor day equals 8 hours.

To determine the local economic impacts of visitor spending, only spending by persons living outside the local six-county area are included in the analysis. The rationale for excluding local visitor spending is twofold. First, money flowing into the local area from visitors living outside the local area (hereinafter referred to as nonlocal visitors) is considered new money injected into the local economy. Second, if residents of local six-county area visit the Refuge more or less due to the management changes, they will correspondingly change the spending of their money elsewhere in the six-county area, resulting in no net change to the local economy. These are standard assumptions made in most regional economic analyses at the local level. Refuge visitation statistics and hunting permits were used to determine the percentage of nonlocal Refuge visitors. Table 15 shows the estimated percentage of nonlocal refuge visits for Alternative A.

A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis, we use the average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill, 2007) that were derived from the 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (NSFHWR). The NSFHWR reports trip-related spending of State residents and nonresidents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person, per-day expenditures by recreation activity for each FWS region. Residents were defined as living within 30 miles of the refuge, and nonresidents were defined as living outside the 30-mile radius (Carver and Caudill, 2007). For our analysis, nonlocal visitors match the nonresident spending profile definition. Therefore, we used the spending profiles for nonresidents for FWS Region 6 (the region where the CMR is located). Nonresident average daily spending profiles for big game hunting (\$190,380 per day), small game hunting (\$156,870 per day), migratory bird hunting (\$67,620 per day), and freshwater fishing (\$112,020 per day) were used to estimate nonlocal visitor spending for refuge hunting and fishing-related activities. The average daily nonresident spending profile for nonconsumptive wildlife recreation (observing, feeding, or photographing fish and wildlife) was used for nonconsumptive wildlife-viewing activities (\$140,460 per day).

The visitor spending profiles are estimated on an average per day (8 hours) basis. Because some visitors only spend short amounts of time on the Refuge, counting each visit as a full visitor day would overestimate the economic impact of Refuge visitation. In order to properly account for the amount of spending, the annual number of nonlocal refuge visits were converted to visitor days. Refuge personnel estimate that nonlocal hunters and anglers spend a full visitor day (8 hours) on the refuge. Nonlocal visitors that view wildlife on nature trails or participate in other wildlife observation activities typically spend 4 hours (one-half of a visitor day) on the refuge. Table 15 shows the number of nonlocal visitor days by recreation activity for Alternative A.

Total spending by nonlocal refuge visitors was determined by multiplying the average nonlocal visitor daily spending by the number of nonlocal visitor days. Table 16 summarizes the total economic impacts associated with current nonlocal fishing, hunting (all types), and nonconsumptive (wildlife viewing) visitation for Alternative A. Nonlocal refuge visitors would spend more than \$20.9 million in the six-county area annually. This spending would directly account for \$14.6 million in local output, 204 jobs, and \$4.2 million in labor income in the local economy. The secondary or multiplier effects would generate an additional \$5.9 million in local output, 60 jobs, and \$1.6 million in labor income.

Accounting for both the direct and secondary effects, spending by nonlocal visitors for Alternative A would generate total economic impacts of \$20.5 million in local output, 264 jobs and \$5.8 million in labor income.

Table 16. Annual impacts of nonlocal visitor spending for Alternative A (2007\$).

Visitor activity	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects			
Fishing	\$2,367.7	\$646.4	30
Hunting	\$8,913.9	\$2,606.0	123
Wildlife viewing	\$3,337.6	\$975.4	51
Direct effects total	\$14,619.2	\$4,227.8	204
Secondary effects			
Fishing	\$917.6	\$244.5	9
Hunting	\$3,519.7	\$946.6	36
Wildlife viewing	\$1,438.0	\$379.2	15
Secondary effects total	\$5,875.3	\$1,570.3	60
Total effects			
Fishing	\$3,285.3	\$890.9	39
Hunting	\$12,433.6	\$3,552.6	159
Wildlife viewing	\$4,775.6	\$1,354.6	66
Total economic impact	\$20,494.5	\$5,798.1	264

Impacts from Other Charles M. Russell National Wildlife Refuge Management Activities—Grazing

FWS records indicate there were 42 cattle permits on the Refuge in 2008 (table 17). During 2008, approximately 24,000 AUMs were permitted; however, only 18,872 AUMs were actually used. Garfield County had the largest number of permits and AUMs (38.1 percent and 36.2 percent, respectively). Both McCone and Phillips Counties had 19 percent of the permits, but Phillips accounted for 25.7 percent of total Refuge AUMs while McCone only accounted for 14.4 percent. Valley County had 11.9 percent of total permits, and accounted 19.2 percent of total Refuge AUMs. Both Fergus and Petroleum Counties received less than 10 percent of total permits (9.5 percent and 2.4 percent, respectively) while accounting for only 1.9 percent and 2.5 percent of total Refuge AUMs.

