SOCIOECONOMIC REPORT

Analysis of Agriculture, Urban/Ex-Urban Development and Transportation Sectors

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Abstract

The Yellowstone River Corridor, located in southern Montana and eastern North Dakota, spans 12 counties. This report details socioeconomic data for each of the counties grouped, according to economic characteristics, into five segments. This report focuses on the three sectors: agriculture, exurban and urban development, and transportation. Each section of this report provides historic and current data for each segment along the River Corridor. In some cases, data are provided at the county level to highlight important differences between the counties within a single segment, while in other cases, aggregate data are provided at the segment level.

Introduction

The Yellowstone River Corridor, located in southern Montana and eastern North Dakota, spans 12 counties. The corridor covers a geographically and economically diverse area. For ease of discussion, the 12 counties have been grouped into five segments that reflect economically similar areas. It should be noted that this is the same geographic grouping applied in the Yellowstone River Cultural Inventory Report. Segment 1 encompasses the counties located in eastern Montana and western North Dakota: Prairie, Dawson, Richland Counties, MT; and McKenzie County, ND. Segment 2 spans eastern central Montana, including Treasure, Rosebud and Custer Counties, MT. Given the uniqueness of the economy of Yellowstone County, it is the only county included in Segment 3. Segment 4 includes Sweet Grass, Stillwater and Carbon Counties, MT. Segment 5, similar to Segment 3, only consists of Park County, MT. Again this is due to the unique economy of this county. The region shares a unique history and is culturally important; while each of the counties is distinct in its own way, together, they are facing many of the same opportunities and uncertainties moving into the future.

Today, counties in the River Corridor are experiencing an increase in the diversity of economic sectors driving local economies. Natural resource extraction continues to drive the economy of many communities within the River Corridor. The Bakken Oil Field is having notable effects on communities in Segment 1, coal mines continue to be an important source of employment for residents of the counties in Segment 2, and coal and metal mines are still fully operational in Segment 4 (Southeastern Montana Development Corporation, 2010; Bohnenkamp and others, 2011; Montana Department of Labor and Industry, 2012b). In addition to extractive natural resource industries, counties along the corridor are well known for abundant recreation opportunities. Yellowstone National Park, Gallatin and Custer National Forests, several blue ribbon streams and rivers, as well as over a hundred lakes and reservoirs make the counties along the River Corridor a heavily-used area for recreation. These recreation-based industries are viewed as important economic drivers for several counties within the corridor, especially Park County (Segment 5) (Northern Rocky Mountain Economic Development District, 2012). In the future, the continued development of extractive industries may conflict with the emerging tourism and recreation industries.

This report details agricultural, exurban and urban development and transportation data for each of the five segments. Each section of this report provides historic and current data for each River Corridor segment. In some cases, data are provided at the county level to highlight important similarities or differences between the counties within a single segment, while in other cases, aggregate data are provided at the segment level.

Agriculture

Segment 1

Historical Introduction

Beginning in the early 1900s, the Enlarged Homestead Act drove an increase in population and dryland agriculture in Eastern Montana (Barber, 2012). The Enlarged Homestead Act allowed 320-acre claims of land, which made farming west of the 100th meridian possible. In addition to the Enlarged Homestead Act, the arrival of the railroad in Eastern Montana also led to an increase in population (Barber, 2012).

The development of a large-scale irrigation project, known as the Lower Yellowstone Project, completed in 1909, allowed for the irrigation of approximately 54,000 acres of land along the Yellowstone River. The project created a diversion dam near the town of Glendive, located in Dawson County, MT. In 1925, the Yellowstone irrigation project, along with rail transportation, allowed for the creation of the Midland Sugar Company, a sugar beet processing plant, in Sidney, Montana (Dawson County) (Sidney Sugars Inc.). The Midland Sugar Company remains in operation today as Sidney Sugars Incorporated and has grown from contracting just over 8,000 acres in 1925 to over 45,000 today.

Today, the Lower Yellowstone Project continues to play an important role in the agricultural production of Eastern Montana. Currently, the project consists of a pumping plant, the Main Canal, 225 miles of lateral ditches and 118 miles of drains (Bureau of Reclamation, 2012). The irrigation project continues to support crops including small grains, alfalfa and other hay crops, pasture, silage, beans and sugar beets.

Agricultural Statistics

The agricultural data presented here are representative of county level statistics. The River Corridor Counties column demonstrates the representative statistic for all the 12 counties in which Yellowstone River is located. As the size of the counties varies, so does the length of the river stretch contained within those counties. For example, McKenzie County, North Dakota, is a large county but with only a short section of the Yellowstone River.

Between 1950 and 2012, the agricultural landscape in Segment 1 changed. All counties in the segment experienced a decrease in the number of farms, with as much as a 50% decrease in the number of farms in McKenzie and Richland Counties (Table 1 and Table 2). The amount of land in farms, however remained fairly constant in most counties, decreasing in some and increasing in other counties. This is likely attributed to the consolidation of land into fewer but larger farms. Irrigated acres in McKenzie County remained nearly constant between 1949 and 2012, while almost doubling in Richland and increasing 34% and 57 % in Dawson and Prairie counties respectfully. Counties in Segment 2 experienced a slightly lower increase in irrigated land while all other counties along the River Corridor saw a decrease in irrigated agricultural land from 1950 to 2012 (United States Department of Agriculture, 2012).

McKenzie, Richland and Dawson counties have a similar number of farms as well as a comparable number of acres of land in farms, approximately 500 farms and 1 million acres as of 2012 (Table 2). The

average farm size is much larger in Prairie County (4,135 acres) than the other counties in Segment 1. In 2012, Richland County had the largest number of irrigated farms, 154 irrigated out of a total of 544 with the largest number of irrigated acres in the Segment, 62,730 acres. In Richland County, acres under irrigation represent almost 5% of total land in farms. In Prairie County, about a quarter of the farms are irrigated (45 farms under irrigation compared to a total of 186), with slightly over 1% of land in farms under irrigation (see Table 2). In the River Corridor counties as a whole, almost 3% of the land in farms is irrigated. Despite the Lower Yellowstone Project, the majority of farming in McKenzie County, ND and Dawson County, MT continues to be dryland farming. Additionally, McKenzie County, ND and Richland County, MT have the largest production of cattle and calves in the Segment, each producing over 62,000 head in 2012. The main crop produced in Segment 1 is wheat, with the largest acres in wheat production located in McKenzie County, ND and Richland County, MT, 203,519 and 199,851 acres, respectively. Prairie and Dawson Counties, MT each produce nearly 40,000 head of cattle and calves, with fewer acres under wheat production, 179,575 and 27,019 acres, respectively (United States Department of Agriculture, 2012).

Table 1. Agricultural Statistics for Counties in Segment 1, 1950

	McKenzie	Richland	Dawson	Prairie	River Corridor Counties
Number of Farms	1,234	1,057	758	257	8,593
Land in farms (acres)	1,193,921	1,218,545	1,404,965	661,564	15,261,807
Land in farms\ Average size of farm (acres)	968	1,153	1,854	2,574	1,776
Irrigated land (farms)	173	375	108	40	4,571
Irrigated land (acres)*	19,856	33,995	12,808	5,891	421, 408

Source: United States Dept. of Agriculture, 1950
*1949 values

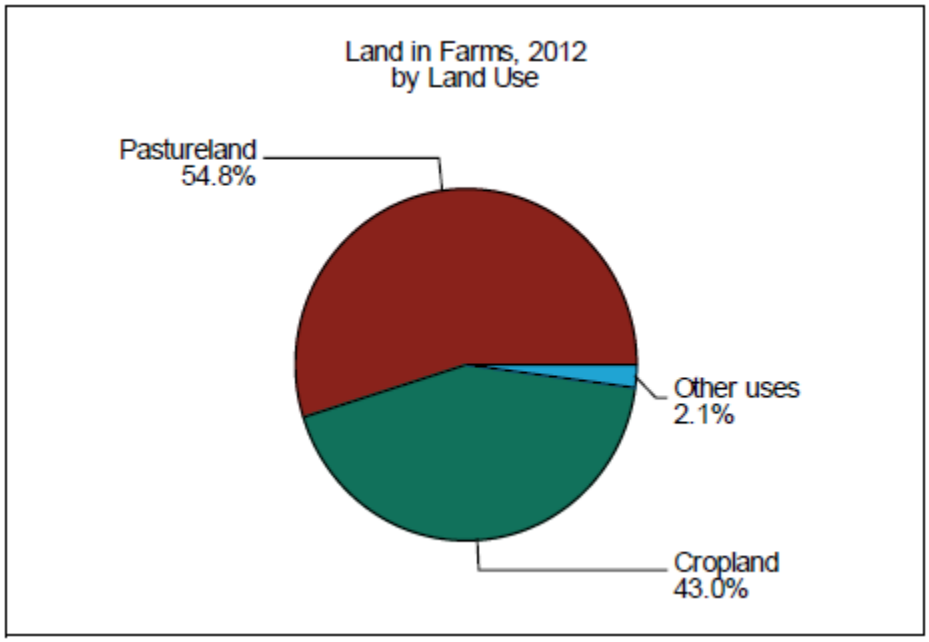
Table 2. Agricultural Statistics for Counties in Segment 1, 2012

	McKenzie	Richland	Dawson	Prairie	River Corridor Counties
Number of Farms	574	544	485	186	6,303
Land in farms (acres)	1,064,191	1,293,012	1,258,119	769,046	15,232,307
Land in farms\ Average size of farm (acres)	1,854	2,377	2,594	4,135	2,416
Irrigated land (farms)	49	154	74	45	2,326
Irrigated land (acres)	19,913	62,730	17,151	9,240	439,122

Source: United States Dept. of Agriculture, 2012

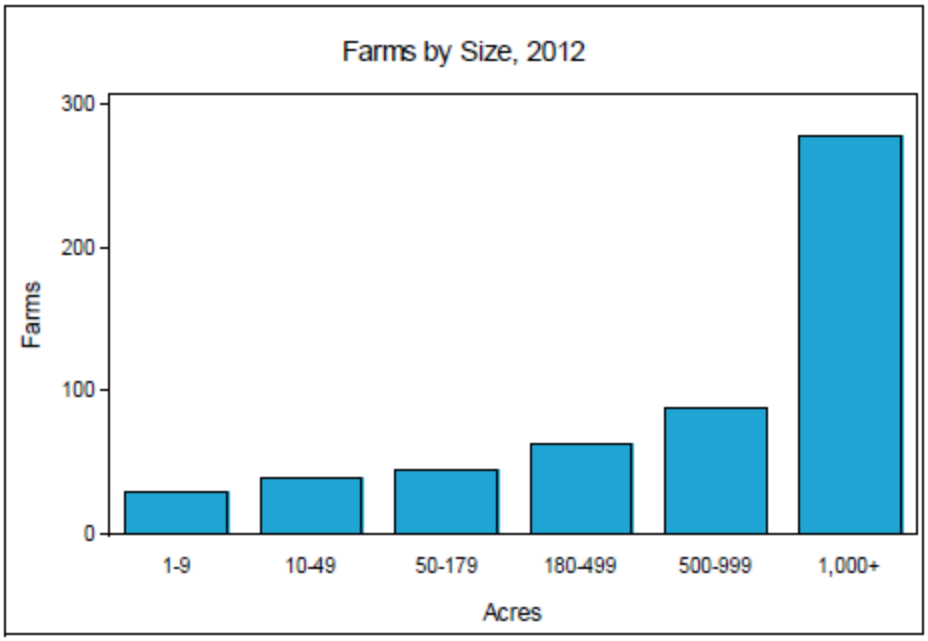
Across all counties in Segment 1, the majority of the farms are larger than 1,000 acres (Figures 2, 4, 6 and 8). Further, more than half of the land in farms within the four – county areas is used for pastureland with an average of 1/3 used as cropland (Figures 1,3,5, and 7) (United States Department of Agriculture, 2012). Pastureland is defined by the agricultural census as grazable land that does not qualify as woodland pasture or cropland pasture. Pastureland may be irrigated or dry land. In some areas, it can be a high quality pasture that could not be cropped without improvements. In other areas, it is barely able to be grazed and is only marginally better than wasteland.

Figure 1: Richland County Land in Farms by Land Use, 2012



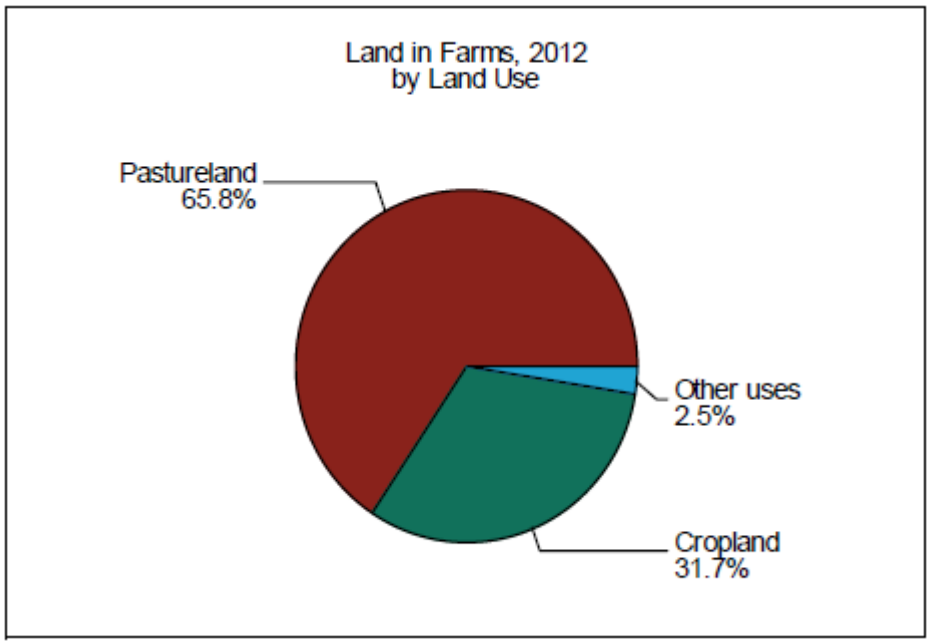
Source: United States Dept. of Agriculture, 2012

Figure 2: Richland County Farms by Size, 2012



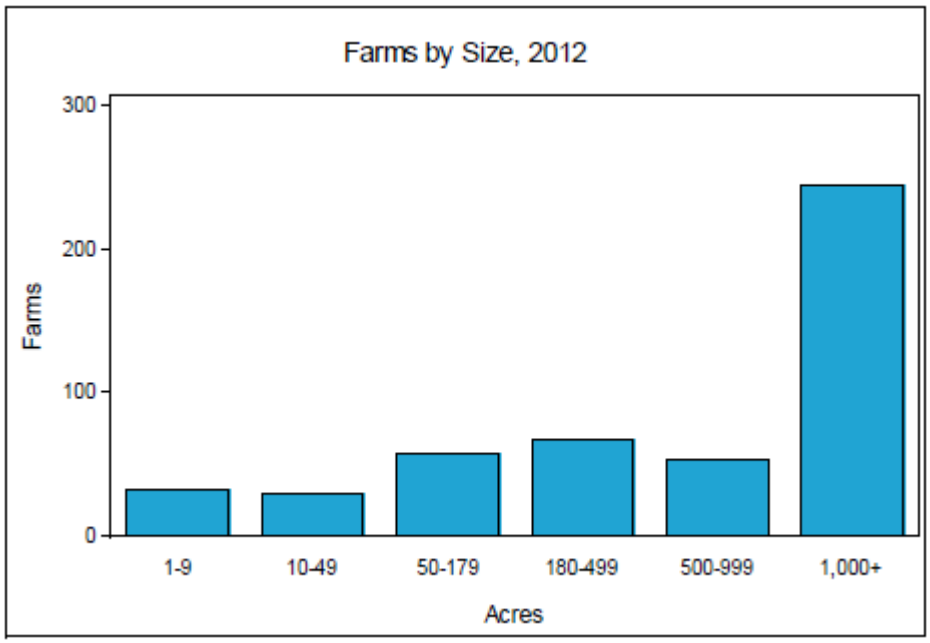
Source: United States Dept. of Agriculture, 2012

