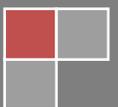


The Economic Impact of Non-motorized Trail Usage on National Forests in Wyoming

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30-Jun-13



Introduction

Many opportunities exist for non-motorized recreation in Wyoming including hiking, backpacking, cross-country skiing, snowshoeing, biking, and horseback riding. Results from the 2013 Wyoming Trails Inventory Report (Nagler et al., 2013) indicate that there are a total of 2,160 trails or trail segments in Wyoming with a combined length of 10,470 miles. These estimates include trails with shared motorized and non-motorized use. These trails are managed by a variety of federal, state, local, and tribal agencies as well as private organizations (Table 1). These trails significantly contribute to the quality of life for many residents of the state as well as increasing visitor enjoyment during their stay in the Wyoming. The spending associated with the use of these trails is also important to the state's economy through the jobs and income generated in Wyoming.

Unfortunately, quantifying the economic impact of non-motorized trail use is difficult. Unlike motorized trail use, such as snowmobiling and the use of off-road vehicles, there are generally no permits associated with non-motorized trail use. As a result there is no centralized database with contact information that can be used to survey non-motorized trail users to determine how much they use trails and their expenditures associated with that use. Instead, quantifying the economic impact of non-motorized trail use typically requires intercept sampling of users at the trail sites. Due to the disbursed nature of trails this is a time-consuming and expensive process that is particularly difficult to accomplish at the state level. As a result information on the economic impact of non-motorized trail use is generally more limited than that for motorized trail use.

Methodology

Due to the difficulties mentioned above, intercept sampling of non-motorized trail users in Wyoming was beyond the scope of this project. In addition, a review of the recreation data available from the various agencies that manage trails in Wyoming indicated that only the U.S. Forest Service, through its National Visitor Use Monitoring (NVUM) program (2013), had statewide data on both non-motorized trail use and expenditures. Due to these data limitations, this analysis will focus on the economic impact of non-motorized trail use on the National Forests located in Wyoming. This includes non-motorized trail use on the Bighorn National Forest, the Bridger-Teton National Forest, the Medicine Bow National Forest, and the Shoshone National Forest. Because the NVUM analysis is only designed to estimate recreation at the forest level, it was not possible to estimate recreation use for forests that are only partially located in Wyoming. The recreation trips included in the analysis were hiking/walking, biking, cross-country skiing, back packing, horseback riding, and other non-motorized activities where these recreation activities were the primary purpose of the trips. Other non-motorized activities represent a variety of non-motorized outdoor recreation activities in addition to the specific set of activities listed. It could include such things as dog sledding, hang gliding, llama packing, goat packing, and geocaching; some of which may involve little actual trail use.

While focusing strictly on U.S. Forest Service non-motorized recreation use is not a complete evaluation of the economic impact of non-motorized trail use in Wyoming; it does provide a good starting point since the Forest Service represents nearly two-thirds of the trails in Wyoming and nearly three-fourths of the trail miles (Table 1). The analysis also illustrates the type of recreation information that would be needed from the other agencies in order to estimate the total economic impact of all non-motorized trail use in Wyoming.

Table 1. Trails in Wyoming by Agency

Agency	Number of Trails	Percent of Total	Miles of Trails	Percent of Total
<u>Federal</u>				
U.S. Forest Service	1,399	64.8%	7,610	72.7%
National Park Service	284	13.1%	1,474	14.1%
Bureau of Land Management	71	3.3%	520	5.0%
U.S. Fish and Wildlife Service	1	0.0%	1	0.0%
Total Federal	1,755	81.3%	9,605	91.7%
<u>State</u>				
Wyoming State Parks	236	10.9%	115	1.1%
Wyoming Game and Fish	5	0.2%	6	0.1%
Wyoming Department of Transportation	3	0.1%	6	0.1%
Total State	244	11.3%	127	1.2%
<u>Local</u>				
Cities and Towns	86	4.0%	393	3.8%
County Government	25	1.2%	102	1.0%
Total Local	111	5.1%	495	4.7%
<u>Private</u>	11	0.5%	112	1.1%
<u>Wind River Indian Reservation</u>	39	1.8%	131	1.3%
Grand Total	2,160	100.0%	10,470	100.0%