While total AUMs supplied by the Refuge have decreased from 2001 to 2008, revenues received from Refuge grazing permits have risen due to increases in Refuge grazing fees from \$9.50 per AUM in 2001 to \$17.20 per AUM in 2008.

Table 17. Refuge permits and Animal Unit Months (AUM) by county, 2008.

County	Permits	Annual Unit Months
Fergus	4	359
Garfield	16	6,839
Petroleum	1	468
Phillips	8	4,849
McCone	8	2,726
Valley	5	3,631
Total	42	18,872

Table 18 summarizes the estimated economic impact of one AUM of Refuge grazing to the six-county area economy if the Refuge grazing is considered in isolation. This analysis, conducted by Dr. David Taylor (agricultural economist at the University of Wyoming), was estimated from a modified 2007 IMPLAN model of the six-county area. These estimates are based on the 1999–2008 average value of production for cow and (or) calf operations in the Northern Great Plains region of the United States (U.S. Department of Agriculture–Economic Research Service, 2009), which includes the CMR area, and a 2006 University of Idaho cow and (or) calf budget (a specific budget for the six-county area was not available; the Idaho budget was determined to be the best match). On a per-AUM basis, the average value of production was \$41.09. Due to economic linkages between ranching and the rest of the six-county area economy, the total output from the production associated with one AUM of grazing was estimated to be \$79.52. This represents the total economic activity that occurs within the region as a result of the production from one AUM of livestock grazing. As a result of this economic activity, it is estimated that \$18.17 of labor income is generated throughout the local economy and 0.000741 jobs are supported per AUM of livestock grazing. The 0.000741 jobs represent about one job for every 1,350 AUMs of livestock grazing. Average earnings per job for this employment are \$24,532 per year.

Table 18. Economic impact of refuge grazing (2007\$).

Grazing statistics	Per AUM	Total CMR AUMs permitted	Total CMR AUMs used
Total AUMs	1	24,000	18,872
Value of production	\$41.09	\$986,160	\$775,450
Total economic impact (output)	\$79.52	\$1,908,480	\$1,500,620
Total labor earnings	\$18.17	\$436,080	\$342,993
Total employment (jobs)	0.000741	18	14
Average earning per job	\$24,532	\$24,532	\$24,532

Source: David Taylor, University of Wyoming, 2009.

For Alternative A, the current level of permitted Refuge grazing (24,000 AUMs) would generate \$986,200 of production in the six-county area annually. This production would account for \$1.9 million in total economic output, \$436,000 in labor earnings, and 18 jobs in the local economy (table 18). The current level of AUMs actually used on the Refuge (18,872 AUMs) would generate \$775,500 of production in the six-county area annually. This production would account for \$1.5 million in total economic output, \$343,000 in labor earnings, and 14 jobs in the local economy (table 18).

Summary of Economic Impacts for Alternative A

Table 19 summarizes the direct and total economic impacts of Refuge management activities for Alternative A in the six-county area. Under Alternative A, refuge management activities directly related to all refuge operations generate an estimated \$16.7 million in local output, 217 jobs, and \$4.6 million in labor income in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate total economic impacts of about \$23.1 million in local output, 282 jobs, and about \$6.3 million in labor income. In addition, grazing on Refuge lands generates \$1.5 million in total output, 14 jobs, and \$343,000 in labor income in the six-county area economy. The economic impacts associated with grazing were not included in the summary of Refuge management activities for Alternative A (table 19). Grazing will be on a prescriptive basis for all other Alternatives where the specific number of AUMs are unknown; therefore, grazing impacts were not analyzed.

Table 19. Economic impacts of refuge management activities for Alternative A (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$25.5	\$5.0	0
Total effects	\$32.6	\$7.0	0
Refuge administration¹			
Direct effects	\$2,098.9	\$336.0	13
Total effects	\$2,548.1	\$455.9	18
Public use activities			
Direct effects	\$14,619.2	\$4,227.8	204
Total effects	\$20,748.6	\$5,798.1	260
Aggregate impacts			
Direct effects	\$16,743.6	\$4,568.8	217
Total effects	\$23,075.2	\$6,261.1	282

Note: Economic impacts associated with grazing are not included.

¹Staff salary spending and work-related purchases.

In 2007, total labor income was estimated at \$466.4 million, and total employment was estimated at 17,945 jobs for the six-county area (Minnesota IMPLAN Group, Inc., 2007). Excluding grazing operations, total economic impacts associated with refuge operations under Alternative A represents 1.4 percent of total income and 1.6 percent of total employment in the overall six-county area economy. Total economic effects of refuge operations are more of a factor in the communities near the refuge such as Lewistown, Glasgow, Fort Peck, Jordan, and Malta where most of the Refuge public-use-related economic activity occurs.