Figure 3: Dawson County Land in Farms by Land Use, 2012



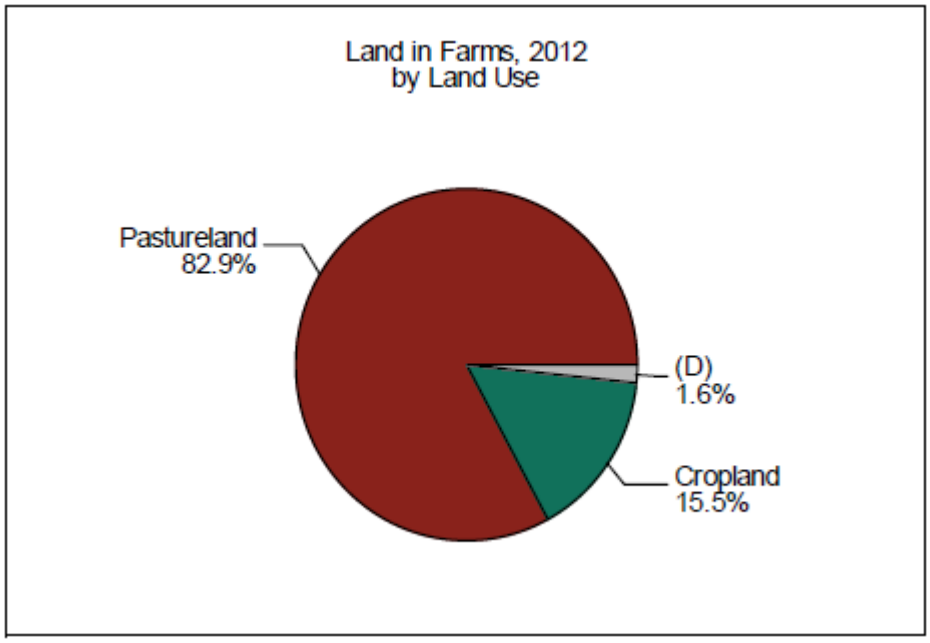
Source: United States Dept. of Agriculture, 2012

Figure 4: Dawson County Farms by Size, 2012



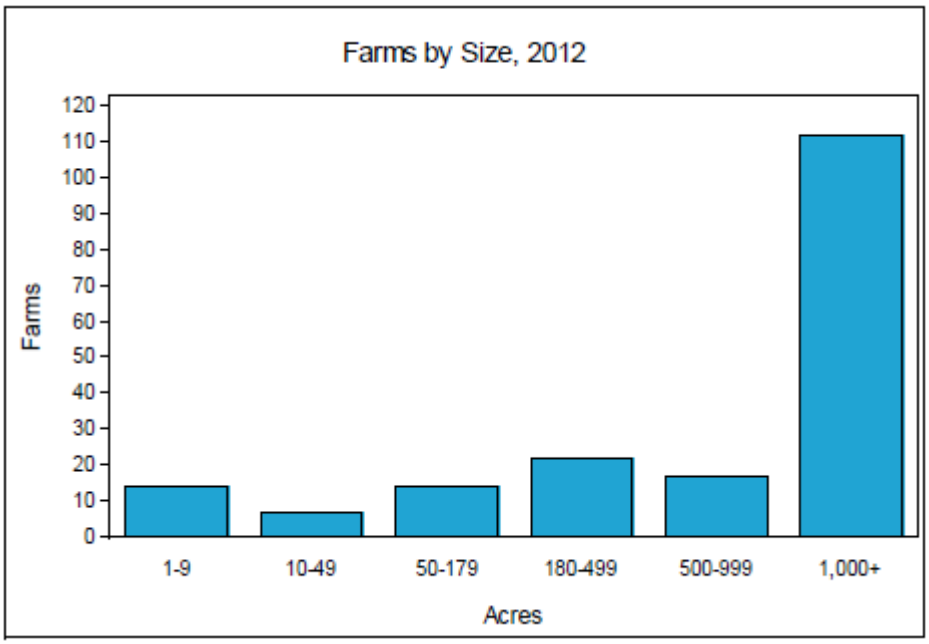
Source: United States Dept. of Agriculture, 2012

Figure 5: Prairie County Land in Farms by Land Use, 2012



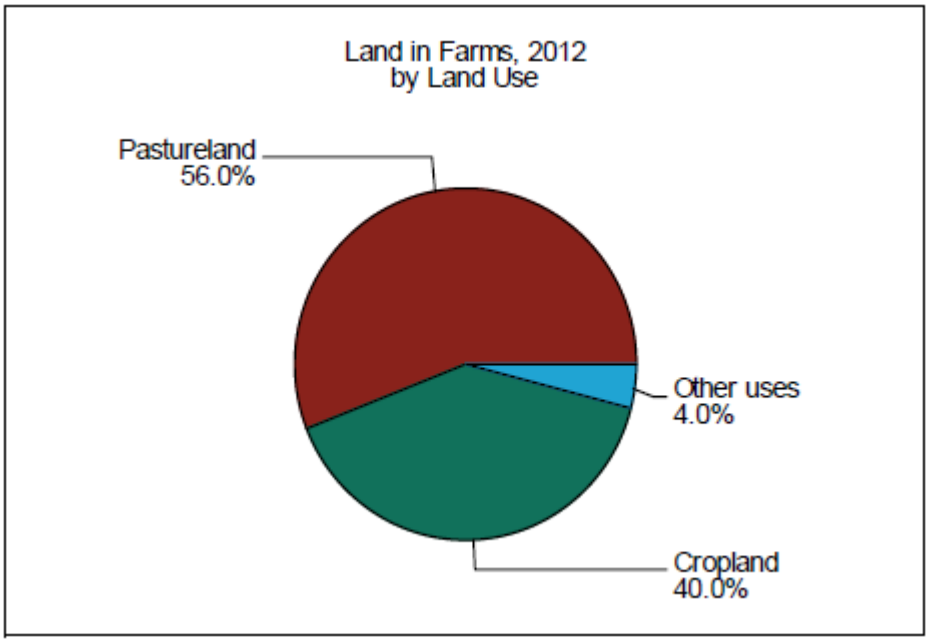
Source: United States Dept. of Agriculture, 2012

Figure 6: Prairie County Farms by Size, 2012



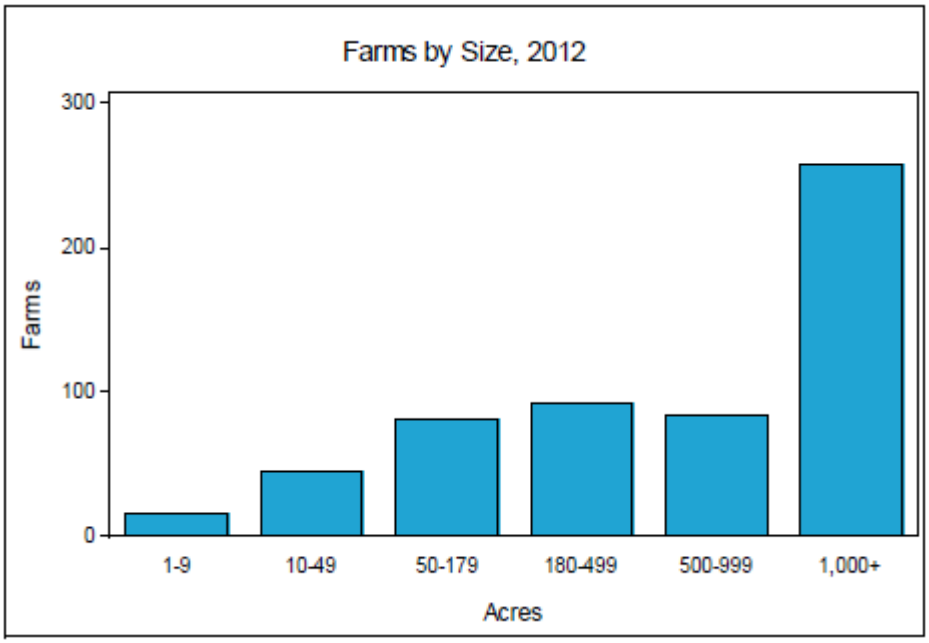
Source: United States Dept. of Agriculture, 2012

Figure 7: McKenzie County Land in Farms by Land Use, 2012



Source: United States Dept. of Agriculture, 2012

Figure 8: McKenzie County Farms by Size, 2012



Source: United States Dept. of Agriculture, 2012

Market Value of Products and Capital/Farm Equity

The market value of products sold represents the gross market value before taxes and production expenses of all agricultural products sold or removed from the farm in 2012 (United States Department of Agriculture, 2012). The value of products from the 2012 harvest cannot be inferred from the market value of products sold because the values of products harvested in previous years, held in storage and sold in 2012 are also included into this market value. "Market value of agricultural products sold does not include payments received for participation in other federal farm programs. Also, it does not include income from farm-related sources such as customwork and other agricultural services, or income from nonfarm sources" (United States Department of Agriculture, 2012).

McKenzie County, ND and Richland County, MT report some of the largest market values of products sold in Segment 1 as well as the River Corridor (Table 3). Yellowstone County in Segment 3 is the only county that shows a higher total value for agricultural products sold in 2012. The majority of the value is found in crops in McKenzie, Richland and Dawson Counties. Prairie County has the lowest total value of agricultural products sold with nearly an even division between the value of crops and the value of livestock. This ratio more closely represents the River Corridor, where the majority of the total value of agricultural products sold comes from livestock, poultry and their products (United States Department of Agriculture, 2012).

Table 3. Market Value of Products Sold in Segment 1, 2012 ($1,000)

	McKenzie	Richland	Dawson	Prairie	River Corridor Counties
Total value of agricultural products sold	114,448	139,166	80,365	31,194	1,035,226
value of crops including nursery and greenhouse	78,937	93,696	55,488	14,947	429,403
value of livestock, poultry and their products	35,510	45,470	24,877	16,247	605,823

Source: United States Dept. of Agriculture, 2012

Prairie County has the largest average per farm market value of land and buildings in Segment 1 (Table 4). This value is more similar to that of the counties in Segment 2 and Sweet Grass County in Segment 4. The estimated market value of all machinery and equipment is highest is Richland County, MT and McKenzie County, ND and lowest in Prairie County, MT (United States Department of Agriculture, 2012).

Table 4. Market Value of Farm Capital in Segment 1, 2012

	McKenzie	Richland	Dawson	Prairie
Market value of land and buildings \ Average per farm ($)	1,366,372	1,418,388	1,163,130	2,331,347
Estimated market value of all machinery and equipment \ Average per farm ($)	246,225	263,979	171,186	147,819

Source: United States Dept. of Agriculture, 2012

Government Payments

Government payments consist of "direct payments as defined by the 2008 Farm Bill; payments from Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Farmable Wetlands Program (FWP), and Conservation Reserve Enhancement Program (CREP); loan deficiency payments; disaster payments; other conservation programs; and all other federal farm programs under which payments were made directly to farm operators" (United States Department of Agriculture, 2012). Government payments do not include Commodity Credit Corporation proceeds, the amount from State and local government agricultural program payments, and federal crop insurance payments (United States Department of Agriculture, 2012).

Richland and Dawson Counties, MT receive the highest government payments of the counties in Segment 1, with payments totaling more than $6 million and averaging slightly over $15 thousand per farm in Richland County and over $18 thousand per farm in Dawson County (Table 5). When compared to other counties in the River Corridor, McKenzie, Richland and Dawson Counties each receive the largest total government payments. Prairie County receives the smallest total government payment

while McKenzie County receives the smallest government payment amount per farm in Segment 1 (United States Department of Agriculture, 2012).

Table 5. Government Payments Segment 1, 2012

	McKenzie	Richland	Dawson	Prairie	River Corridor Counties
Total ($)	4,116,000	6,117,000	6,390,000	1,749,000	32,789,000
Average per farm ($)	10,238	15,330	18,576	13,354	

Source: United States Dept. of Agriculture, 2012

Tax Revenue

The Montana Legislature has identified 14 different classes of property for property taxes, and agricultural land is one of the 14. Each class of property is valued differently. For example, agricultural land is valued differently than railroads. However, properties within each class, such as grazing land and tillable irrigated land, are valued the same. Agricultural land class is reappraised by the state every 6 years and is based on the productivity of the land. The last valuation cycle occurred in 2008. The productivity value is multiplied by the tax rate (2.63 percent for 2012) to determine the taxable value. Non-productive mining claims and non-qualified agricultural land are also included in the agricultural land class. Non-qualified agricultural land is defined as parcels of land between 20 to 160 acres, not used primarily for agricultural purposes. In 2012, these parcels were taxed at 18.41 percent. (Montana Department of Revenue, 2012).

Estimated tax revenues for each county in Segment 1 from agricultural land in 2012 are reported in Table 6. These values are derived from a calculation of taxable value and the millage rate and therefore are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue. Subtracting the average millage rate associated with the state revenue (0.101) from 0.54883 results in a millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Compared to the estimated total revenue for all counties in the River Corridor (excluding McKenzie County), the counties in Segment 1 receive a higher percentage of revenue from agricultural lands (Table 6). Prairie County in particular derives nearly 30% of total tax revenue from agriculture. Irrigated land accounts for 14% of revenue in Prairie County, 9% in Richland County and 12% in Dawson County. Over 70% of property tax revenue comes from sources other than agricultural land in Segment 1.

Table 6. Agricultural Property Tax Revenue for Counties in Segment 1, 2012 (in 2012 $)

	Richland		Dawson		Prairie		River Corridor Counties (MT only)*	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Agricultural Land	1,764,575	13%	1,675,072	19%	539,466	28%	12,607,835	5%
Tillable Irrigated	287,766	2%	108,747	1%	86,036	5%	2,247,812	1%
Tillable Non Irrigated	982,786	7%	1,007,498	11%	171,604	9%	3,363,055	1%
Grazing	401,416	3%	496,441	6%	257,178	13%	5,319,837	2%
Wild Hay	41,832	> 1%	36,683	> 1%	22,456	1%	616,523	> 1%
Non-Qualified Ag Land	50,979	> 1%	25,703	> 1%	2,192	> 1%	1,060,766	> 1%
Other	11,960,733	87%	7,228,296	81%	1,367,495	72%	259,597,393	95%
Total Property Revenue	13,725,307		8,903,368		1,906,961		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

*Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. (Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government). The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "Multipliers" (or "response coefficients") capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes, 1998). To determine the secondary effects, a combination of input, output and employment multipliers are calculated and will vary depending on the defined local area. The sums of the direct and secondary effects describe the total economic contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is defined as a functional economic area that includes primary labor markets and economic flows. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis all four counties in Segment 1, McKenzie County, ND and Richland, Dawson and Prairie Counties, MT, were included as the region. The year 2012 IMPLAN v3 county-level data profiles for these four counties were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.

- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of agriculture in the four-county area were estimated in IMPLAN using total output values for 19 agriculture-related sectors including among others grain farming, sugarcane and sugar beet farming, cattle ranching and dairy cattle and commercial logging. Economic contribution analyses address the importance or contribution of an existing industry to a local economy.

Table 7 summarizes the results of the contribution analysis for the four-county area. All results are presented in 2012 dollars. In 2012, agriculture in Segment 1 directly accounts for an estimated 2,800 jobs, $84.8 million in labor income, and $126.8 million in value added to the local economy. Secondary or multiplier effects of agriculture account for an additional estimated 600 jobs, $28.7 million in labor income, and $62.8 million in value added to the local economy. Accounting for both direct and secondary effects, agriculture in Segment 1 contributes an estimated total of 3,500 jobs, $113.5 million in labor income, and $189.6 million in value added to the local economy of the counties in Segment 1. Though agriculture contributes the greatest number of jobs in Segment 2, labor income and value added contributed by agriculture are highest in Segment 1.

Table 7. Contribution of Agriculture, Segment 1

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	2,800	$84.8	$126.8
Secondary Effects	600	$28.7	$62.8
Total Effect*	3,500	$113.5	$189.6

*Please note due to rounding, Total Effect reported may not be equal to the sum of Direct and Secondary Effects, as reported.

Segment 2

Historical Introduction

Similar to Segment 1, agriculture in Segment 2 has historically been a mix of both dryland and irrigated crops. Like the counties in Segment 1, the Homestead Act and Desert Land Act brought homesteaders into the three counties of Segment 2 (State Engineers Office, 1948). In 1886, the Miles City Irrigation and Ditch Company was formed. The Miles City Irrigation and Ditch Company, now the Tongue and Yellowstone River Irrigation District, remains in operation with 100 miles of canals pumping water to 9,400 acres and serving approximately 300 families, as of 2005 (Dickson, 2005). Crops grown within the irrigation district include alfalfa, corn and barley, vegetables, and orchard fruit (Dickson, 2005). In addition to the Tongue and Yellowstone Irrigation District, Cartersville Irrigation District was constructed in the early 1900s. The dam is located in Rosebud County and serves an area of about 12,000 acres (Tootell, 1932).