The economic contribution and economic impact of non-motorized trail use on national forest land in Wyoming was estimated using a 2011 IMPLAN model of the Wyoming economy. IMPLAN is an economic assessment package developed by the Minnesota IMPLAN Group (2013) which provides economic resolution down to the county level. By constructing Social Accounts that describe the structure and function of a specific economy, IMPLAN creates a localized model to investigate the consequences of projected economic activity in a specific geographic region. IMPLAN is typically used for economic contributions and impact analysis because it is readily available for any county in the United States, it is very detailed (440 sectoring scheme), relatively easy to adjust to more accurately reflect the structure of local industries, and comparatively inexpensive.

Results

Table 2 summarizes annual non-motorized trail use on the four national forests in Wyoming. NVUM data indicates that there were more than one million annual visits to the four national forests in Wyoming where non-motorized recreation was the primary purpose of the visit. NVUM defines a visit as the entry of one person upon a national forest to participate in recreation activities for an unspecified period of time. The visit ends when the person leaves the national forest to spend the night somewhere else. Of the total non-motorized visits reported 57 percent occurred in the Bridger-Teton National Forest, followed by 25 percent in the Medicine Bow National Forest, 13 percent in the Shoshone National Forest, and 5 percent in the Bighorn National Forest. Hiking/walking was the most popular non-motorized trail use (51 percent), followed by cross-country skiing (25 percent), biking (11 percent), horseback riding (5 percent), back packing (3 percent) and other activities (5 percent). Statewide non-motorized trail visits represent one-quarter of the 4.4 million total annual recreation visits to national forests in Wyoming. The percent of non-motorized recreation visits ranges from a high of 29 percent of total visits for the Bridger-Teton National Forest to a low of 9 percent of total visits for the Bighorn National Forest.

Table 2. Non-Motorized Trail Use on National Forests in Wyoming by Type of Recreation

Type of Recreation	Bighorn Forest	Bridger-Teton Forest	Medicine Bow Forest	Shoshone Forest	Total Wyoming Forests	Percent of Non-Motorized Use
Hiking/Walking	36,003	322,885	99,033	100,139	558,060	51.0%
Biking	4,800	93,811	14,855	3,230	116,697	10.7%
X-C Skiing	1,200	148,353	106,956	18,736	275,244	25.2%
Back Packing	7,201	8,727	17,826	3,876	37,629	3.4%
Horseback Riding	3,600	19,635	8,913	18,736	50,884	4.7%
Other Non-Motorized	0	32,725	20,797	1,292	54,814	5.0%
Total Non-Motorized	52,804	626,135	268,380	146,009	1,093,328	100.0%
Percent by Forest	4.8%	57.3%	24.5%	13.4%	100.0%	
Total Visits	600,042	2,181,655	990,331	646,059	4,418,087	
Percent Non-Motorized	8.8%	28.7%	27.1%	22.6%	24.7%	

Because spending levels differ between local and non-local visitors on different types of recreation visits to national forests, NVUM breaks out total recreational use by seven types of visit. The visit types include: 1) Non-Local day visitors; 2) Non-Local visitors staying overnight on the Forest; 3) Non-Local visitors staying overnight off the Forest; 4) Local day visitors; 5) Local visitors staying overnight on the Forest; 6) Local visitors staying overnight off the Forest; and 7) Non-Primary visitors. Local visitors are defined as individuals who indicated that they traveled 60 miles or less to the recreation site where they were interviewed. Non-primary visits represent individuals who were recreating on a national forest but indicated that recreating on the national forest was not the primary purpose of the trip. For example, an individual recreating on the Bridger-Teton National Forest who indicated that the primary purpose of the trip was to visit Yellowstone National Park would be considered a non-primary visit.