In 2007, total labor income was estimated at \$466.4 million, and total employment was estimated at 17,945 jobs for the six-county area (Minnesota IMPLAN Group, 2007). Excluding grazing operations, total economic impacts associated with refuge operations under Alternative A represent 1.4 percent of total income and 1.6 percent of total employment in the overall six-county area economy. Total economic effects of refuge operations are more of a factor in the communities near the refuge such as Lewistown, Glasgow, Fort Peck, Jordan, and Malta, where most of the Refuge public-use related economic activity occurs.

Economic Impacts of Alternative B

Impacts from Charles M. Russell National Wildlife Refuge Revenue Sharing

Same as Alternative A.

Impacts from Charles M. Russell National Wildlife Refuge Administration

Staff—Personal Purchases

Proposed staff for Alternative B includes all approved staff positions (Alternative A, table 12) plus five additional positions. The new positions are: an Outdoor Recreation Planner; a Law

Enforcement Officer; a Refuge Operations Specialist; a Range Technician; and a Technician. Table 20 shows the economic impacts associated with spending of salaries in the six-county area by refuge employees under Alternative B. For Alternative B, salary spending by refuge personnel would directly account for \$1.7 million in local output, 13 jobs, and \$306,700 in labor income in the local economy. The secondary or multiplier effects would generate an additional \$415,100 in local output, four jobs, and \$109,800 in labor income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for Alternative B would generate total economic impacts of \$2.1 million in local output, 17 jobs, and \$416,500 in labor income. Due to the increased staffing levels for Alternative B, the associated economic effects of staff salary spending would generate \$199,600 more in local output, two more jobs, and \$40,400 more in labor income than Alternative A.

Table 20. Local economic impacts of salary spending by refuge personnel for Alternative B (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$1,661.8	\$306.7	13
Secondary effects	\$415.1	\$109.8	4
Total economic impact	\$2,076.9	\$416.5	17

Work-Related Purchases

Nonsalary expenditures for Alternative B are anticipated to increase in proportion with the salary increase for the new staff positions for a total annual nonsalary budget of \$1.61 million (an 11 percent increase compared to Alternative A). Table 21 shows the economic impacts associated with work-related expenditures in the six-county area for Alternative B. These estimates assume 40 percent of the nonsalary budget will be spent on goods and services purchased in the six-county area (same as current and Alternative A). Work-related expenditures under Alternative B would directly account for \$660,300 in local output, two jobs, and \$65,100 in labor income in the local economy. Accounting for both the direct and secondary effects, work-related purchases for Alternative B would generate a total economic impact of \$742,200 in local output, three jobs, and \$88,400 in labor income. Due to the increased nonsalary expenditures for Alternative B, the associated economic effects of work-related purchases would generate \$71,300 more in local output and \$8,600 more in labor income than Alternative A.

Table 21. Local economic impacts of refuge related purchases for Alternative B (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$660.3	\$65.1	2
Secondary effects	\$81.9	\$23.3	1
Total economic impact	\$742.2	\$88.4	3

Impacts from Public Use and Access Management

Charles M. Russell National Wildlife Refuge Visitor Expenditures in Local Economy

Changes in refuge management activities can affect recreational opportunities offered and visitation levels. Table 22 shows the estimated visitation levels associated with each visitor activity for Alternative B. Under Alternative B, annual visitation is anticipated to increase for waterfowl hunting (3 percent), upland game hunting (20 percent), and nonconsumptive-use activities (7 percent) compared to Alternative A (table 15). No change is anticipated for fishing activities, while big game hunting is anticipated to decrease by 6 percent, compared to Alternative A.

Table 22. Estimated annual refuge visitation by visitor activity for Alternative B.

Visitor activity	Total number of visits	Percentage of nonlocal visits	Total number of nonlocal visits	Number of hours spent at refuge	Number of nonlocal visitor days ¹
Consumptive-use					
Fishing	60,000	50	30,000	8	30,000
Big game hunting	85,000	70	59,500	8	59,500
Waterfowl and migratory bird hunting	3,000	70	2,100	8	2,100
Upland game hunting	12,000	75	9,000	8	9,000
Nonconsumptive-use					
Nature trails, other wildlife observation, office visits	93,000	70	65,100	4	32,550
Total	253,000		165,700		133,150

¹One visitor day equals 8 hours.