In addition to crops, cattle and sheep ranching has historically been a significant agricultural activity amongst the counties in Segment 2. Again the Enlarged Homestead Act, coupled with Eastern Montana's vast prairies, brought cattle ranchers to the area (State of Montana, 2014). Miles City was a part of the brief period (1880-1890) when thousands of cattle were brought in to stock the ranges created with the killing off of the buffalo. After a disastrous winter in 1886-1887 the open range rapidly disappeared and a more complex range of ranching and farming operations replaced open range ranching." Today, agriculture continues to be an important economic driver in this segment, and Eastern Montana. Both dryland and irrigation farming practices continue to be common practices in these counties. Additionally, cattle operations continue to be a driver of the economy in South Eastern Montana; both Custer and Rosebud Counties are in the top 10 counties for producing cattle and calves in the state of Montana, as of 2007 (United States Department of Agriculture, 2007).

Current Agricultural Statistics

The agricultural data presented here are representative of county level statistics. The River Corridor Counties column demonstrates the representative statistic for all the 12 counties in which Yellowstone River is located. As the size of the counties varies, so does the length of the river stretch contained within those counties. For example, Custer is a larger county compared to Treasure although the river stretch within the two counties is more similar to one another.

Between 1950 and 2012, the number of farms in Segment 2 decreased in each county (Tables 8 and 9). Counties in Segment 2 lost between 16-33% of the total number of farms during this time period. Land in farms decreased slightly in Custer County, but increased in Rosebud and Treasure Counties. While Treasure County saw a 33% decrease in the number of farms, it also experienced a 28% increase in the acreage of land in farms. It is likely that, similar to Segment 1, smaller farms were consolidated into larger farms, resulting in the increase in farmland acreage but decrease in total number of farms. Between 1949 and 2012, the number of irrigated acres decreased Rosebud County, increased slightly in Custer, while nearly doubling in Treasure County. (United States Department of Agriculture, 2012).

In both, 1950 and 2012, Custer and Rosebud Counties are comparable in the number of farms, although Rosebud has significantly more land in farms in both years (Table 9). In 2012, Rosebud County had the lowest acreage of irrigated land, 17,485 acres; this is comparable to Dawson County, MT in Segment 1

(17,151 acres). In 2012, irrigated agriculture accounts for 1.4 % of agricultural land use in Custer County, and about 3.5% in Rosebud and Treasure Counties (Table 9). While forage is the highest produced commodity in Custer County, Rosebud and Treasure Counties primarily grow wheat, as of 2012 (United States Department of Agriculture, 2012). Cattle and calves production are present within each county with 112 thousand head in Custer County, 95 thousand in Rosebud County and 28 thousand in Treasure County, according to the 2012 Agricultural Census.

Table 8. Agricultural Statistics for Segment 2, 1950

	Custer	Rosebud	Treasure	River Corridor Counties
Number of Farms	506	550	163	8,593
Land in farms (acres)	2,412,808	3,055,710	483,326	15,261,807
Land in farms\ Average size of farm (acres)	4,768	5,556	2,965	1,776
Irrigated land (farms)	254	173	519	4,571
Irrigated land (acres)*	25,541	20,556	11,405	421,408

Source: United States Dept. of Agriculture, 1950
*1949 values

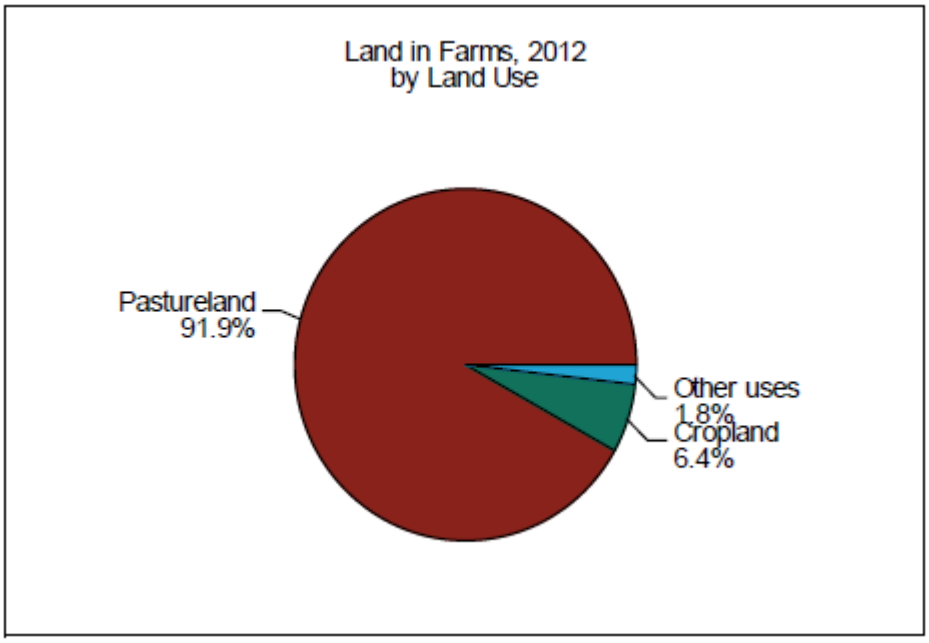
Table 9. Agricultural Statistics for Segment 2, 2012

	Custer	Rosebud	Treasure	River Corridor Counties
Number of Farms	423	437	109	6,303
Land in farms (acres)	2,189,930	3,141,524	617,635	15,232,307
Land in farms\ Average size of farm (acres)	5,177	7,189	5,666	2,416
Irrigated land (farms)	175	99	59	2,326
Irrigated land (acres)	30,315	17,485	21,907	439,122

Source: United States Dept. of Agriculture, 2012

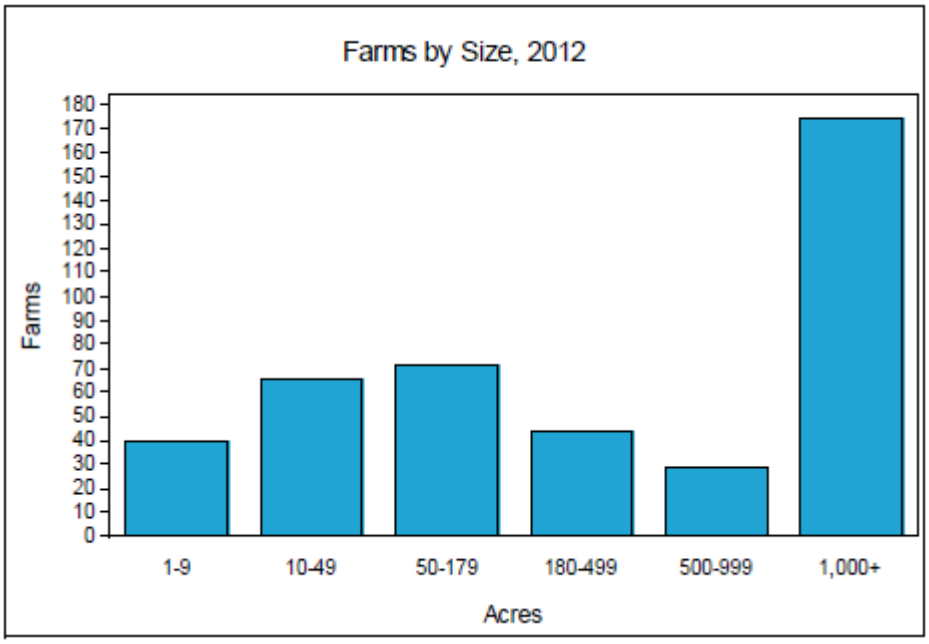
In Segment 2, nearly 90% of all land in farms was used for pastureland, in 2012 (Figures 9, 11, 13). Of the land in farms in Rosebud County, 5.4% is classified as woodland. Pastureland is defined by the agricultural census as grazable land that does not qualify as woodland pasture or cropland pasture. Pastureland may be irrigated or dry land. In some areas, it can be a high quality pasture that could not be cropped without improvements. In other areas, it is barely able to be grazed and is only marginally better than wasteland. The Census of Argiculture defines woodland as planted woodlots or timer tracts, cutover and deforested land with young growth which has or will have value for wood products or woodland pastured. This category includes natural or woodland pasrture. Only two other counties in the River Corridor have land classified as woodland, Sweet Grass County, MT with 5.6% of land in farms classified as woodland and Park County, MT with 14.3% of land in farms classified as woodland. The majority of farms in the three counties of Segment 2 are 1000 acres or larger (Figures 10, 12, 14). This is similar to the distribution of farm size seen in Segment 1 (United States Department of Agriculture, 2012).

Figure 9. Custer County Land in Farms by Land Use, 2012



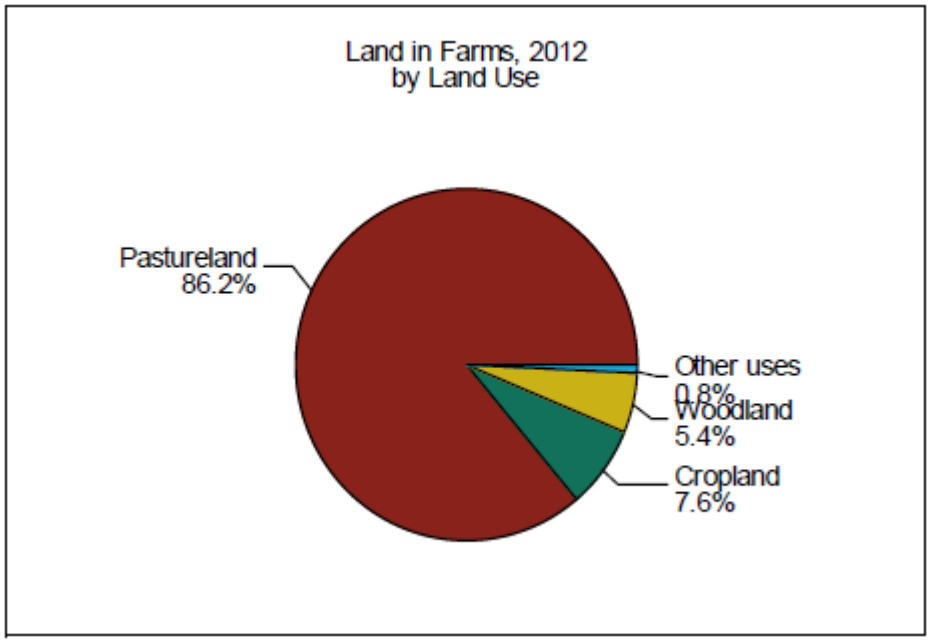
Source: United States Dept. of Agriculture, 2012

Figure 10. Custer County Farms by Size, 2012



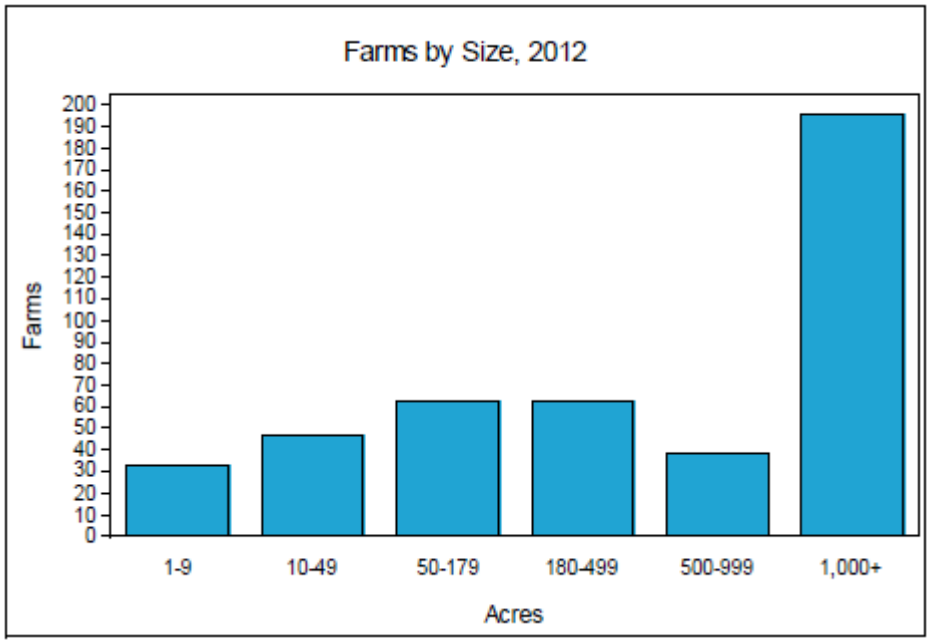
Source: United States Dept. of Agriculture, 2012

Figure 11. Rosebud County Land in Farms by Land Use, 2012



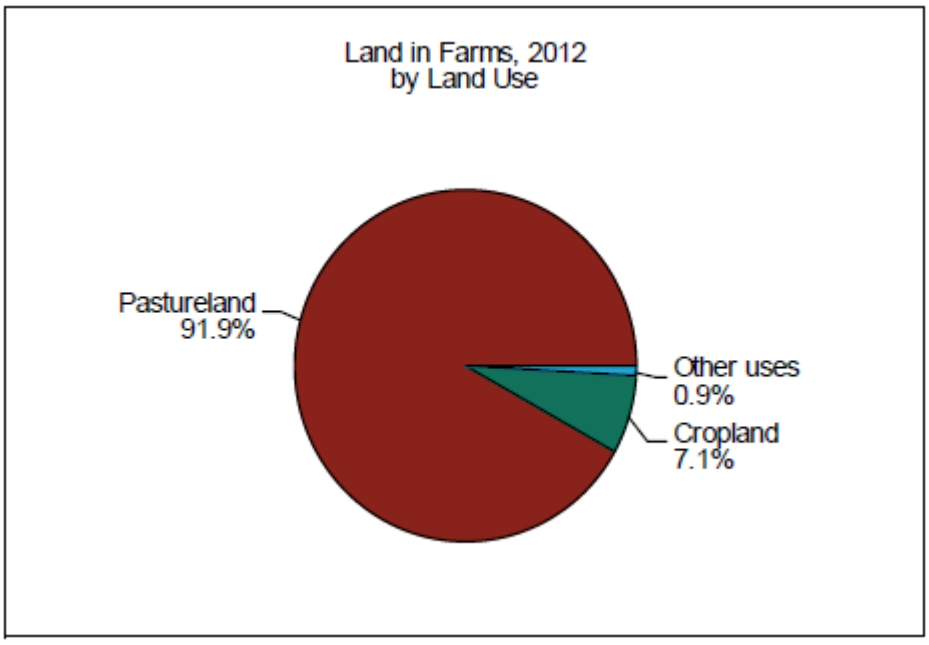
Source: United States Dept. of Agriculture, 2012

Figure 12. Rosebud County Farms by Size, 2012



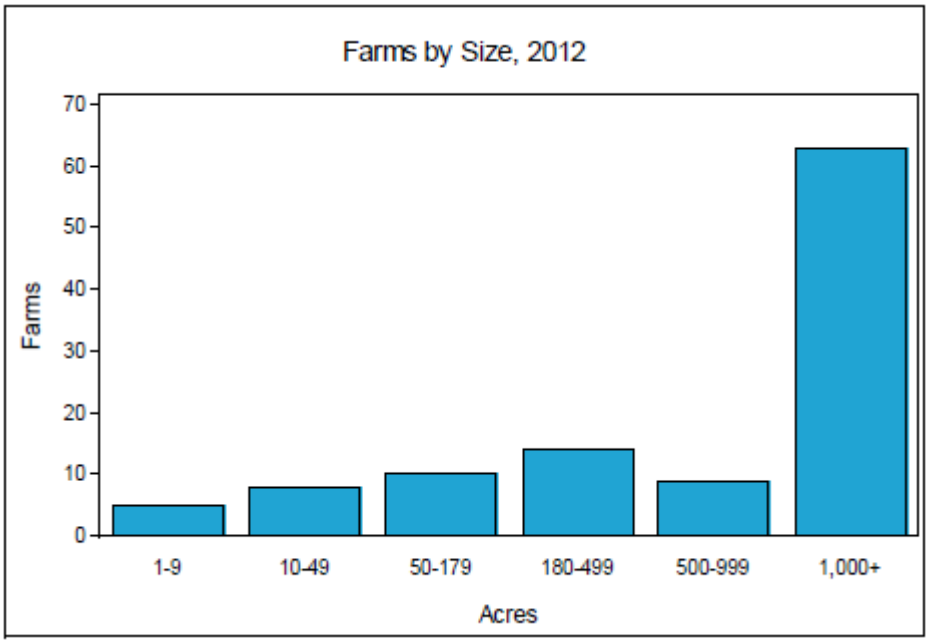
Source: United States Dept. of Agriculture, 2012

Figure 13. Treasure County Land in Farms by Land Use, 2012



Source: United States Dept. of Agriculture, 2012

Figure 14. Treasure County Farms by Size, 2012



Source: United States Dept. of Agriculture, 2012

Market Value of Farm Products and Capital/Farm Equity

The market value of products sold represents the gross market value before taxes and production expenses of all agricultural products sold or removed from the farm in 2012 (United States Department of Agriculture, 2012). The market value of products sold also does not infer that the value of 2012 harvest; the values of products harvested in a previous year, held in storage and sold in 2012, are also included into this market value. "Market value of agricultural products sold does not include payments received for participation in other federal farm programs. Also, it does not include income from farm-related sources such as customwork and other agricultural services, or income from nonfarm sources." (United States Department of Agriculture, 2012).