Table 3 summarizes non-motorized trail use by type of visit and visitor expenditure on national forests in Wyoming. Approximately two-thirds of the one million plus visits to the national forest are by local residents, with 23 percent by non-locals residents, and 12 percent by individuals on non-primary visits; the majority of which are non-local visitors. Among local visitors the vast majority of visits represent day use (95 percent of local visits). There is more variability in visit type for non-local visitors with the largest category being overnight staying off the forest (42 percent of non-local visits).

Table 3. Non-Motorized Trail Use Visitor Expenditures for National Forests in Wyoming

Type of Visit	Number of Visits	Percent of Total	Per Person Per Visit Spending	Total Visitor Spending	Percent of Total	Out of Area Substitute Site	Net Visitor Spending	Percent of Total
Non-Local Day	82,667	7.6%	\$30.97	\$2,560,240	4.9%	100.0%	\$2,560,240	6.2%
Non-Local Overnight On Forest	60,422	5.5%	\$120.35	\$7,271,950	14.0%	100.0%	\$7,271,950	17.6%
Non-Local Overnight Off Forest	102,650	9.4%	\$262.05	\$26,899,095	51.9%	100.0%	\$26,899,095	65.0%
Total Non-Local Visits	245,739	22.5%	\$149.47	\$36,731,284	70.8%		\$36,731,284	88.8%
Local Day	681,830	62.4%	\$14.89	\$10,151,273	19.6%	17.0%	\$1,725,716	4.2%
Local Overnight On Forest	24,694	2.3%	\$87.66	\$2,164,649	4.2%	36.0%	\$779,274	1.9%
Local Overnight Off Forest	11,686	1.1%	\$108.53	\$1,268,266	2.4%	46.0%	\$583,402	1.4%
Total Local Visits	718,211	65.7%	\$18.91	\$13,584,188	26.2%		\$3,088,392	7.5%
Non-Primary	129,378	11.8%	\$11.93	\$1,543,336	3.0%	100.0%	\$1,543,336	3.7%
Total Non-Local, Local Visits	1,093,328	100.0%	\$47.43	\$51,858,808	100.0%		\$41,363,012	100.0%

Spending levels differ significantly between visit types, ranging from a high of \$262.05 per person per visit for non-local visitors staying overnight off the forest to \$14.89 per person per visit for local visitors on day trips (Table 3). Non-primary visitor spending is based on local day spending but is somewhat lower due to a larger average party size. Spending levels are higher for non-local visitors versus local visitors, overnight visits versus day visits, and staying overnight off the forest versus staying overnight on the forest.

As shown in Table 3, the estimated total visitor spending associated with non-motorized trail use on National Forests in Wyoming is estimated to be \$51.9 million. Unlike non-motorized trail use, the majority of non-motorized trail expenditures are by non-locals (71 percent). This results from their higher per person per visit spending levels. Although they represent less than 10 percent of total visits, non-local visitors staying overnight off the forest contribute more than 50 percent of total visitor spending. Table 4 indicates that of the \$51.9 million in expenditures nearly two-thirds is associated with non-motorized recreation on the Bridger-Teton National Forest, 20 percent is associated with non-motorized recreation on the Medicine Bow National Forest, 11 percent is associated with non-motorized recreation on the Shoshone National Forest, and 4 percent is associated with non-motorized recreation on the Bighorn National Forest.

Table 4. Total Non-Motorized Use Visitor Expenditures by National Forest

Forest	Total Spending	Percent of Total
Bighorn National Forest	\$2,246,401	4.3%
Bridger-Teton National Forest	\$33,386,621	64.4%
Medicine Bow National Forest	\$10,331,055	19.9%
Shoshone National Forest	\$5,894,731	11.4%
Total	\$51,858,808	100.0%