Table 23 summarizes the total economic impacts associated with current nonlocal fishing, hunting (all types), and nonconsumptive visitation for Alternative B. Nonlocal refuge visitors would spend more than \$20.8 million in the six-county area annually. This spending would directly account for \$14.6 million in local output, 203 jobs, and \$4.2 million in labor income in the local economy. The secondary or multiplier effects would generate an additional \$5.9 million in local output, 60 jobs, and \$1.6 million in labor income. Accounting for both the direct and secondary effects, spending by nonlocal visitors for Alternative B would generate total economic impacts of \$20.4 million in local output, 263 jobs and \$5.8 million in labor income. Even though visitation increased slightly (135 total nonlocal visitor days) compared to Alternative A, the increase in waterfowl hunting (70 visitor days with an average spending of \$67.62 per day), upland game hunting (1,500 visitor days with an average spending of \$156.87 per day), and nonconsumptive-use activities (2,065 visitor days with an average spending of \$140.46 per day) does not offset the decrease in big game hunters (3,500 visitor days with an average spending of \$190.39 per day). Therefore, for Alternative B, the associated economic effects of Refuge visitation would be less than Alternative A by \$54,900 in local output, one job, and \$12,500 in labor income.

Table 23. Annual impacts of nonlocal visitor spending for Alternative B (2007\$).

Visitor activity	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects			
Fishing	\$2,367.7	\$646.4	30
Hunting	\$8,641.8	\$2,529.0	119
Wildlife viewing	\$3,563.7	\$1,041.5	54
Direct effects total	\$14,573.2	\$4,216.9	203
Secondary effects			
Fishing	\$917.6	\$244.5	9
Hunting	\$3,413.4	\$919.3	35
Wildlife viewing	\$1,535.4	\$404.9	16
Secondary effects total	\$5,866.4	\$1,568.7	60
Total effects			
Fishing	\$3,285.3	\$890.9	39
Hunting	\$12,055.2	\$3,448.3	154
Wildlife viewing	\$5,099.1	\$1,446.4	70
Total economic impact	\$20,439.6	\$5,785.6	263

Impacts from Other Charles M. Russell National Wildlife Refuge Management Activities—Grazing

For Alternative B, Refuge management will move towards a prescriptive grazing regime in order to meet specific wildlife and (or) habitat goals and objectives. Within 4 to 7 years, a prescriptive grazing plan would be developed for 50 to 75 percent of the refuge. As a result, the level of grazing could be reduced or increased during short time periods.

As shown in table 7, the Refuge supplies less than 1 percent of total AUMs in the six-county area. Therefore, changes to Refuge grazing levels would not be significant for the six-county economy but could impact individual ranches with Refuge-grazing permits. The Refuge grazing impacts in table 18 assume that the only effect on the ranching operation from Refuge grazing is the direct production associated with the Refuge AUMs. Although most ranches are typically only partly dependent on Federal land grazing for forage, this forage source can be a critical part of their livestock operation due to the rigidity of seasonal forage availability (Taylor and others, 2008). Therefore, potential reductions in income and net ranch returns can be greater than just the direct economic loss from reductions in Federal grazing AUMs (Van Tassell and Richardson, 1998; Rowe and Bartlett, 2001; Taylor and others, 2008). The level of an increased impact above the direct production associated with Refuge AUMs would depend on a number of factors including the individual ranch's level of dependency on Refuge grazing, the magnitude of the proposed change in grazing, the financial solvency of the ranch, and the availability of alternative sources of forage (Taylor and others, 2008).

Summary of Economic Impacts for Alternative B

Table 24 summarizes the direct and total economic impacts of Refuge management activities for Alternative B in the six-county area. Excluding grazing operations, refuge management activities directly related to Refuge operations would generate an estimated \$16.9 million in local output, 218 jobs, and \$4.6 million in labor income in the local economy under Alternative B. Including direct,

indirect, and induced effects, all Refuge activities would generate total economic impacts of \$23.3 million in local output, 283 jobs, and \$6.3 million in labor income. Excluding grazing operations, total economic impacts associated with refuge operations under Alternative B represents 1.4 percent of total income and 1.6 percent of total employment in the overall six-county area economy. Total economic effects of Refuge operations are a greater factor in the communities near the refuge such as Lewistown, Glasgow, Fort Peck, Jordan, and Malta, where most of the Refuge public-use-related economic activity occurs.

Table 24. Summary of all refuge management activities for Alternative B (2007\$).

Visitor activity	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$25.5	\$5.0	0
Total effects	\$32.6	\$7.0	0
Refuge administration¹			
Direct effects	\$2,322.1	\$371.8	15
Total effects	\$2,819.1	\$504.9	20
Public use activities			
Direct effects	\$14,573.2	\$4,216.9	203
Total effects	\$20,439.6	\$5,785.6	263
Aggregate impacts			
Direct effects	\$16,920.8	\$4,593.7	218
Total effects	\$23,291.3	\$6,297.5	283

¹Staff salary spending and work-related purchases.

Table 25 summarizes the change in economic effects associated with Refuge operations under Alternative B as compared to Alternative A. Due to increases in Refuge administration and decreases in big game hunting, Alternative B would generate \$216,000 more in local output, \$36,400 more in labor income, and one more job as compared to Alternative A.