A large majority of the total value of agricultural products sold in Custer and Rosebud Counties is derived from livestock, poultry and their products (Table 10). The total value of agricultural products is more evenly distributed between crops and livestock in Treasure County (United States Department of Agriculture, 2012).

Table 10. Market Value of Products Sold in Segment 2, 2012 ($1,000)

	Custer	Rosebud	Treasure	River Corridor Counties
Total value of ag products sold	109,201	91,739	46,565	1,035,226
value of crops including nursery and greenhouse	21,165	25,759	22,387	429,403
value of livestock, poultry and their products	88,036	65,981	24,178	605,823

Source: United States Dept. of Agriculture, 2012

The market value of land and buildings is similar in Rosebud County and Treasure County, with a per farm average of nearly $3 million. This value is most similar to that of Park County, MT ($3,502,195) and Sweet Grass County, MT ($ 2,771,481). These five counties show the largest average per farm market value of land and buildings across all River Corridor counties. In Segment 2, the average per farm estimated market value of all machinery and equipment in Treasure County is more than double that of Custer or Rosebud Counties. Within the River Corridor, the highest average per farm market value of machinery and equipment is in Treasure County (Table 11) (United States Department of Agriculture, 2012).

Table 11. Market Value of Farm Capital in Segment 2, 2012

	Custer	Rosebud	Treasure
Market value of land and buildings \ Average per farm ($)	2,082,524	2,970,357	2,847,427
Estimated market value of all machinery and equipment \ Average per farm ($)	132,859	141,041	329,849

Source: United States Dept. of Agriculture, 2012

Government Payments

Government payments consist of "direct payments as defined by the 2008 Farm Bill; payments from Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Farmable Wetlands Program (FWP), and Conservation Reserve Enhancement Program (CREP); loan deficiency payments; disaster payments; other conservation programs; and all other federal farm programs under which payments were made directly to farm operators" (United States Department of Agriculture, 2012). Government payments do not include Commodity Credit Corporation proceeds, amount from State and local government agricultural program payments, and federal crop insurance payments (United States Department of Agriculture, 2012).

Custer and Rosebud Counties each received close to $2 million in total government payments, in 2012. Treasure County received only a quarter of that amount, $548 thousand. On an average per farm basis, the payment varied from $9 thousand to almost $15 thousand in the three counties (see Table 12). These average per farm payments are similar to those seen in Segment 1 (United States Department of Agriculture, 2012).

Table 12. Government Payments, 2012

	Custer	Rosebud	Treasure	River Corridor Counties
Total ($)	1,847,000	2,043,000	548,000	32,789,000
Average per farm ($)	10,738	14,806	8,990	

Source: United States Dept. of Agriculture, 2012

Tax Revenue

Montana legislature determined 14 different classes of property for property taxes, and agricultural land is one of the 14. Each class of property is valued differently. For example, agricultural land is valued differently than railroads. However, properties within each class, such as grazing land and tillable irrigated land are valued the same. Agricultural land class is reappraised by the state every 6 years based on productivity of the land. The last valuation cycle took place in 2008. The phased-in productivity value is multiplied by the tax rate at 2.63 percent for 2012 to determine the taxable value. The Montana Department of Revenue reports that non-productive mining claims and non-qualified agricultural land are also included in the agricultural land class. Non-qualified agricultural land is defined as parcels of land between 20 to 160 acres, not used primarily for agricultural purposes. These parcels are taxed at 18.41 percent in 2012 (Montana Department of Revenue, 2012).

Estimated 2012 tax revenues for each county in Segment 2 from agricultural land class are reported in Table 13. These values are derived from a calculation of taxable value and the millage rate and therefore are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue.

Subtracting the average millage rate associated with the state revenue (0.101), from 0.54883 results in a millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Although Rosebud County has the largest number of farms, the greatest acreage of land in farms, and receives the highest number of total and per farm government payments in Segment 2, only 3% of its total county revenue comes from agriculture. Custer and Treasure Counties both receive about 20% of tax revenue from agricultural property taxes, a large portion of which comes from grazing (Table 13). This is similar to the tax revenue derived from agricultural property seen in Dawson and Prairie Counties located in Segment 1. Aside from these four counties, the remaining counties within the River corridor received less revenue from agricultural property taxes as compared to their total property tax revenue (Montana Department of Revenue, 2012).

Table 13. Agricultural Property Tax Revenue in Segment 2, 2012 (In 2012 $)

	Custer		Rosebud		Treasure		River Corridor Counties*	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Agricultural Land	1,419,691	19%	1,608,416	3%	460,133	22%	12,607,835	5%
Tillable Irrigated	186,245	3%	191,620	> 1%	153,231	7%	2,247,812	1%
Tillable Non Irrigated	167,518	2%	306,378	1%	27,570	1%	3,363,055	1%
Grazing	909,354	12%	974,687	2%	246,225	12%	5,319,837	2%
Wild Hay	64,295	1%	77,166	> 1%	26,515	1%	616,523	> 1%
Non-Qualified Ag Land	92,279	1%	58,566	> 1%	6,593	> 1%	1,060,766	> 1%
Other	5,886,228	81%	44,994,714	97%	1,592,915	78%	259,597,393	95%
Total Property Revenue	7,305,919		46,603,130		2,053,048		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

*Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "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 contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is typically well-defined. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis all three counties in Segment 2, Custer, Rosebud and Treasure Counties, MT, were included as the region. The year 2012 IMPLAN v3 county-level data profiles for these three counties were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of agriculture in the three-county area were estimated in IMPLAN using total output values for 19 agriculture-related sectors including grain farming, tree nut and fruit farming,

animal production and commercial logging. Economic contribution analyses address the importance or contribution of an existing industry to a local economy.

Table 14 summarizes the results of the contribution analysis for the three-county area. All results are presented in 2012 dollars. Labor income and value added are presented in 2012 dollars. In 2012, agriculture in Segment 2 directly accounts for an estimated 4,200 jobs, $74.1 million in labor income, and $97.0 million in value added to the local economy. Secondary or multiplier effects of agriculture account for an additional estimated 500 jobs, $17.6 million in labor income, and $38.4 million in value added to the local economy. Accounting for both direct and secondary effects, agriculture in Segment 2 contributes an estimated total of 4,800 jobs, $91.6 million in labor income, and $135.4 million in value added to the local economy of the counties in Segment 2. Segment 2 has the highest number of jobs contributed by agriculture to the local economy in the River Corridor.

Table 14. Contribution of Agriculture, Segment 2

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	4,200	$74.1	$97.0
Secondary Effects	500	$17.6	$38.4
Total Effect*	4,800	$91.6	$135.4

*Please note due to rounding, Total Effect reported may not equal than the sum of Direct and Secondary Effects, as reported.

Segment 3

Historical Overview

Outside of Billings, MT is another large irrigation project, the Huntley Project. The Huntley Project was not created as a result of growth, but rather prompted agricultural growth in this area (Dick, 1996). Land was originally purchased by the United States Government from the Crow Indian Reservation and following the acquisition and development of the Huntley Project, was opened to homesteading. Following its establishment in 1907, land served by the Huntley Project was opened and 585 farm units were available to homesteaders. In total, the project serves three irrigation districts, covering 27,000 acres of land, and consists of a 32 mile main canal (Dick, 1996).

Billings, MT is home to a sugar beet refinery, owned by the Western Sugar Cooperative, which processes beets grown in south central Montana (The Western Sugar Cooperative, 2006). In addition to the sugar beet refinery, two livestock auctions are located in Billings, Public Auction Yard and the Billings Live Stock Commission (BLS). Founded in 1934, BLS is one of the oldest continuous livestock operations and holds both cattle and horse auctions today (Billings Live Stock Commission, 2014). Yellowstone County remains an important producer and distribution point for agricultural products today.

Current Agricultural Statistics

The agricultural data presented here are representative of county level statistics. The River Corridor Counties column demonstrates the representative statistic for all the 12 counties in which Yellowstone River is located. As the size of the counties varies, so does the length of the river stretch contained within those counties. Yellowstone County contains the longest stretch of the river.

From 1950 to 2012, Yellowstone County experienced changes in the county's agricultural sector. The number of farms decreased from 1,475 to 1,330 while the land in farms increased from 1,581,320 to 1,668,346. The number of irrigated farms decreased by about 45%, while acres in irrigated land decreased 17% (see Tables 15 and 16). Yellowstone County produced the largest number of cattle and calves in 2012, as compared to other counties in the River Corridor. The top producing crop in the county is wheat, covering nearly 100 thousand acres of production (United States Department of Agriculture, 2012).

Table 15. Agricultural Statistics for Segment 3, 1950

	Yellowstone	River Corridor Counties
Number of Farms	1,475	8,593
Land in farms (acres)	1,581,320	15,261,807
Land in farms\ Average size of farm (acres)	1,072	1,776
Irrigated land (farms)	1,134	4,571
Irrigated land (acres)*	88,409	421,408

Source: United States Dept. of Agriculture, 1950
*1949 values

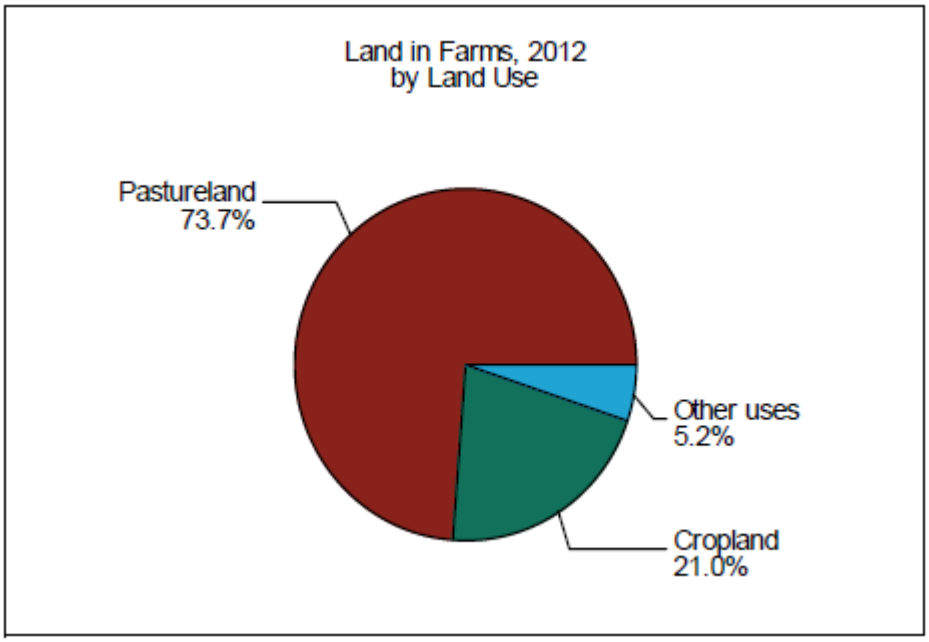
Table 16. Agricultural Statistics for Segment 3, 2012

	Yellowstone	River Corridor
Number of Farms	1,330	6,303
Land in farms (acres)	1,668,346	15,232,307
Land in farms\ Average size of farm (acres)	1,254	2,416
Irrigated land (farms)	636	2,326
Irrigated land (acres)	73,161	439,122

Source: United States Dept. of Agriculture, 2012

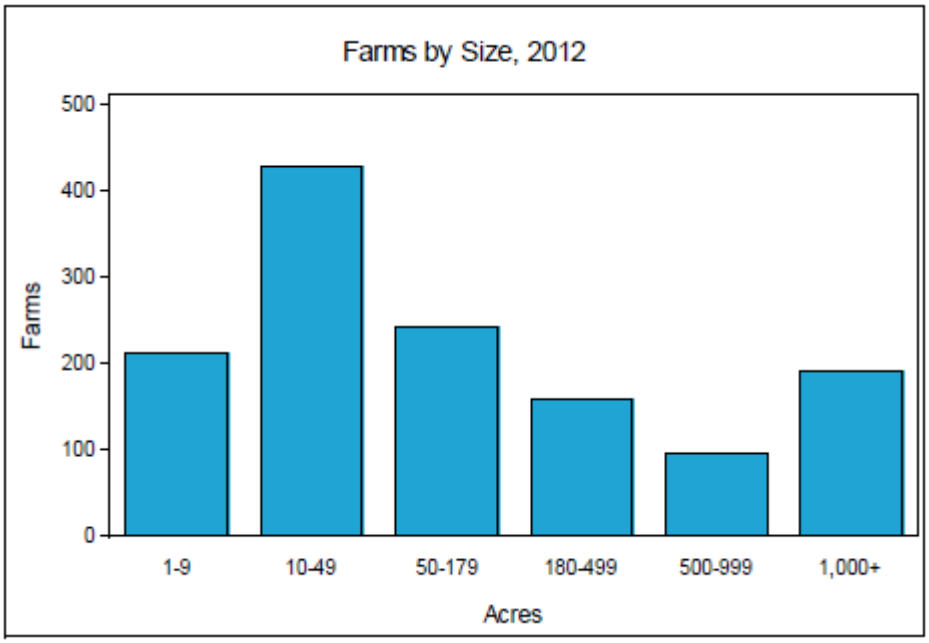
Pastureland accounts for close to 74% of land in farms within the county (see Figure 15). Unlike most counties in the River Corridor where the average farm size is 1,000 acres or greater, the majority of the farms in Yellowstone County are between 1-179 acres (Figure 16) (United States Department of Agriculture, 2012). Pastureland is defined by the agricultural census as grazable land that does not qualify as woodland pasture or cropland pasture. Pastureland may be irrigated or dry land. In some areas, it can be a high quality pasture that could not be cropped without improvements. In other areas, it is barely able to be grazed and is only marginally better than wasteland.

Figure 15. Yellowstone County Land in Farms by Land Use, 2012



Source: United States Dept. of Agriculture, 2012

Figure 16. Yellowstone County Farms by Size, 2012



Source: United States Dept. of Agriculture, 2012

Market Value of Farm Products and Capital/Farm Equity

The market value of products sold is a category that represents the gross market value before taxes and production expenses of all agricultural products sold or removed from the place in 2012 (Agricultural Census, 2012). The market value of products sold also does not infer the value of 2012 harvest. Values of products harvested in a previous year, held in storage and sold in 2012, are also included into this market value. "Market value of agricultural products sold does not include payments received for participation in other federal farm programs. Also, it does not include income from farm-related sources such as customwork and other agricultural services, or income from nonfarm sources" (United States Department of Agriculture, 2012). A higher percentage of the total value of agricultural products sold comes from livestock in Yellowstone County than in the rest of the River Corridor counties (Table 17). The average per farm market value of land and buildings in Yellowstone County is slightly less than $1 million (see Table 18) (United States Department of Agriculture, 2012).

Table 17. Market Value of Products Sold in Segment 3, 2012 ($1,000)

	Yellowstone	River Corridor
Total value of agricultural products sold	216,815	1,035,226
value of crops including nursery and greenhouse	60,667	429,403
value of livestock, poultry and their products	156,148	605,823

Source: United States Dept. of Agriculture, 2012

Table 18. Market Value of Farm Capital in Segment 3, 2012

	Yellowstone
Market value of land and buildings \ Average per farm ($)	957,953
Estimated market value of all machinery and equipment \ Average per farm ($)	95,176

Source: United States Dept. of Agriculture, 2012

Government Payments

Government payments consist of "direct payments as defined by the 2008 Farm Bill; payments from Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Farmable Wetlands Program (FWP), and Conservation Reserve Enhancement Program (CREP); loan deficiency payments; disaster payments; other conservation programs; and all other federal farm programs under which payments were made directly to farm operators" (Agricultural Census, 2012). Government payments do not include Commodity Credit Corporation proceeds, the amount from State and local government agricultural program payments, and federal crop insurance payments (United States Department of Agriculture, 2012).

Table 19 shows payments received by agricultural producers in Yellowstone County. Payments in Yellowstone County are similar to the median payment received by other counties in the River Corridor.