There are two types of analysis commonly used to measure the economic importance of recreation activities to a region's economy: 1) Economic Contribution and 2) Economic Impact. While spending by local visitors is typically **included** in economic contribution analysis, local visitor spending is typically **excluded** from impact analysis in an attempt to estimate the impact in terms of "with" versus "without" the recreation opportunity. The issue is whether spending by local visitors to a recreation site would be lost to the regional economy in the absence of the recreation opportunity or whether this money would be spent locally anyway on other activities. To help address this and other economic issues the NVUM survey asked respondents to report what they would have done if they were unable to use the recreation site where they were interviewed. If local visitors would have gone outside the region in the absence of the recreation opportunity, their spending would constitute a loss to the local economy and should therefore be included in an impact analysis. Results from the NVUM survey reported in Table 3 indicate that 17 percent of local day trip visitors, 36 percent of local visitors staying overnight on the forest, and 46 percent of local visitors staying overnight off the forest would have gone to a substitute site outside the region if the recreation opportunity had not been available locally. These estimates were used to adjust total visitor spending to net visitor spending. This adjustment reduced total visitor spending from \$51.9 million to net visitor spending of \$41.4 million (a 20 percent reduction).

However, the local versus non-local distinction is more complicated in this analysis since it is being conducted at the state level. As a result visitors who are considered as non-locals from a forest perspective may in fact be locals from the state perspective. For example residents from Casper may visit the Bighorn National Forest to recreate and would be considered non-local visitors from the Bighorn National Forest perspective but local visitors from a Wyoming perspective. Due to the

uncertainty regarding locals versus non-local visitors both economic contribution and economic impact were calculated for this analysis.

Table 5 summarizes the economic contributions and economic impact estimates for non-motorized trail use on National Forests in Wyoming. From an economic contributions standpoint, the IMPLAN model estimates that the \$51.9 million of total visitor spending generated \$16.0 million in secondary economic activity (indirect and induced) within the state’s economy for a total economic contribution of \$67.9 million. This level of overall economic activity is estimated to support the equivalent of 600 year-round jobs and generate \$17.8 million in labor income in the Wyoming economy. The average earnings per job are estimated to be \$29,623.

From an economic impact standpoint, the IMPLAN model estimates that the \$41.3 million of net visitor spending generates \$13.8 million in secondary economic activity (indirect and induced) within the state’s economy for a total economic impact of \$55.1 million. This level of overall economic activity is estimated to support the equivalent of 505 year-round jobs and generate \$15.0 million in labor income in the Wyoming economy. The average earnings per job are estimated to be \$29,609 (see Table 5).

Table 5. Economic Contribution and Economic Impact of Non-Motorized Trail Use on National Forest In Wyoming

	Economic Contributions	Economic Impact
<u>Output</u>		
Direct	\$51,858,808	\$41,363,012
Indirect	\$9,048,885	\$7,894,452
Induced	\$6,993,361	\$5,881,543
Total	\$67,901,054	\$55,139,007
<u>Employment</u>		
Direct	477.0	399.5
Indirect	65.5	57.2
Induced	57.9	48.7
Total	600.4	505.4
<u>Labor Income</u>		
Direct	\$12,435,703	\$10,342,795
Indirect	\$3,190,108	\$2,805,374
Induced	\$2,159,548	\$1,816,221
Total	\$17,785,359	\$14,964,390
<u>Earnings Per Job</u>		
Direct	\$26,071	\$25,889
Indirect	\$48,704	\$49,045
Induced	\$37,298	\$37,294
Total	\$29,623	\$29,609

Summary and Conclusions

The many opportunities that exist for non-motorized recreation in Wyoming contribute to the quality of life for many residents, increases visitor enjoyment during the stay in the area, and are economically important to the state's economy. This analysis has focused on the economic contribution and impact of non-motorized trail use in National Forests in Wyoming in terms of jobs and income generation.

The results of the analysis indicate that there are more than one million annual visits to the four National Forests in Wyoming where non-motorized recreation was the primary purpose of the trip. Hiking/walking was the most popular non-motorized trail use (51 percent), followed by cross-country skiing (25 percent), biking (11 percent), horseback riding (5 percent), back packing (3 percent) and other non-motorized activities (5 percent). Statewide, non-motorized trail visits represented one-quarter of the 4.4 million total annual recreation visits to National Forests in Wyoming.