Economic Impacts of Alternative C

Impacts from Charles M. Russell National Wildlife Refuge Revenue Sharing
Same as Alternative A.

Impacts from Charles M. Russell National Wildlife Refuge Administration

Staff—Personal Purchases

Proposed staff for Alternative C includes all current staff positions (Alternative A, table 12) plus seven additional positions. The new positions are: two Outdoor Recreation Planners; two Maintenance Workers; a Law Enforcement Officer; a Station Manager (UL Bend NWR); and a Range Technician. Table 26 shows the economic impacts associated with spending of salaries in the six-county area by Refuge employees under Alternative C. For Alternative C, salary spending by Refuge personnel would

Table 25. Change in economic impacts under Alternative B compared to Alternative A (2007\$).

Visitor activity	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$0	\$0	0
Total effects	\$0	\$0	0
Refuge administration¹			
Direct effects	+\$223.2	+\$35.8	+2
Total effects	+\$270.9	+\$48.9	+2
Public use activities			
Direct effects	-\$46	-\$10.9	-1
Total effects	-\$309.0	-\$12.5	+3
Aggregate impacts			
Direct effects	+\$177.2	+\$24.9	+1
Total effects	+\$216.0	+\$36.4	+1

¹Staff salary spending and work-related purchases.

Table 26. Local economic impacts of salary spending by refuge personnel for Alternative C (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$1,742.0	\$321.5	13
Secondary effects	\$435.1	\$114.7	4
Total economic impact	\$2,177.1	\$436.2	17

directly account for about \$1.7 million in local output, 13 jobs, and \$321,500 in labor income in the local economy. The secondary or multiplier effects would generate an additional \$435,100 in local output, four jobs, and \$114,700 in labor income. Accounting for both the direct and secondary effects, salary spending by refuge personnel for Alternative C would generate total economic impacts of \$2.2 million in local output, 17 jobs, and \$436,200 in labor income. Due to the increased staffing levels for Alternative C, the associated economic effects of staff salary spending would generate \$300,000 more in local output, two more jobs, and \$60,100 more in labor income than Alternative A.

Work-Related Purchases

Nonsalary expenditures for Alternative C are anticipated to increase in proportion with the salary increase for the new staff positions for a total annual nonsalary budget of \$1.68 million (16-percent increase compared to Alternative A). Table 27 shows the economic impacts associated with work-related expenditures in the six-county area for Alternative C. These estimates assume 40 percent of the nonsalary budget will be spent on goods and services purchased in the six-county area (same as current and Alternative A). Work-related expenditures under Alternative C would directly account for \$692,200 in local output, two jobs, and \$68,200 in labor income in the local economy. Accounting for both the

direct and secondary effects, work-related purchases for Alternative C would generate a total economic effect of \$778,000 in local output, three jobs, and \$92,600 in labor income. Due to the increased nonsalary expenditures for Alternative B, the associated economic effects of work-related purchases would generate \$107,200 more in local output and \$12,800 more in labor income than Alternative A.

Table 27. Local economic impacts of refuge related purchases for Alternative C (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$692.2	\$68.2	2
Secondary effects	\$85.8	\$24.4	1
Total economic impact	\$778.0	\$92.6	3

Impacts from Public Use and Access Management

Charles M. Russell National Wildlife Refuge Visitor Expenditures in Local Economy

Table 28 shows the estimated visitation levels associated with each visitor activity for Alternative C. Under Alternative C, visitation increases are anticipated for all activities except fishing as compared to Alternative A (table 15).

Table 28. Estimated annual refuge visitation by visitor activity for Alternative C.

Visitor activity	Total number of visits	Percentage of nonlocal visits	Total number of nonlocal visits	Number of hours spent at refuge	Number of nonlocal visitor days ¹
Consumptive use					
Fishing	60,000	50	30,000	8	30,000
Big game hunting	100,000	70	70,000	8	70,000
Waterfowl and migratory bird hunting	3,500	70	2,450	8	2,450
Upland game hunting	15,000	75	11,250	8	11,250
Nonconsumptive use					
Nature trails, other wildlife observation, office visits	117,585	70	82,310	4	41,155
Total	296,085		196,010		154,855

¹One visitor day equals 8 hours.