Table 19: Government Payments in Segment 3, 2012

	Yellowstone	River Corridor
Total ($)	3,843,000	32,789,000
Average per farm ($)	9,559	

Source: United States Dept. of Agriculture, 2012

Tax Revenue

Montana legislature determined 14 different classes of property for property taxes, and agricultural land is one of the fourteen classifications. Each class of property is valued differently. For example, agricultural land is valued differently than railroads. However, properties within each class, such as grazing land and tillable irrigated land are valued the same. Agricultural land class is reappraised by the state every 6 years based on productivity of the land. The last valuation cycle took place in 2008. The phased-in productivity value is multiplied by the tax rate at 2.63 percent for 2012 to determine the taxable value. Non-productive mining claims and non-qualified agricultural land are also included in the agricultural land class. Non-qualified agricultural land is defined as parcels of land between 20 to 160 acres, not used primarily for agricultural purposes. These parcels are taxed at 18.41 percent in 2012 (Montana Department of Revenue, 2012).

Estimated tax revenues for each county in Segment 3 in 2012 from agricultural land class are reported in Table 19. These values are derived from a calculation of taxable value and the millage rate and therefore

are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue. Subtracting the average millage rate associated with the state revenue (0.101), from 0.54883 results in a millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

As shown in Table 20, agricultural land produces about 1% of the total tax revenue in Yellowstone County. This is below the 5% average, as seen across the River Corridor.

Table 20. Agricultural Property Tax Revenue in Segment 3, 2012 (in 2012 $)

	Yellowstone		River Corridor Counties *	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Agricultural Land	1,562,636	1%	12,607,835	5%
Tillable Irrigated	365,531	> 1%	2,247,812	1%
Tillable Non Irrigated	380,852	> 1%	3,363,055	1%
Grazing	483,163	> 1%	5,319,837	2%
Wild Hay	40,279	> 1%	616,523	> 1%
Non-Qualified Ag Land	292,810	> 1%	1,060,766	> 1%
Other	132,029,704	99%	259,597,393	95%
Total Property Revenue	133,592,340		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota
**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.
Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct

effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "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 contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is typically well-defined. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis Yellowstone County, MT was included as the region. The year 2012 IMPLAN v3 county-level data profiles for the county were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of agriculture in the one-county area were estimated in IMPLAN using total output values for 19 agriculture-related sectors including grain farming, tree nut and fruit farming, animal production and commercial logging . Economic contribution analyses address the importance or contribution of an existing industry to a local economy.

Table 21 summarizes the results of the contribution analysis. All results are presented in 2012 dollars. In 2012, agriculture in Segment 3 directly accounts for an estimated 1,600 jobs, $28.9 million in labor income, and $49.9 million in value added to the local economy. Secondary or multiplier effects of agriculture account for an additional estimated 500 jobs, $21.1 million in labor income, and $42.6 million in value added to the local economy. Accounting for both direct and secondary effects, agriculture in Segment 3 contributes an estimated total of 2,100 jobs, $50.0 million in labor income, and $92.5 million in value added to the local economy of Yellowstone County, MT. Agriculture contributes the fewest jobs in Segment 3, as compared to the other segments of the River Corridor.

Table 21. Analysis of Agricultural Contribution, Segment 3

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	1,600	$28.9	$49.9
Secondary Effects	500	$21.1	$42.6
Total Effect*	2,100	$50.0	$92.5

*Please note due to rounding, Total Effect reported may not be equal to the sum of Direct and Secondary Effects, as reported.

Segment 4

Historical Overview

Similar to other segments along the River Corridor, the formation of irrigation ditches along with the Enlarged Homestead Act and Desert Act led to the development of the counties in Segment 4 (City of Columbus Montana, 2012). Specifically, the Columbus Irrigation Project (1906-1938) and the Columbus Water Users Association Stillwater County (formed in 1938), promoted the development of agriculture in Stillwater County, MT (City of Columbus Montana, 2012).

Unlike other counties along the River Corridor, the base of agriculture in Sweet Grass County, MT has historically been sheep and wool production (Sweet Grass County, 2003), and as of 2007, Sweet Grass County remained in the top ten counties for sheep production in the State of Montana (Sweet Grass County, 2009). Though agriculture is, and has been, important in the development of the counties in Segment 4, mining has played an even greater role, which makes the counties in Segment 4, along with Rosebud County in Segment 2, somewhat unique as compared to the rest within the River Corridor (Sweet Grass County, 2009).

Current Agricultural Statistics

The agricultural data presented here are representative of county level statistics. The River Corridor Counties column demonstrates the representative statistic for all the 12 counties in which Yellowstone River is located. As the size of the counties varies, so does the length of the river stretch contained within those counties. For example, Carbon is a large county but with only a short section of the Yellowstone River.

Unlike other segments in the River Corridor, the counties that make up Segment 4 experienced a smaller change in the number of farms and acres in agricultural production between 1950 to 2012. The number of farms decreased in all three counties, while the land in farms increased in Carbon County, decreased in Stillwater County, and remained stable in Sweet Grass. Average farm size remained relatively unchanged in Stillwater and Sweet Grass, and increased by about 70% in Carbon County. From 1949 to 2012, the number of irrigated farms decreased significantly (between 42-45%) while irrigated acres saw only a smaller decrease (between 7-23%), Tables 22 and 23. In 2012, the main crop produced in Carbon and Sweet Grass Counties was forage while in Stillwater County it was wheat. Carbon County had the largest number of cattle and calves in 2012 with 72,073 head as compared to 42,642 and 37,962 head in Stillwater and Sweet Grass Counties, respectively (United States Department of Agriculture, 2012).

Table 22. Agricultural Statistics for Segment 4, 1950

	Carbon	Stillwater	Sweet Grass	River Corridor Counties
Number of Farms	998	647	384	8,593
Land in farms (acres)	652,287	901,132	855,125	15,261,807
Land in farms\ Average size of farm (acres)	654	1,393	2,227	1,776
Irrigated land (farms)	787	314	263	4,571
Irrigated land (acres)*	80,847	28,305	38,335	421,408

Source: United States Dept. of Agriculture, 1950
*1949 values

Table 23. Agricultural Statistics for Segment 4, 2012

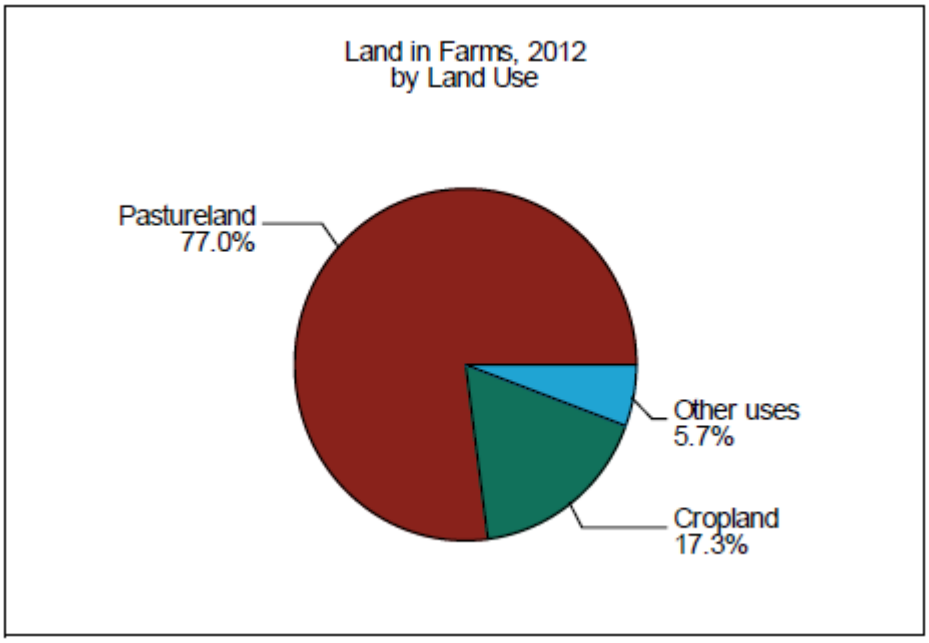
	Carbon	Stillwater	Sweet Grass	River Corridor Counties
Number of Farms	726	593	332	6,303
Land in farms (acres)	791,295	809,443	855,709	15,232,307
Land in farms\ Average size of farm (acres)	1,090	1,365	2,577	2,416
Irrigated land (farms)	431	179	152	2,326
Irrigated land (acres)	72,781	21,557	35,770	439,122

Source: United States Dept. of Agriculture, 2012

Similarly to other segments in the River Corridor, the majority of the land in farms is pastureland, with over 70% classified as such in each county (Figures 17, 19, and 21). Pastureland is defined by the agricultural census as grazable land that does not qualify as woodland pasture or cropland pasture. Pastureland may be irrigated or dry land. In some areas, it can be a high quality pasture that could not be cropped without improvements. In other areas, it is barely able to be grazed and is only marginally better than wasteland. The Census of Argiculture defines woodland as planted woodlots or timer tracts, cutover and deforested land with young growth which has or will have value for wood products or woodland pastured. This category includes natural or woodland pasrture. In 2012, 5.6% of land in farms was considered woodland in Sweet Grass County. The other two counties in the River Corridor that have land use classified as woodland are Rosebud (5.4%) and Park (14.3%) Counties. The distribution of farm size in this segment varies. For example, the majority of farms in Carbon and Stillwater Counties are

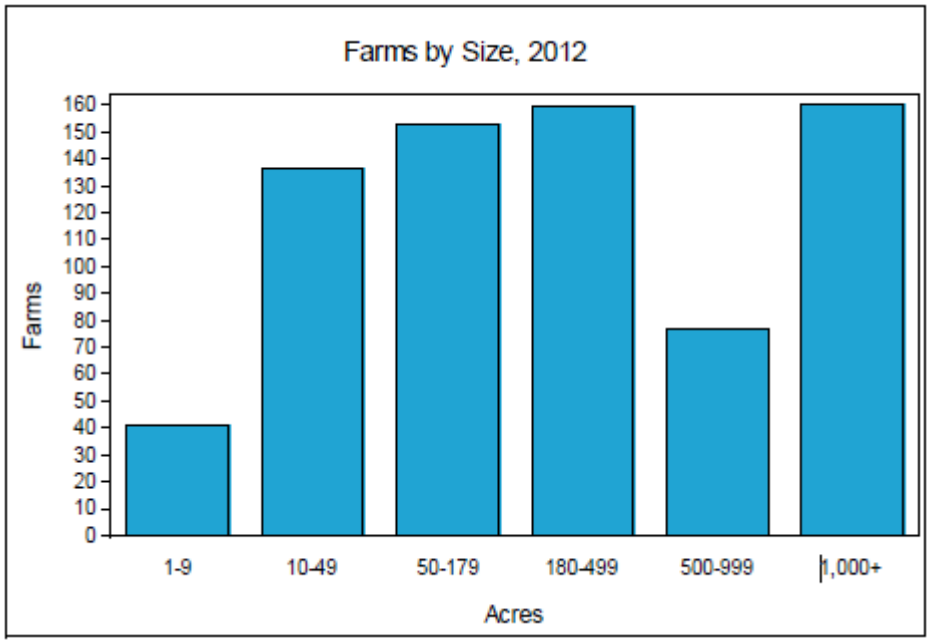
between 10-499 acres, although there is also a large number of farms 1000 acres and over (Figures 18, 20, and 22). The majority of the farms in Sweet Grass County are over 1000 acres, which is more representative of other counties in the River Corridor (United States Department of Agriculture, 2012).

Figure 17. Carbon County Land in Farms by Land Use, 2012



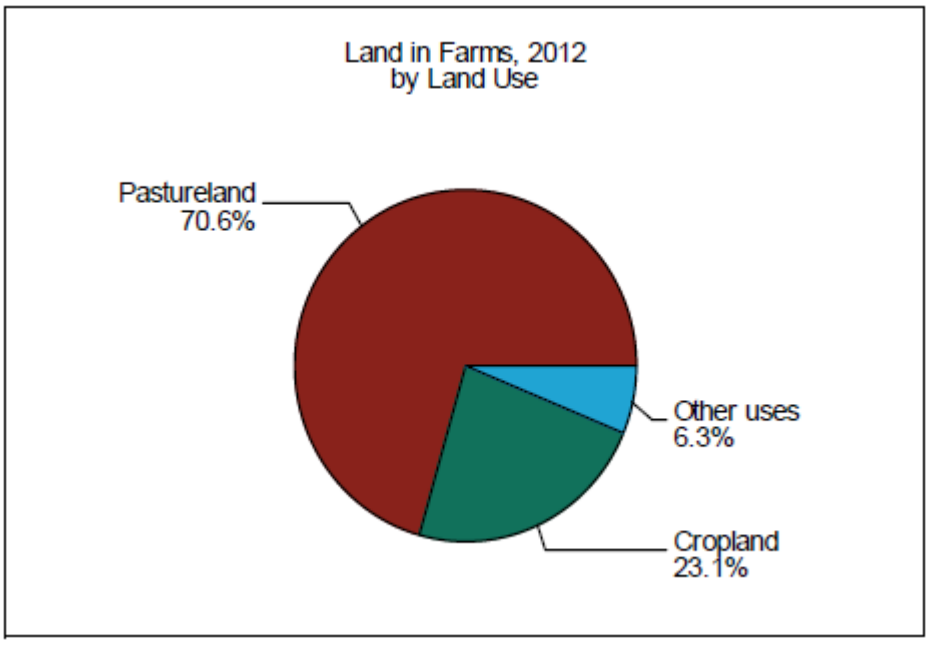
Source: United States Dept. of Agriculture, 2012

Figure 18. Carbon County Farms by Size, 2012



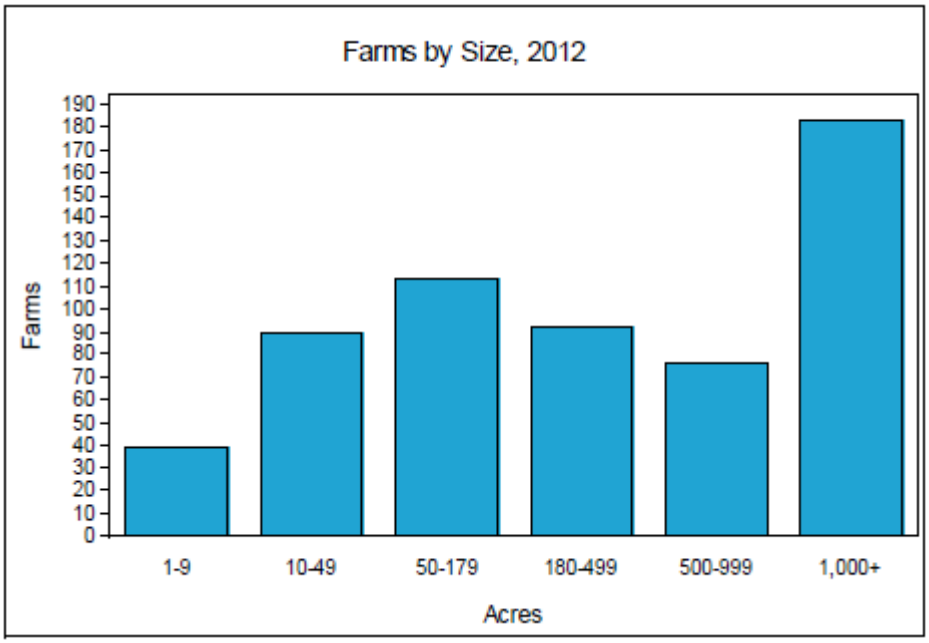
Source: United States Dept. of Agriculture, 2012

Figure 19. Stillwater County Land in Farms by Land Use, 2012



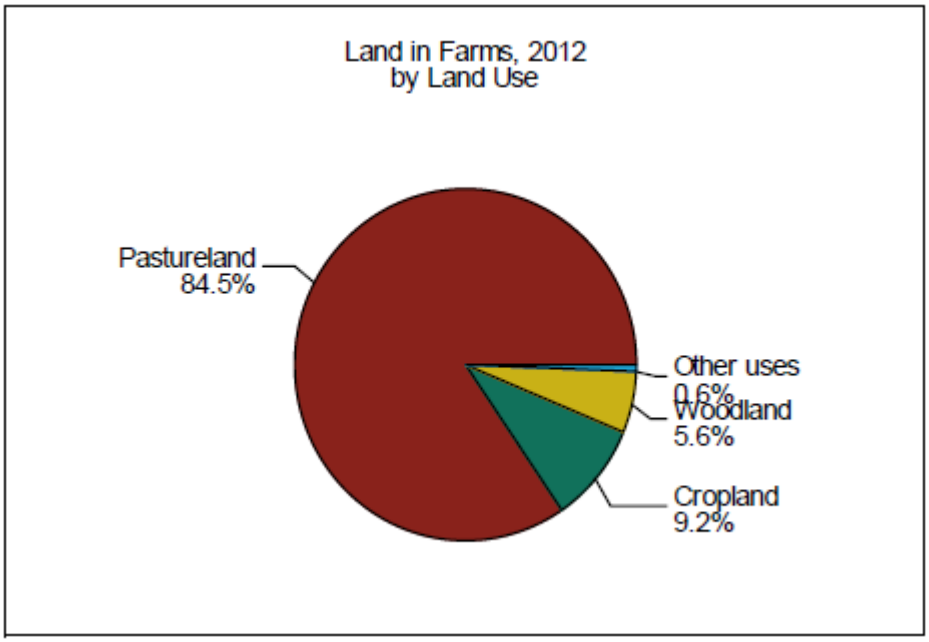
Source: United States Dept. of Agriculture, 2012