Approximately two-thirds of the more than one million non-motorized trail visits to National Forests in Wyoming were by local residents traveling 60 miles or less to the recreation site, with 23 percent by non-local residents, and 12 percent by non-primary visitors. Non-primary visitors are individuals whose primary purpose for the trip was not to visit the national forest, the majority of which are non-locals.

The estimated total visitor spending associated with non-motorized trail use on National Forests in Wyoming is estimated to be \$51.9 million annually. Unlike non-motorized trail use, the majority of non-motorized trail expenditures in Wyoming are by non-locals (71 percent). This results from the higher per person per visit spending by non-local visitors. For example, although they represent less than 10 percent of total visits, non-local visitors staying overnight off the forest represent more than 50 percent of total visitor spending for non-motorized trail use.

The results indicate that visitor spending for non-motorized trail use on National Forests in Wyoming generated between \$55.1 million and \$67.9 million in total economic activity in Wyoming. This level of economic activity is estimated to support the equivalent of between 505 and 600 year-round jobs and between \$15.0 million and \$17.8 million in labor income.

Because this analysis only considers the economic importance of non-motorized trail use on National Forests located in Wyoming, it is not a complete assessment of the total economic importance of non-motorized trail use in the state. Unfortunately, data limitations prevented the estimation of the economic importance of other non-motorized trails in the state. Since the Forest Service represents nearly two-thirds of the trails and nearly three-fourths of the trail miles in Wyoming (Table 1), it may seem reasonable to extrapolate from the National Forest results to the other trail systems in the state. However, such an extrapolation is probably not appropriate because the intensity of use and expenditures associated with that use on other trail systems could be considerably different from those for Forest Service trails. For example, trail systems in more urban areas of Wyoming probably have much higher intensity of use than many Forest Service trails which tend to be in more remote areas. In addition, the mix of resident and nonresident use and the type of visits are also probably different. Consequently, it is expected that there are potential differences in spending and use between trail systems. Even within the Forest Service, the NVUM analysis identifies three different categories of Forest in terms of expenditures 1) Above Average Spending Forests, 2) Average Spending Forests, and 3) Below Average Spending Forests. The NVUM analysis also notes that spending by National Park Service

visitors, which has the second largest number of trail and trail miles in Wyoming (Table 1), is higher than National Forest visitors for all types of visits. This suggests potential heterogeneity in expenditures across visitors and supports the likelihood of differences in expenditures on different trails outside of the forest. Finally, it is difficult to apply NVUM expenditure estimates to use for other trail systems since the NVUM expenditures are based on visits for an unspecified time period rather than daily spending. Due to these limitations, further research would be necessary to adequately measure the total economic importance of non-motorized trail use in Wyoming.

An accurate assessment of economic impacts from non-motorized trail usage on trails in Wyoming outside the National Forests would require primary data gathered from users. This research could be done by intercept sampling these trails with a design that allowed researchers to adequately represent different user groups, time and date of usage (such as morning versus afternoon or weekday versus weekend use), and mitigate avidity bias that could affect related survey responses. Respondents could then be asked to fill out surveys and/or trip diaries for a specified period of time that would capture usage and appropriate expenditures data that could be used for economic impact estimates. If any state agencies engaged in survey efforts about non-motorized trails usage, additional questions necessary to obtain the appropriate economic data could be added at minimal cost to existing survey instruments. In the absence of such efforts any extrapolation from the economic estimates reported here to other trails in Wyoming would be mere speculation.

References

Minnesota IMPLAN Group (MIG). 2013: <http://implan.com/V4/Index.php>

Nagler, A.M., C.T. Bastian, D.T. Taylor, and T.K. Foulke. 2013. 2103 Wyoming Statewide Trails Inventory Report. Prepared for the State of Wyoming, Department of State Parks and Cultural Resources by the Department of Agricultural and Applied Economics, University of Wyoming, Draft Report July 2013.

National Visitor Use Monitoring Program – USDA Forest Service. 2013:
<http://www.fs.fed.us/recreation/programs/nvum/>