Table 29 summarizes the total economic impacts associated with current nonlocal fishing, hunting (all types), and nonconsumptive visitation for Alternative C. Nonlocal refuge visitors would spend almost \$23.4 million in the six-county area annually. This spending would directly account for \$17.1 million in local output, 240 jobs, and \$5 million in labor income in the local economy. The secondary or multiplier effects would generate an additional \$6.9 million in local output, 70 jobs, and \$1.8 million in labor income. Accounting for both the direct and secondary effects, spending by nonlocal visitors for Alternative C would generate total economic impacts of \$24 million in local output, 310 jobs, and \$6.8 million in labor income. Due to the increased visitation levels (except for

Table 29. Annual Impacts of nonlocal visitor spending for Alternative C (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects			
Fishing	\$2,367.7	\$646.4	30
Hunting	\$10,240.0	\$2,990.2	141
Wildlife viewing	\$4,505.8	\$1,316.8	69
Direct effects total	\$17,113.5	\$4,953.4	240
Secondary effects			
Fishing	\$917.6	\$244.5	9
Hunting	\$4,045.0	\$1,087.5	41
Wildlife viewing	\$1,941.3	\$511.9	20
Secondary effects total	\$6,903.9	\$1,843.9	70
Total effects			
Fishing	\$3,285.3	\$890.9	39
Hunting	\$14,285.0	\$4,077.7	182
Wildlife viewing	\$6,447.1	\$1,828.7	89
Total economic impact	\$24,017.4	\$6,797.3	310

fishing) under Alternative C, the associated economic effects of visitor spending would generate \$3.5 million more in local output, 46 more jobs, and \$999,200 more in labor income than Alternative A.

Impacts from Other Charles M. Russell National Wildlife Refuge Management Activities—Grazing

For Alternative C, Refuge management will gradually move toward a prescriptive grazing regime in order to promote ecological resilience, biological diversity, integrity, and heterogeneity across the landscape. Prescriptive grazing will be implemented across 50 to 75 percent of the refuge within 6 to 9 years. As a result, the level of grazing could probably be reduced from the current level but could possibly increase for short periods of time.

As shown in table 7, the Refuge supplies less than 1 percent of total AUMs in the six-county area. Therefore, changes to Refuge grazing levels would not be significant for the six-county economy but could impact individual ranches with Refuge-grazing permits. The Refuge-grazing impacts in table 18 assume that the only affect on the ranching operation from Refuge grazing is the direct production associated with the Refuge AUMs. Although most ranches are typically only partly dependent on Federal land grazing for forage, this forage source can be a critical part of their livestock operation due to the rigidity of seasonal forage availability (Taylor and others, 2008). Therefore, potential reductions in income and net ranch returns can be greater than just the direct economic loss from reductions in Federal grazing AUMs (Van Tassell and Richardson, 1998; Rowe and Bartlett, 2001; Taylor and others, 2008). The level of an increased impact above the direct production associated with Refuge AUMs would depend on a number of factors including the individual ranch's level of dependency on Refuge grazing, the magnitude of the proposed change in grazing, the financial solvency of the ranch, and the availability of alternative sources of forage (Taylor and others, 2008).

Summary of Economic Impacts for Alternative C

Table 30 summarizes the direct and total economic impacts of all refuge management activities for Alternative C in the six-county area. Under Alternative C, refuge management activities directly related to all refuge operations generate an estimated \$19.6 million in local output, 255 jobs, and \$5.4 million in labor income in the local economy. Including direct, indirect, and induced effects, all refuge

Table 30. Summary of refuge management activities for Alternative C (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$25.5	\$5.0	0
Total effects	\$32.6	\$7.0	0
Refuge administration¹			
Direct effects	\$2,434.2	\$389.7	15
Total effects	\$2,955.1	\$528.8	20
Public use activities			
Direct effects	\$17,113.5	\$4,953.4	240
Total effects	\$24,017.4	\$6,797.3	310
Aggregate impacts			
Direct effects	\$19,573.2	\$5,348.1	255
Total effects	\$27,005.1	\$7,333.1	330

¹Staff salary spending and work-related purchases.

activities would generate total economic impacts of \$27 million in local output, 330 jobs, and \$7.3 million in labor income. Excluding grazing operations, total economic impacts associated with refuge operations under Alternative C would represent 1.6 percent of total income and 1.8 percent of total employment in the overall six-county area economy. Total economic effects of refuge operations are a larger factor in the communities near the refuge such as Lewistown, Glasgow, Fort Peck, Jordan, and Malta, where most of the Refuge public-use-related economic activity occurs.

Table 31 summarizes the change in economic effects associated with refuge operations under Alternative C as compared to Alternative A. Due to increases in refuge administration and visitation, Alternative C would generate \$3.9 million more in local output, 48 additional jobs, and \$1 million more in labor income as compared to Alternative A.

Economic Impacts of Alternative D

Impacts from Charles M. Russell National Wildlife Refuge Revenue Sharing

Same as Alternative A.

Impacts from Charles M. Russell National Wildlife Refuge Administration

Staff—Personal Purchases

Proposed staff for Alternative D includes all current staff positions (Alternative A, table 12) plus seven additional positions. The new positions are: two Outdoor Recreation Planners; a Maintenance

Table 31. Change in economic impacts under Alternative C compared to Alternative A (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$0	\$0	0
Total effects	\$0	\$0	0
Refuge administration¹			
Direct effects	+\$335.3	+\$53.7	+2
Total effects	+\$407.0	+\$72.8	+2
Public use activities			
Direct effects	+\$2,494.3	+\$725.6	+36
Total effects	+\$3,268.8	+\$999.2	+50
Aggregate impacts			
Direct effects	+\$2,829.6	+\$779.3	+38
Total effects	+\$3,929.9	+\$1,072.0	+48

¹Staff salary spending and work-related purchases.