Figure 20. Stillwater County Farms by Size, 2012



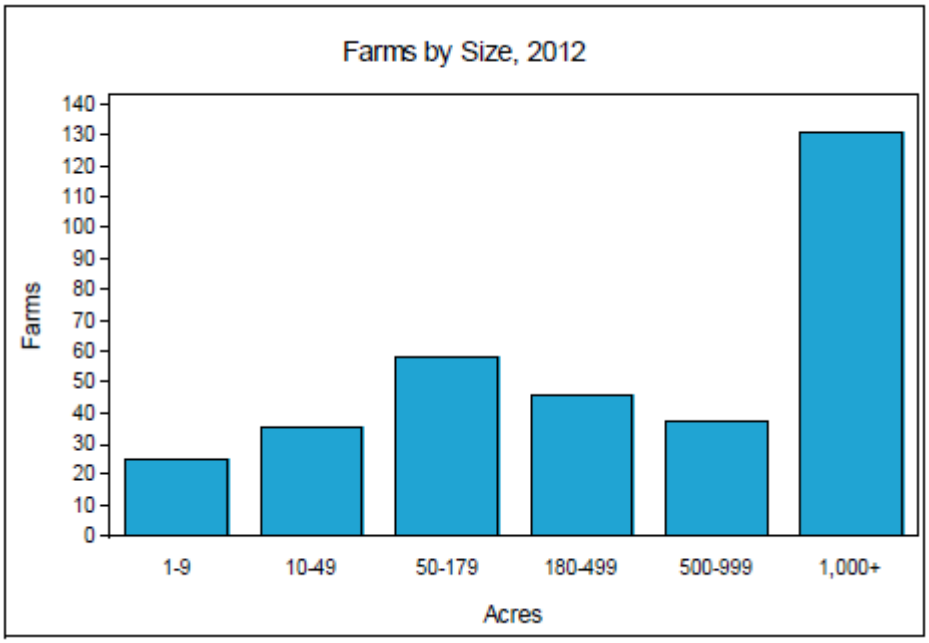
Source: United States Dept. of Agriculture, 2012

Figure 21. Sweet Grass County Land in Farms by Land Use, 2012



Source: United States Dept. of Agriculture, 2012

Figure 22. Sweet Grass County Farms by Size, 2012



Source: United States Dept. of Agriculture, 2012

Market Value of Farm Products and Capital/Farm Equity

The market value of products sold is a category that represents the gross market value before taxes and production expenses of all agricultural products sold or removed from the place in (United States Department of Agriculture, 2012). The market value of products sold also does not infer the value of the 2012 harvest. Values of products harvested in a previous year, held in storage and sold in 2012, are also included into this market value. "Market value of agricultural products sold does not include payments received for participation in other federal farm programs. Also, it does not include income from farm-related sources such as customwork and other agricultural services, or income from nonfarm sources" (United States Department of Agriculture, 2012).

Of the three counties in Segment 4, Carbon County had the highest market value of products sold in 2012, valued at nearly $77 million, with $50 million in value from livestock, poultry and their products Table 24). Sweet Grass County had the lowest market value of all three counties in the segment.

Table 24. Market Value of Products Sold in Segment 4, 2012 ($1,000)

	Carbon	Stillwater	Sweet Grass	River Corridor Counties
Total value of ag products sold	76,862	56,888	33,496	1,035,226
value of crops including nursery and greenhouse	25,966	12,989	4,276	429,403
value of livestock, poultry and their products	50,896	43,898	29,221	605,823

Source: United States Dept. of Agriculture, 2012

Though Sweet Grass County had the lowest value of agricultural products sold, it has the highest average per farm market value of land and buildings. Carbon County had the highest estimated market value of machinery and equipment (see Table 25) (United States Department of Agriculture, 2012).

Table 25. Market Value of Capital in Segment 4, 2012

	Carbon	Stillwater	Sweet Grass
Market value of land and buildings \ Average per farm ($)	1,283,405	1,905,004	2,771,481
Estimated market value of all machinery and equipment \ Average per farm ($)	115,977	84,404	105,374

Source: United States Dept. of Agriculture, 2012

Government Payments

Government payments consist of "direct payments as defined by the 2008 Farm Bill; payments from Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Farmable Wetlands Program (FWP), and Conservation Reserve Enhancement Program (CREP); loan deficiency payments; disaster payments; other conservation programs; and all other federal farm programs under which payments were made directly to farm operators" (Agricultural Census, 2012). Government payments do not include Commodity Credit Corporation proceeds, the amount of State and local government agricultural program payments, and federal crop insurance payments(United States Department of Agriculture, 2012).

Stillwater County receives the largest amount of total government payment in this segment. However, the average per farm payments in all counties within Segment 4 is similar to payments in other counties along the River Corridor (Table 26).

Table 26. Government Payments in Segment 4, 2012

	Carbon	Stillwater	Sweet Grass	River Corridor Counties
Total ($)	1,696,000	2,997,000	689,000	32,789,000
Average per farm ($)	6,625	11,892	8,305	

Source: United States Dept. of Agriculture, 2012

Tax Revenue

Montana legislature determined 14 different classes of property for property taxes, agricultural land being one of the fourteen classifications. Each class of property is valued differently. For example, agricultural land is valued differently than railroads. However, properties within each class, such as grazing land and tillable irrigated land are valued the same. Agricultural land class is reappraised by the

state every 6 years based on productivity of the land. The last valuation cycle took place in 2008. The phased-in productivity value is multiplied by the tax rate at 2.63 percent for 2012 to determine the taxable value. Non-productive mining claims and non-qualified agricultural land are also included in the agricultural land class. Non-qualified agricultural land is defined as parcels of land between 20 to 160 acres, not used primarily for agricultural purposes. These parcels are taxed at 18.41 percent in 2012. (Montana Department of Revenue, 2012).

Estimated 2012 tax revenues for each county in Segment 4 from agricultural land classifications are reported in Table 26. These values are derived from a calculation of taxable value and the millage rate and therefore are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue. Subtracting the average millage rate associated with the state revenue (0.101), from 0.54883 results in a millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

As shown in Table 27, Sweet Grass County receives a higher portion of property tax revenue from agricultural land than the other two counties in the Segment; with 11% of tax revenue coming from agricultural land and 7% of this from grazing lands. Agricultural property tax revenue received by Carbon and Stillwater counties is similar to that of the River Corridor at 6% and 5%, respectively (Montana Department of Revenue, 2012).

Table 27. Agricultural Property Tax Revenue, 2012

	Carbon		Stillwater		Sweet Grass		River Corridor Counties	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Agricultural Land	935,895	6%	889,663	5%	827,507	11%	12,607,835	5%
Tillable Irrigated	373,515	2%	90,635	1%	152,918	2%	2,247,812	1%
Tillable Non Irrigated	77,091	> 1%	190,647	1%	13,342	> 1%	3,363,055	1%
Grazing	294,010	2%	338,835	2%	522,653	7%	5,319,837	2%
Wild Hay	54,839	> 1%	135,891	1%	92,266	1%	616,523	> 1%
Non-Qualified Ag Land	136,440	1%	133,654	1%	46,328	1%	1,060,766	> 1%
Other	15,101,968	94%	15,763,875	95%	7,024,519	89%	259,597,393	95%
Total Property Revenue	16,037,863		16,653,538		7,852,026		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "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 contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is typically well-defined. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis all three counties in Segment 4, Carbon, Stillwater and Sweet Grass Counties, MT, were included as the region. The year 2012 IMPLAN v3 county-level data profiles for these three counties were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of agriculture in the three-county area were estimated in IMPLAN using total output values for 19 agriculture-related sectors including grain farming, tree nut and fruit farming,

animal production and commercial logging. Economic contribution analyses address the importance or contribution of an existing industry to a local economy.

Table 28 summarizes the results of the contribution analysis. All results are presented in 2012 dollars. In 2012, agriculture in Segment 4 directly accounts for an estimated 2,600 jobs, $37.4 million in labor income, and $56.3 million in value added to the local economy. Secondary or multiplier effects of agriculture account for an additional estimated 300 jobs, $7.0 million in labor income, and $21.3 million in value added to the local economy. Accounting for both direct and secondary effects, agriculture in Segment 2 contributes an estimated total of 2,900 jobs, $44.4 million in labor income, and $77.6 million in value added to the local economy of the three counties in Segment 4. Segment 4 has the second highest employment contribution from agriculture across the segments in the River Corridor.

Table 28. Analysis of Agricultural Contribution, Segment 4

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	2,600	$37.4	$56.3
Secondary Effects	300	$7.0	$21.3
Total Effect	2,900	$44.4	$77.6

*Please note due to rounding, Total Effect reported may not be equal to the sum of Direct and Secondary Effects, as reported.

Segment 5

Historical Overview

Unlike other counties along the Yellowstone River Corridor, it was not just the prospect of agricultural development that attracted residents to Park County, MT. The expansion of the railroad promted the development of the city of Livingston, MT, the county seat of Park County (City of Livingston Montana, 2008). The proximity of Yellowstone National Park, just 55 miles between Livingston to the north entrance, also increased the popularity of Park County.

Current Agricultural Statistiscs

The agricultural data presented here are representative of county level statistics. The River Corridor Counties column demonstrates the representative statistic for all the 12 counties in which Yellowstone River is located. As the size of the counties varies, so does the length of the river stretch contained within those counties. Park County contains the second longest stretches of the Yellowstone River.

From 1950 to 2012, the number of farms in Park County remained the same, 564 farms. The land in farms decreased during this time. In 1950, 431 farms were under irrigation. By 2012, this number had decreased to 273 farms. Finally, total irrigated acreage has remained relatively constant during this time period, increasing slightly (see Tables 29 and 30).

Table 29. Agricultural Statistics for Segment 5, 1950

	Park	River Corridor
Number of Farms	564	8,593
Land in farms (acres)	841,104	15,261,807
Land in farms\ Average size of farm (acres)	1,491	1,776
Irrigated land (farms)	431	4,571
Irrigated land (acres)*	55,460	421,408

Source: United States Dept. of Agriculture, 1950
*1949 values

Table 30. Agricultural Statistics for Segment 5, 2012

	Park	River Corridor
Number of Farms	564	6,303
Land in farms (acres)	774,057	15,232,307
Land in farms\ Average size of farm (acres)	1,372	2,416
Irrigated land (farms)	273	2,326
Irrigated land (acres)	57,112	421,408

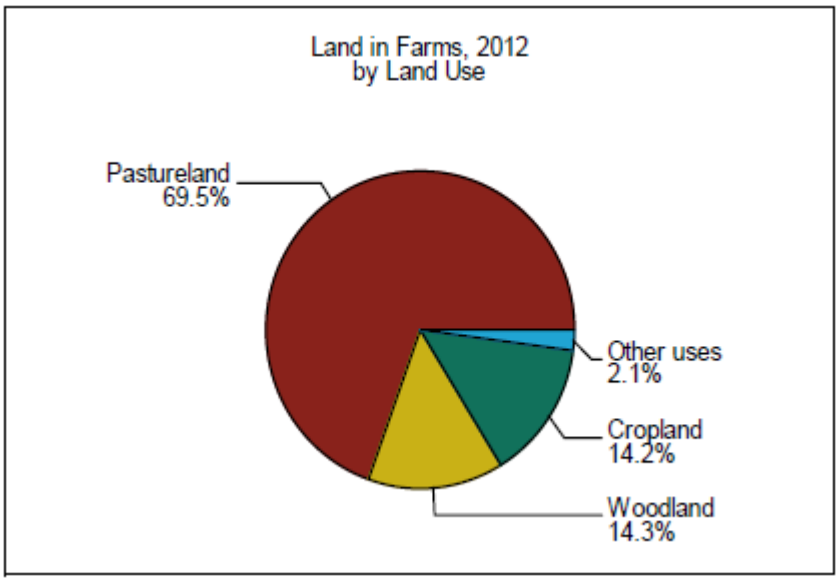
Source: United States Dept. of Agriculture, 2012

In 2012, majority of the land in farms in Park County was used as pastureland. However, 14.3% of the land in farms was classified as woodland, the highest percentage of woodland of any of the counties within the River Corridor (Figure 23). Pastureland is defined by the agricultural census as grazable land that does not qualify as woodland pasture or cropland pasture. Pastureland may be irrigated or dry land.

In some areas, it can be a high quality pasture that could not be cropped without improvements. In other areas, it is barely able to be grazed and is only marginally better than wasteland. The Census of Argiculture defines woodland as planted woodlots or timer tracts, cutover and deforested land with young growth which has or will have value for wood products or woodland pastured. This category includes natural or woodland pasrture. The majority of farms in Park County are either 10-49 areas, or greater than 1,000 acres in size (see Figure 24).

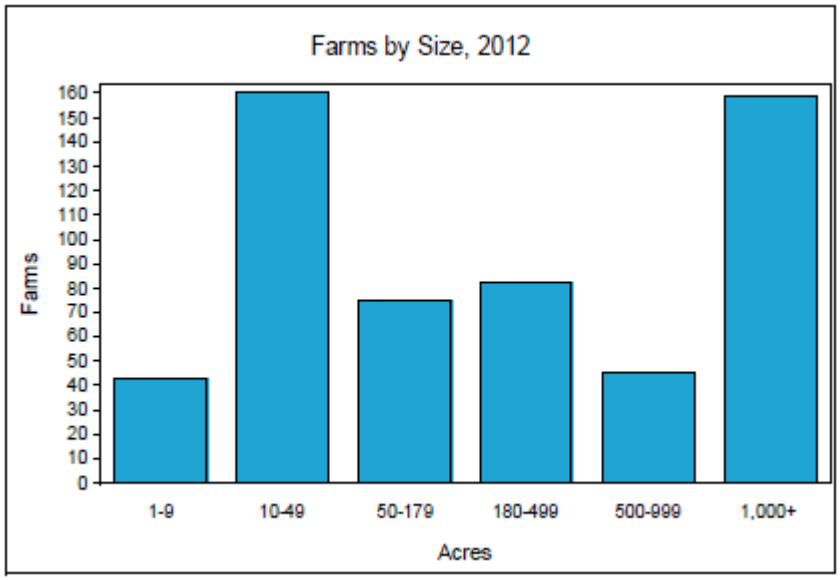
Figure 23. Park County Land in Farms by Land Use, 2012

Source: United States Dept. of Agriculture, 2012



Source: United States Dept. of Agriculture, 2012

Figure 24. Park County Farms by Size, 2012



Source: United States Dept. of Agriculture, 2012

Market Value of Farm Products and Capital/Farm Equity

The market value of products sold is a category that represents the gross market value before taxes and production expenses of all agricultural products sold or removed from the place in 2012 (United States Department of Agriculture, 2012). The market value of products sold also does not infer that the value of the 2012 harvest. Values of products harvested in a previous year, held in storage and sold in 2012 are also included into this market value. "Market value of agricultural products sold does not include payments received for participation in other federal farm programs. Also, it does not include income from farm-related sources such as customwork and other agricultural services, or income from nonfarm sources" (United States Department of Agriculture, 2012).

As compared to other counties within the River Corridor, the market value of agricultural products sold is relatively low in Park County. In 2012, the total value of agricultural products sold was slightly over $38 million. Contrarily, the average per farm market value of land and buildings in Park County is relatively high, valued at $3.5 million in 2012 (see Table 31 and 32, below) (United States Department of Agriculture, 2012).

Table 31. Market Value of Products Sold in Segment 5, 2012 ($1,000)

	Park	River Corridor Counties
Total value of ag products sold	38,487	1,035,226
value of crops including nursery and greenhouse	13,126	429,403
value of livestock, poultry and their products	25,361	605,823

Source: United States Dept. of Agriculture, 2012

Table 32. Market Value of Farm Capital In Segment 5, 2012

	Park
Market value of land and buildings \ Average per farm ($)	3,502,195

Estimated market value of all machinery and equipment \ Average per farm ($)	96,944

Source: United States Dept. of Agriculture, 2012

Government Payments

Government payments consist of "direct payments as defined by the 2008 Farm Bill; payments from Conservation Reserve Program (CRP), Wetlands Reserve Program (WRP), Farmable Wetlands Program (FWP), and Conservation Reserve Enhancement Program (CREP); loan deficiency payments; disaster payments; other conservation programs; and all other federal farm programs under which payments were made directly to farm operators" (United States Department of Agriculture, 2012). Government payments do not include Commodity Credit Corporation proceeds, the amount of State and local government agricultural program payments, and federal crop insurance payments (United States Department of Agriculture, 2012).

As shown in Table 33, total government payments in Park County, MT equaled $754 thousand, averaging $7,544 per farm in the County, in 2012.

Table 33. Government Payments in Segment 5, 2012

	Park	River Corridor Counties
Total ($)	754,000	32,789,000
Average per farm ($)	7,544	

Source: United States Dept. of Agriculture, 2012

Tax Revenue

Montana legislature determined 14 different classes of property for property taxes, agricultural land being one of the 14 classifications. Each class of property is valued differently. For example, agricultural land is valued differently than railroads. However, properties within each class, such as grazing land and tillable irrigated land are valued the same. Agricultural land class is reappraised by the state every 6 years based on productivity of the land. The last valuation cycle took place in 2008. The phased-in productivity value is multiplied by the tax rate at 2.63 percent for 2012 to determine the taxable value. Non-productive mining claims and non-qualified agricultural land are also included in the agricultural land class. Non-qualified agricultural land is defined as parcels of land between 20 to 160 acres, not used primarily for agricultural purposes. These parcels are taxed at 18.41 percent in 2012 (Montana Department of Revenue, 2012).

Estimated tax revenues for Park County in Segment 5 in 2012 from agricultural land class are reported in Table 34. These values are derived from a calculation of taxable value and the millage rate and therefore are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue. Subtracting the average millage rate associated with the state revenue (0.101), from 0.54883 results in a

millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

In 2012, 5% of total revenue in Park County was derived from agricultural lands, with a majority of tax revenue from grazing lands. This is similar to what can be seen across the River Corridor.

Table 34. Agricultural Property Tax Revenue, 2012

	Park		River Corridor Counties*	
	Estimated County Property Tax Revenue	**% Total County Property Tax Revenue**	**Estimated Property Tax Revenue**	**% Total Property Tax Revenue**
Agricultural Land	924,781	5%	12,607,835	5%
Tillable Irrigated	251,567	1%	2,247,812	1%
Tillable Non Irrigated	37,769	>1%	3,363,055	1%
Grazing	395,875	2%	5,319,837	2%
Wild Hay	24,301	>1%	616,523	>1%
Non-Qualified Ag Land	215,222	1%	1,060,766	>1%
Other	16,646,947	95%	259,597,393	95%
Total Property Revenue	17,571,729		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "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 contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is typically well-defined. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis, Park County, MT was included as the region. The year 2012 IMPLAN v3 county-level data profiles for the county were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of agriculture in the one-county area were estimated in IMPLAN using total output values for 19 agriculture-related sectors including grain farming, tree nut and fruit farming,

animal production and commercial logging. Economic contribution analyses address the importance or contribution of an existing industry to a local economy.

Table 35 summarizes the results of the contribution analysis. All results are presented in 2012 dollars. In 2012, agriculture in Segment 5 directly accounts for an estimated 2,000 jobs, $37.6 million in labor income, and $41.3 million in value added to the local economy. Secondary or multiplier effects of agriculture account for an additional estimated 200 jobs, $6.6 million in labor income, and $15.8 million in value added to the local economy. Accounting for both direct and secondary effects, agriculture in Segment 2 contributes an estimated total of 2,200 jobs, $44.2 million in labor income, and $57.1 million in value added to the local economy of the three counties in Segment 5. Across the River Corridor, Segment 5 has the second fewest jobs contributed by agriculture, and the lowest contribution to labor income and value added.

Table 35. Analysis of Agricultural Contribution, Segment 5

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	2,000	$37.6	$41.3
Secondary Effects	200	$6.6	$15.8
Total Effect	2,200	$44.2	$57.1

*Please note due to rounding, Total Effect reported may not be equal to the sum of Direct and Secondary Effects, as reported.

Urban and Exurban Development

Historical Introduction

Much attention has been focused on urban and exurban development, defined as low density development of houses on 5-40 acres (Wildlife Conservation Society, Impacts of Low Density, Exurban Development). There is great concern over possible environmental damage and degradation that this type of development promotes (Vandenbosch and Erickson, 2007). In 1996 and 1997 two floods along the Yellowstone River brought this discussion to the forefront. Many homeowners had developed their homes along the riverbank and adjacent floodplain, subsequently losing some these homes following the floods. Debate began over how far back from the river homeowners should develop their lots and what type of riparian damage this type of development was causing to the river's ecosystem. In 2007, a bill was brought to state legislation requiring, "new construction to be at least 250 feet from the high-water mark of a major river and provide a vegetative buffer at least 100 feet wide" (Vandenbosch and Erickson, 2007). This bill did not pass, but the issues surrounding urban and ex-urban development continue to be analyzed and debated.

Current Housing

Representative housing statistics from the 2010 census are provided below. Though these statistics are county-wide and are not solely representative of development of land abutting the Yellowstone River Corridor, trends can be identified within the counties that make up the River Corridor. Tables 35 through 39 describe current housing data for counties within the River Corridor.

Yellowstone County, MT, which makes up Segment 3, accounted for over half of the total housing units, 63,943 units (see Table 37), while Treasure County had the fewest housing units, 422 units, in 2010 (see Table 36). Carbon County, MT had the highest percentage of housing units for seasonal or recreation use, with more than 1 of every 5 housing units used for seasonal or recreation use (see Table 38). In 2010, only 0.6% of the housing units in Yellowstone County are considered to be for seasonal or recreation use. Sweet Grass County, MT had the highest homeowner and rental vacancy rates, 3.8% and 15.0%, respectively (Table 38). Average household size remained fairly constant across the counties within the River Corridor, with all households having an average size of less than 3 individuals (United States Census Bureau, 2010).

Table 36. Housing Data for Segment 1, 2010

			Vacant Housing Units		Occupied Housing Units		
	Total Housing Units (2010)	% of Units For Seasonal/ Rec use	Homeowner Vacancy Rate	Rental Vacancy Rate	Owner Occupied	Renter Occupied	Average Household Size
McKenzie County, ND	3,090	7.5	0.5	8.5	2,410	729	2.58
Richland County, MT	4,550	1.6	0.7	2.7	2,904	1,263	2.33
Dawson County, MT	4,233	2.0	1.7	6.6	2,658	1,091	2.26
Prairie County, MT	673	8.9	2.0	3.4	438	113	2.10
Segment Total	12,546	3.6	1.2	5.3	8,410	3,196	2.32
River Corridor Total	109,295	4.4	1.9	8.9	68,269	30,037	2.29

Source: United States Census Bureau, 2010

Table 37. Housing Data for Segment 2, 2010

			Vacant Housing Units		Occupied Housing Units		
	Total Housing Units (2010)	% of Units For Seasonal/ Rec use	Homeowner Vacancy Rate	Rental Vacancy Rate	Owner Occupied	Renter Occupied	Average Household Size
Treasure County, MT	422	9.0	0.4	12.8	241	94	2.14
Rosebud County, MT	4,057	4.4	1.0	14.1	2,259	1,136	2.70
Custer County, MT	5,560	1.3	1.1	5.8	3,349	1,682	2.24
Segment Total	10,039	2.8	0.8	10.9	5,849	2,912	2.36
River Corridor Total	109,295	4.4	1.9	8.9	68,269	30,037	2.29

Source: United States Census Bureau, 2010

Table 38. Housing Data for Segment 4, 2010

Segment 4	Total Housing Units (2010)	% of Units For Seasonal/ Rec use	Vacant Housing Units: Homeowner Vacancy Rate	Vacant Housing Units: Rental Vacancy Rate	Occupied Housing Units: Owner Occupied	Occupied Housing Units: Renter Occupied	Average Household Size
Sweet Grass County, MT	2,148	16.2	3.8	15.0	1,112	478	2.27
Stillwater County, MT	4,803	13.6	2.0	10.1	2,960	836	2.37
Carbon County, MT	6,441	21.4	2.7	10.6	3,471	1,100	2.19
Segment Total	13,392	17.8	2.8	11.9	7,543	2,414	2.28
River Corridor Total	109,295	4.4	1.9	8.9	68,269	30,037	2.29

Source: United States Census Bureau, 2010

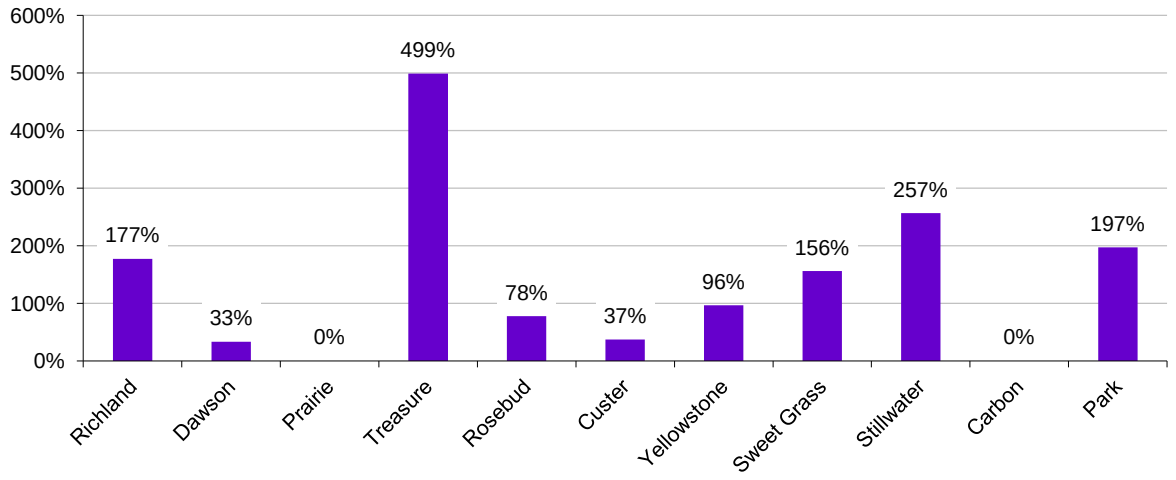
Table 39. Housing Data for Segment 5, 2010

	Total Housing Units (2010)	% of Units For Seasonal/ Rec use	Vacant Housing Units: Homeowner Vacancy Rate	Vacant Housing Units: Rental Vacancy Rate	Occupied Housing Units: Owner Occupied	Occupied Housing Units: Renter Occupied	Average Household Size
Park County, MT	9,375	14.0	3.0	10.3	4,938	2,372	2.12
River Corridor Total	109,295	4.4	1.9	8.9	68,269	30,037	2.29

Source: United States Census Bureau, 2010

Headwaters Economics developed an atlas for the counties in Montana, within the Yellowstone River Corridor. Figure 25 highlights the percent change in developed land along the Yellowstone River 100-Year Flood Zone from 1970 to 2008. Treasure County had nearly a 500% increase in land developed within the flood zone during this time period while Prairie and Carbon Counties did not experience a change. Stillwater County had a 257% increase in developed land and both Richland and Park Counties had an increase of nearly 200% in developed land within the flood zone (Headwaters Economics, 2014). This further highlights the concern over lands being developed in the flood plain, as mentioned previously.

Figure 25. Percent Change in Developed Land in Yellowstone River 100-Year Flood Zone, 1970 - 2008



Source: Headwaters Economics, 2014

Tax Revenue

Montana legislature determined 14 different classes of property for property taxes. Residential, commercial, and industrial (land and improvements) is one of the 14 classes. Each class of property is valued differently. For example, residential, commercial, and industrial (land and improvements) class is valued differently than the airlines and railroads class. Both residential and commercial properties are reappraised every 6 years by the Montana Department of Revenue. The most recent valuation cycle took place in 2011. Montana Department of Revenue reports that residential property had a 44 percent homestead exemption, so the residential taxable value was based on 56 percent of the market value. The tax rate of 2.63 percent is applied to the 56 percent of the market value to arrive at the taxable value. Commercial and industrial properties are taxed the same way except for the lower exemption rate of 19 percent, leaving 79 percent of market value being applied to the 2.63 percent tax rate to determine the taxable value (Montana Department of Revenue, 2012). Estimated tax revenues for each county in Segment 1 in 2012 from agricultural land class are reported in Table 40. These values are derived from a calculation of taxable value and the millage rate and therefore are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue. Subtracting the average millage rate associated with the state revenue (0.101), from 0.54883 results in a millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

The counties within the River Corridor as a whole received 28% of property tax revenue from residential property taxes. Park County is the only county that received over half of its property tax revenue from residential property, with 52% derived from residential property, Table 44. Following Park County, Carbon, Yellowstone and Custer Counties received a third or more of their property tax revenue from residential properties, 41%, 38% and 30%, respectively (Tables 41, 42, 43). For the remaining counties

within the corridor, residential property taxes comprise less than 20% of county property tax revenue, with 5% of property tax revenue from residential property taxes in Prairie County, 2% in Rosebud County, and finally only 3% from residential property taxes in Treasure County (Montana Department of Revenue, 2012) (see tables 40-44, below).

Table 40. Land and Improvements Property Tax Revenue in 1, 2012

	Richland		Dawson		Prairie		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Land and Improvements	3,128,837	23%	2,275,730	26%	238,295	12%	126,192,430	46%
Residential	1,640,953	12%	1,426,609	16%	96,297	5%	77,522,483	28%
Commercial	1,089,932	8%	649,976	7%	129,657	7%	41,737,298	15%
Industrial	10,944	> 1%	4,220	> 1%	90	> 1%	901,461	> 1%
Other	10,596,471	77%	6,627,638	74%	1,668,666	88%	146,012,798	54%
Total Property Revenue	13,725,307		8,903,368		1,906,961		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 41. Land and Improvements Property Tax Revenue in Segment 2, 2012

	Custer		Rosebud		Treasure		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Land and Improvements	3,641,554	50%	1,991,062	4%	184,330	9%	126,192,430	46%
Residential	2,161,434	30%	910,972	2%	59,675	3%	77,522,483	28%
Commercial	1,291,783	18%	546,877	1%	109,668	5%	41,737,298	15%
Industrial	12,624	> 1%	74,903	> 1%	366	> 1%	901,461	> 1%
Other	3,664,365	50%	44,612,067	96%	1,868,718	91%	146,012,798	54%
Total Property Revenue	7,305,919		46,603,130		2,053,048		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 42. Land and Improvements Property Tax Revenue in Segment 3, 2012

	Yellowstone		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Land and Improvements	84,682,235	63%	126,192,430	46%
Residential	50,745,316	38%	77,522,483	28%
Commercial	29,587,770	22%	41,737,298	15%
Industrial	728,156	1%	901,461	> 1%
Other	48,910,105	37%	146,012,798	54%
Total Property Revenue	133,592,340		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 43. Land and Improvements Property Tax Revenue in Segment 4, 2012

	Carbon		Stillwater		Sweet Grass		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Land and Improvements	8,852,575	55%	5,169,883	31%	2,545,369	32%	126,192,430	46%
Residential	6,616,179	41%	3,509,010	21%	1,221,999	16%	77,522,483	28%
Commercial	1,934,742	12%	1,248,973	7%	1,144,600	15%	41,737,298	15%
Industrial	16,473	> 1%	23,790	> 1%	16,658	> 1%	901,461	> 1%
Other	7,185,288	45%	11,483,655	69%	5,306,657	68%	146,012,798	54%
Total Property Revenue	16,037,863		16,653,538		7,852,026		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 44. Land and Improvements Property Tax Revenue in Segment 5, 2012

	Park		River Corridor	
	Estimated County Property Tax Revenue	**% Total County Property Tax Revenue**	**Estimated Property Tax Revenue**	**% Total Property Tax Revenue**
Land and Improvements	13,482,559	77%	126,192,430	46%
Residential	9,134,039	52%	77,522,483	28%
Commercial	4,003,320	23%	41,737,298	15%
Industrial	13,237	> 1%	901,461	> 1%
Other	4,089,169	23%	146,012,798	54%
Total Property Revenue	17,571,729		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "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 contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is typically well-defined. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis, the counties within the Segments were included as the region. The year 2012 IMPLAN v3 county-level data profiles for the counties were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of the housing sectors were estimated in IMPLAN using total output values for two housing-related sectors, construction of new residential permanent sight single- and multi-family structures and construction of other new residential structures. These sectors include

industries such as residential housing general contractors (i.e., new construction, remodeling, or renovating existing residential structures), operative builders and remodelers of residential structures, residential project construction management firms, and residential design-build firms. Economic contribution analyses address the importance or contribution of an existing industry to a local economy.