Worker; a Law Enforcement Officer; a Station Manager (UL Bend NWR); a Range Technician; and a Technician. Table 32 shows the economic impacts associated with spending of salaries in the six-county area by Refuge employees under Alternative D. For Alternative D, salary spending by Refuge personnel would directly account for \$1.7 million in local output, 13 jobs, and \$321,000 in labor income in the local economy. The secondary or multiplier effects would generate an additional \$434,400 in local output, four jobs, and \$114,500 in labor income. Accounting for both the direct and secondary effects, salary spending by the Refuge personnel for Alternative D would generate total economic impacts of \$2.2 million in local output, 17 jobs, and \$435,500 in labor income. Due to the increased staffing levels for Alternative D, the associated economic effects of staff salary spending would generate \$296,000 more in local output, two more jobs, and \$59,000 more in labor income than Alternative A.

Work-Related Purchases

Nonsalary expenditures for Alternative D are anticipated to increase in proportion with the salary increase for the new staff positions, a 16-percent increase (same as Alternative C) compared to Alternative A. Therefore, the impacts would be the same as Alternative C shown in table 27.

Table 32. Local economic impacts of salary spending by refuge personnel for Alternative D (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects	\$1,739.2	\$321.0	13
Secondary effects	\$434.4	\$114.5	4
Total economic impact	\$2,173.6	\$435.5	17

Impacts from Public Use and Access Management

Refuge Visitor Expenditures in Local Economy

Table 33 shows the estimated visitation levels associated with each visitor activity for Alternative D. Under Alternative D, slight increases in visitation are anticipated for all activities except fishing and upland game hunting as compared to Alternative A (table 15).

Table 33. Estimated annual refuge visitation by visitor activity for Alternative D.

Visitor activity	Total number of visits	Percentage of nonlocal visits	Total number of nonlocal visits	Number of hours spent at refuge	Number of nonlocal visitor days ¹
Consumptive-use					
Fishing	60,000	50	30,000	8	30,000
Big game hunting	95,000	70	66,500	8	66,500
Waterfowl and migratory bird hunting	3,000	70	2,100	8	2,100
Upland game hunting	10,000	75	7,500	8	7,500
Nonconsumptive-use					
Nature trails, auto tour, other wildlife observation, office visits	95,810	70	67,067	4	33,534
Total	263,810		173,167		139,634

¹One visitor day equals 8 hours.

Table 34 summarizes the total economic impacts associated with current nonlocal fishing, hunting (all types), and nonconsumptive visitation for Alternative D. Nonlocal refuge visitors would spend almost \$21.8 million in the six-county area annually. This spending would directly account for \$15.8 million in local output, 221 jobs, and \$4.6 million in labor income in the local economy. The secondary or multiplier effects would generate an additional \$6.4 million in local output, 65 jobs, and \$1.7 million in labor income. Accounting for both the direct and secondary effects, spending by nonlocal visitors for Alternative D would generate total economic impacts of \$22.2 million in local output, 287 jobs, and \$6.3 million in labor income. Due to the increased visitation levels (except for fishing and upland game hunting) under Alternative D, the associated economic effects of visitor spending would generate \$1.7 million more in local output, 23 more jobs, and \$497,500 more in labor income than Alternative A.

Table 34. Annual impacts of nonlocal visitor spending for Alternative D (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Direct effects			
Fishing	\$2,367.7	\$646.4	30
Hunting	\$9,803.9	\$2,872.0	135
Wildlife viewing	\$3,671.4	\$1,073.0	56
Direct effects total	\$15,843.0	\$4,591.4	221
Secondary effects			
Fishing	\$917.6	\$244.5	9
Hunting	\$3,870.5	\$1,042.6	40
Wildlife viewing	\$1,581.8	\$417.1	16
Secondary effects total	\$6,369.9	\$1,704.2	65
Total effects			
Fishing	\$3,285.3	\$890.9	40
Hunting	\$13,674.4	\$3,914.6	175
Wildlife viewing	\$5,253.2	\$1,490.1	72
Total economic impact	\$22,212.9	\$6,295.6	287

Impacts from Other Charles M. Russell National Wildlife Refuge Management Activities—Grazing

For Alternative D, Refuge management will gradually move towards a prescriptive grazing regime in order to promote ecological resilience, biological diversity, integrity, and heterogeneity across the landscape. Prescriptive grazing will be implemented across 50 to 75 percent of the refuge within 6 to 9 years. As a result, the level of grazing could probably be reduced from the current level but could possibly increase for short periods of time.