The tables below summarize the results of the contribution analysis for housing across all five segments. All results are presented in 2012 dollars. In 2012, residential construction had the greatest contribution to Yellowstone County, Segment 3, with the construction of new residential permanent site single- and multi-family structures contributing 1,400 jobs and the construction of other new residential structures contributing 2,000 jobs, total. The construction of new residential permanent site single- and multi-family structures contributed over $100 million in labor income and value added in Segment 3 (see Tables 49 and 50). The two housing sectors contributed the least to Park County, with construction of new residential permanent site single- and multi-family structures and construction of other new residential structures contributing 110 and 170 total jobs, respectively (see Tables 53 and 54).

Table 45. Construction of new residential permanent site single- and multi-family structures in Segment 1

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	200	$19.2	$24.6
Secondary Effects	200	$6.9	$11.2
Total Effects	400	$26.1	$35.8

Table 46. Construction of other new residential structures in Segment 1

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	400	$28.2	$28.2
Secondary Effects	200	$9.2	$15.0
Total Effects	600	$37.4	$43.3

Table 47. Construction of new residential permanent site single- and multi-family structures in Segment 2

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	80	$4.1	$4.9
Secondary Effects	60	$1.9	$3.2
Total Effects	140	$6.0	$8.2

Table 48. Construction of other new residential structures in Segment 2

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	128	$6.2	$6.6
Secondary Effects	84	$2.6	$4.5
Total Effects	212	$8.8	$11.1

Table 49. Construction of new residential permanent site single- and multi-family structures in Segment 3

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	600	$36.8	$43.6
Secondary Effects	800	$31.6	$49.1
Total Effects	1400	$68.4	$92.6

Table 50. Construction of other new residential structures in Segment 3

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	1000	$57.2	$60.3
Secondary Effects	1000	$43.9	$68.2
Total Effects	2000	$101.0	$128.5

Table 51. Construction of new residential permanent site single- and multi-family structures in Segment 4

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	100	$3.1	$4.2
Secondary Effects	60	$1.5	$2.7
Total Effects	160	$4.6	$6.9

Table 52. Construction of other new residential structures in Segment 4

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	160	$5.3	$5.8
Secondary Effects	80	$2.1	$3.8
Total Effects	240	$7.4	$9.6

Table 53. Construction of new residential permanent site single- and multi-family structures in Segment 5

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	70	$2.0	$2.8
Secondary Effects	40	$1.2	$2.1
Total Effects	110	$3.3	$4.9

Table 54. Construction of other new residential structures in Segment 5

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	110	$3.4	$3.7
Secondary Effects	60	$1.7	$2.9
Total Effects	170	$5.1	$6.6

Transportation

Historical Introduction

In addition to the Enlarged Homestead Act, the railroads spurred population growth within the counties along the River Corridor. The Northern Pacific Railroad helped to ensure Miles City, located in Custer County, became an important cattle market for Southeastern Montana (Southeastern Montana, 2012b). In 1909, Billings Montana built a Depot to be used by three railroad companies, the Northern Pacific, Great Northern, and the Chicago, Burlington, and Quincy, all three of which would be combined with two additional railroads to form the Burlington Northern, and eventually the Burlington Northern Santa Fe Railway (Burlington Northern Santa Fe, 2013). Due to the number of homesteaders arriving, the railroads expanded and by 1931 more than 26 passenger trains went through the Depot daily (Billings Depot, 2014).

The railroads helped form the city of Livingston, MT in Park County, in 1882. Livingston served as an important stop for the Northern Pacific (NP), as it was a midway point between St. Paul, Minnesota and Tacoma, Washington. The proximity of Livingston to Yellowstone National Park also made it a choice location for the railroad as the NP carried visitors to the Park. Finally, the construction of repair shops in town solidified Livingston's importance to the railway. As automobiles increased in popularity, railroads shifted from transporting passenger to cargo (City of Livingston Montana, 2008).

Though the railroads are no longer important carriers for passengers, they serve as an important link to markets for rural communities. It is also important in the development of coal in eastern Montana. In Dawson County, the Burlington Northern Santa Fe Railway(BNSF) links agricultural producers with Billings and interstate markets. Additionally, the railway is a major employer within the county (Dawson County Economic Development Council). Billings, MT continues to serve as an important hub for the railroads, servicing both the BNSF and Montana Rail Link operating a port facility and two intermodal facilities (Montana Department of Transportation, 2013).

Current Transportation Description

In the state of Montana, between Livingston and Fairview, the railroad tracks stretch approximately 424 miles *(personal communication with Diane Myers of Montana Department of Transportation) in the Yellowstone Valley*. Two railroad companies currently operate within the Yellowstone River Corridor counties: the Burlington Northern Santa Fe and the Montana Rail Link. Information about these companies was collected via published reports and interviews with representatives of the companies.

BNSF has rail stretching through all the counties within the River Corridor and has yards located in Laurel, Forsyth, and Glendive. BNSF reports that there were, on average, 20 trains per day through Forsyth in 2013. Overall, BNSF handled 1.2 million carloads in the state of Montana in 2013. Out of 1.2 million car loads, 343,000 car loads originated in the state and 34,000 terminated in the state. Of the carloads that originated in Montana, 244,000 car loads carried coal, 53,000 car loads carried agricultural products and 45,000 car loads carried industrial products. Most of the car loads of coal likely originated in Southeastern Montana, as this is where many of the coal mines are located. Generally, a large volume of agricultural products originate in North Central Montana with some also originating in the southeastern part of the state. Industrial products include crushed stone, lumber, chemicals and crude oil-related shipments, which primarily originate in the northwestern section of the state, with some

recent growth in Southeastern Montana and North Dakota *(personal communication with Matthew Jones of Burlington Northern Santa Fe Railway)*.

Montana Rail Link operates between Livingston and Huntley in the River Corridor, and reports that 40% of their payroll lives between Laurel and Livingston. The Laurel yard is utilized for car switching as well as train building *(personal communication with Jim Lewis of Montana Rail Link)*.

In addition to the railroads, semi-trucks serve as an important means of freight transportation. The recent oil development and oil transportation in the Bakken Oil Field is increasing the demand on the highways in eastern Montana (Dybing and others, 2013). According to a recent report, Highways 16 and 200 have between 625 and 1407 average annual trucks per day near the town of Sidney, MT. The same can be seen on Interstate 94, near the town of Glendive, in Dawson County (Dybingand others, 2013). Given its midpoint location between Minneapolis and Seattle, as well as Denver and Calgary, Billings serves as a hub for freight transportation via trucking. The portion of Interstate I-94 that runs through Billings has an annual average daily traffic rate between 9,000 and 27,500 vehicles, with an estimated 22% semi-trucks (Kittelson & Associates Inc. and DOWL HKM Inc., 2014). The transportation industry, both the railroads and trucking, provides economic activity across the counties in the River Corridor.

Tax Revenue from Railroads

Montana legislature determined 14 different classes of property for property taxes, with airlines and railroads being one of the fourteen classifications. This report focuses on revenue from railroad property taxes. Railroad properties are valued each year while the tax rate varies depending on the effective tax rate of all industrial property in the state that tax year (Montana Department of Revenue, 2012).

Estimated tax revenues for each of the segments in 2012 are reported in the tables below. These values are derived from a calculation of taxable value and the millage rate and therefore are estimates of revenue received by the counties. The millage rate used is a calculation of the average millage rate for the state of Montana (0.54883). This includes the state and county level revenue. Subtracting the average millage rate associated with the state revenue (0.101), from 0.54883 results in a millage rate of 0.44783 which represents the county revenue. The River Corridor counties revenue estimate is the sum of all revenues across categories for all Montana counties. North Dakota is excluded from that summation. Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Two counties in the River Corridor, Prairie and Treasure, receive more than 25% of their property tax revenue from the railroad (see Tables 55 and 56). Most counties receive around 10% or less. Across the River Corridor counties in Montana, 3% of total property tax revenue comes from the railroad, compared to 28% coming from residential property and 5% from agricultural land (Montana Department of Revenue, 2012).

Table 55. Tax Revenue from Railroads in Segment 1, 2012

	Richland		Dawson		Prairie		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Railroad	85,699	1%	1,142,571	13%	597,408	31%	8,373,172	3%
Other	13,639,608	99%	7,760,797	87%	1,309,553	69%	263,832,056	97%
Total Property Revenue	13,725,307		8,903,368		1,906,961		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 56. Tax Revenue from Railroads in Segment 2, 2012

	Custer		Rosebud		Treasure		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Railroad	599,543	8%	835,301	2%	526,573	26%	8,373,172	3%
Other	6,706,377	92%	45,767,829	98%	1,526,475	74%	263,832,056	97%
Total Property Revenue	7,305,919		46,603,130		2,053,048		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 57. Tax Revenue from Railroads in Segment 3, 2012

	Yellowstone		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Railroad	3,385,938	3%	8,373,172	3%
Other	130,206,402	97%	263,832,056	97%
Total Property Revenue	133,592,340		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 58. Tax Revenue from Railroads in Segment 4, 2012

	Carbon		Stillwater		Sweet Grass		River Corridor (MT only)	
	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated County Property Tax Revenue	% Total County Property Tax Revenue	Estimated Property Tax Revenue	% Total Property Tax Revenue
Railroad	375,009	2%	231,306	1%	231,643	3%	8,373,172	3%
Other	15,662,854	98%	16,422,232	99%	7,620,382	97%	263,832,056	97%
Total Property Revenue	16,037,863		16,653,538		7,852,026		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Table 59. Tax Revenue from Railroads in Segment 5, 2012

	Park		River Corridor (MT only)	
	Estimated County Property Tax Revenue	**% Total County Property Tax Revenue**	**Estimated Property Tax Revenue**	**% Total Property Tax Revenue**
Railroad	362,181	2%	8,373,172	3%
Other	17,209,548	98%	263,832,056	97%
Total Property Revenue	17,571,729		272,205,228	

*River Corridor, in this case, excludes McKenzie County, North Dakota

**Complete and comparable tax data from North Dakota was unavailable at the time this report was produced and is therefore not included in the analysis.

Source: Montana Department of Revenue, 2012

Contribution Analysis

Economic input-output models are commonly used to determine the contribution of specific economic sectors to a local or regional economy. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the IMPLAN Group, LLC. The IMPLAN model draws upon data collected 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, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, the final demand for a good or service can generate a ripple effect throughout an economy. The direct effect of a purchase of a good or service can cause local businesses to purchase labor and supplies to meet the demand for services. The income and employment resulting from these purchases from local businesses represent the direct effects of demand 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 doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to meet demand from local businesses, input suppliers must also purchase inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the indirect effects 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 employee income is the induced effect. The indirect and induced effects are known as the secondary effects. "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 contribution of a sector in a local economy.

For the purposes of an economic contribution analysis, a region (and its economy) is typically well-defined. Only spending that takes place within this regional area is included as contributing to economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. For this analysis, the counties within the Segments were included as the region. The year 2012 IMPLAN v3 county-level data profiles for the counties were used in this study. Regional economic contributions from the IMPLAN model are reported for the following categories:

- Employment represents the number of jobs generated in the region from a sector in the economy. IMPLAN estimates for employment include *full time, part time, and temporary jobs.*
- Labor Income includes employee wages and salaries, including income of sole proprietors and payroll benefits.
- Value Added measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

Current economic contributions of the railroad sectors were estimated in IMPLAN using total output values for two railroad-related sectors, railroad transportation and scenic and sightseeing transportation and support activities. Railroad Transportation includes industries that provide rail transportation of

passengers and/or cargo using railroad rolling stock. Scenic and sightseeing transportation and support activities include transportation equipment to provide recreation and entertainment as well as support activities for rail transport. Economic contribution analyses address the importance or contribution of an existing industry to a local economy. Economic contributions of trucking were estimated in IMPLAN using the total output value for the sector transport by truck. Though outside the scope of this analysis, it should be noted that these transportation sectors support other industries within the River Corridor, including but not limited to, agriculture, energy development and mining industries.

The tables below summarize the results of the contribution analysis for railroad and trucking across all five segments. All results as presented are in 2012 dollars. In 2012, both railroad-related sectors contributed the most to the economy of Yellowstone County, MT, Segment 3. Railroad transportation contributed 1,400 jobs $88.0 million in labor income and nearly $208 million in value added while scenic and sightseeing transportation and rail support activities contributed 2,700 jobs, $115.0 million in labor income and nearly $144 million in value added (see Tables 64 and 65). This is not surprising as Yellowstone County has three rail lines that pass through, Burlington Northern Santa Fe, Montana Rail Link and Signal Peak Energy. Yellowstone County also houses one port facility and three intermodal facilities (Montana Department of Transportation, 2013). Railroads contributed the least in Segment 4 with both sectors contributing 5 jobs, total and less than $1 million in labor income or value added (see Tables 66 and 67). In Segment 4, the BNSF (Burling Northern Santa Fe Railway) operates through Carbon County and the Montana Rail Link operates through Sweet Grass and Stillwater Counties, but there are not any port or intermodal facilities in any of the counties (Montana Department of Transportation, 2013).

Trucking also contributed the most to the economy of Yellowstone County, MT (see Table 72). In 2012, transport by trucking contributed an estimated 3,200 jobs, $163.3 million in labor income and $228.3 million in value added. Trucking also contributed to the economy of the counties in Segment 1. This is not surprising given the recent increase in trucking activity that can be attributed to the Bakken Oil Fields, located in close proximity to the counties in Segment 1. Transport by truck contributed an estimated 2,700 jobs, $218.9 million in labor income and $300.8 million in value added to the economy of Segment 1 (see Table 70). Transport by truck contributed the least to Segment 5, Park County, contributing an estimated 60 jobs, $2.3 million in labor income and $3.3 million in value added (see Table 74).

Table 60. Contribution of Railroad Transportation in Segment 1

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	300	$28.1	$91.8
Secondary Effects	300	$15.7	$24.3
Total Effects	600	$43.8	$116.1

Table 61. Contribution of Scenic and sightseeing transportation and support activities in Segment 1

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	15	$1.1	$1.1
Secondary Effects	5	$0.2	$0.4
Total Effects	20	$1.3	$1.4

Table 62. Contribution of Railroad Transportation in Segment 2

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	130	$13.5	$44.1
Secondary Effects	170	$5.7	$9.5
Total Effects	300	$19.2	$53.6

Table 63. Contribution of Scenic and sightseeing transportation and support activities in Segment 2

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	14	$0.1	$0.1
Secondary Effects	4	$0.1	$0.2
Total Effects	18	$0.2	$0.3

Table 64. Contribution of Railroad Transportation in Segment 3

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	400	$43.3	$141.2
Secondary Effects	1000	$44.7	$66.6
Total Effects	1400	$88.0	$207.8

Table 65. Contribution of Scenic and sightseeing transportation and support activities in Segment 3

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	1500	$69.3	$73.3
Secondary Effects	1200	$45.7	$70.5
Total Effects	2700	$115.0	$143.8

Table 66. Contribution of Railroad Transportation in Segment 4

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	2	$0.22	$0.73
Secondary Effects	3	$0.07	$0.12
Total Effects	5	$0.29	$0.85

Table 67. Contribution of Scenic and sightseeing transportation and support activities in Segment 4

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	4	$0.02	$0.03
Secondary Effects	< 1	$0.02	$0.04
Total Effects	5	$0.05	$0.07

Table 68. Contribution of Railroad Transportation in Segment 5

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	52	$5.5	$18.1
Secondary Effects	86	$2.2	$3.9
Total Effects	138	$7.8	$22.0

Table 69. Contribution of Scenic and sightseeing transportation and support activities in Segment 5

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	13	$0.2	$0.3
Secondary Effects	5	$0.1	$0.2
Total Effects	18	$0.4	$0.5

Table 70. Contribution of Transport by truck in Segment 1

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	1900	$183.4	$239.1
Secondary Effects	800	$35.5	$61.6
Total Effects	2700	$218.9	$300.8

Table 71. Contribution of Transport by truck in Segment 2

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	200	$10.8	$14.6
Secondary Effects	100	$3.6	$6.5
Total Effects	300	$14.5	$21.1

Table 72. Contribution of Transport by truck in Segment 3

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	1600	$99.6	$128.2
Secondary Effects	1600	$63.7	$100.1
Total Effects	3200	$163.3	$228.3

Table 73. Contribution of Transport by truck in Segment 4

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	110	$5.3	$7.3
Secondary Effects	40	$1.2	$2.2
Total Effects	150	$6.4	$9.5

Table 74. Contribution of Transport by truck in Segment 5

Impact Type	Employment	Labor Income (in millions)	Value Added (in millions)
Direct Effect	40	$1.7	$2.4
Secondary Effects	20	$0.5	$0.9
Total Effects	60	$2.3	$3.3

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