As shown in table 7, the Refuge supplies less than one percent of total AUMs in the six-county area. Therefore, changes to Refuge grazing levels would not be significant for the six-county economy but could impact individual ranches with Refuge grazing permits. The Refuge grazing impacts in table 18 assume that the only effect on the ranching operation from Refuge grazing is the direct production associated with the Refuge AUMs. Although most ranches are typically only partially dependent on Federal land grazing for forage, this forage source can be a critical part of their livestock operation due to the rigidity of seasonal forage availability (Taylor and others, 2008). Therefore, potential reductions in income and net ranch returns can be greater than just the direct economic loss from reductions in Federal grazing AUMs (Van Tassell and Richardson, 1998; Rowe and Bartlett, 2001; and Taylor and others, 2008). The level of an increased impact above the direct production associated with Refuge AUMs would depend on a number of factors including the individual ranch's level of dependency on Refuge grazing, the magnitude of the proposed change in grazing, the financial solvency of the ranch, and the availability of alternative sources of forage (Taylor and others, 2008).

Summary of Economic Impacts for Alternative D

Table 35 summarizes the direct and total economic impacts of all refuge management activities for Alternative D in the six-county area. Excluding grazing, refuge management activities directly related to all refuge operations generate an estimated \$18.3 million in local output, 236 jobs, and \$5 million in labor income in the local economy under Alternative D. Including direct, indirect, and induced effects, all refuge activities would generate total economic impacts of \$25.2 million in local output, 307 jobs, and \$6.8 million in labor income. Excluding grazing operations, total economic impacts associated with Refuge operations under Alternative D would represent 1.5 percent of total income and 1.7 percent of total employment in the overall six-county area economy. Total economic effects of refuge operations are a larger factor in the communities near the refuge such as Lewistown, Glasgow, and Malta, where most of the Refuge public-use-related economic activity occurs.

Table 36 summarizes the change in economic effects associated with refuge operations under Alternative D as compared to Alternative A. Due to increases in visitation and refuge administration, Alternative D would generate \$2.1 million more in local output, 25 additional jobs, and \$569,600 more in labor income when compared to Alternative A.

Table 35. Summary of all refuge management activities for Alternative D (2007\$).

Type of effects	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$25.5	\$5.0	0
Total effects	\$32.6	\$7.0	0
Refuge administration¹			
Direct effects	\$2,431.4	\$389.2	15
Total effects	\$2,951.6	\$528.1	20
Public use activities			
Direct effects	\$15,843.0	\$4,591.4	221
Total effects	\$22,212.9	\$6,295.6	287
Aggregate impacts			
Direct effects	\$18,299.9	\$4,985.6	236
Total effects	\$25,197.1	\$6,830.7	307

¹Staff salary spending and work-related purchases.

Table 36. Change in economic impacts under Alternative D compared to Alternative A (2007\$).

	Local output (\$ thousands)	Labor income (\$ thousands)	Employment (number of full- and part-time jobs)
Refuge revenue sharing			
Direct effects	\$0	\$0	0
Total effects	\$0	\$0	0
Refuge administration¹			
Direct effects	+\$332.5	+\$53.2	+2
Total effects	+\$403.5	+\$72.1	+2
Public use activities			
Direct effects	+\$1,223.8	+\$363.6	+17
Total effects	+\$1,464.3	+\$497.5	+27
Aggregate impacts			
Direct effects	+\$1,556.3	+\$416.8	+19
Total effects	+\$2,121.9	+\$569.6	+25

¹Staff salary spending and work-related purchases.

Summary and Conclusions

Under Alternative A, refuge management activities directly related to all refuge operations generate an estimated \$16.7 million in local output, 217 jobs, and \$4.6 million in labor income in the local economy. Including direct, indirect, and induced effects, all Refuge activities would generate total economic impacts of \$23.1 million in local output, 282 jobs, and \$6.3 million in labor income. In addition, grazing on Refuge lands generates \$1.5 million in total output, 14 jobs, and \$343,000 in labor income in the six-county area economy. Excluding grazing operations, total economic impacts associated with refuge operations under Alternative A represent 1.4 percent of total income and 1.6 percent of total employment in the overall six-county area economy.

Due to increases in overall visitation and Refuge administration, Alternatives B, C, and D would generate more economic activity than Alternative A. The largest increase in economic activity would occur under Alternative C. Excluding grazing operations, total economic impacts associated with Refuge operations under Alternative C would represent 1.6 percent of total income and 1.8 percent of total employment in the overall six-county area economy. Total economic effects of refuge operations will be a larger factor in the communities near the refuge such as Lewistown, Glasgow, Fort Peck, Jordan, and Malta, where most of the Refuge CMR public-use-related economic activity occurs.

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