



# Impacts of Visitor Spending on the Local Economy:

## *Fossil Butte National Monument, 2010*



**ON THE COVER**

Photograph courtesy of Fossil Butte National Monument

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# **Impacts of Visitor Spending on the Local Economy:** *Fossil Butte National Monument, 2010*

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## Executive Summary

Fossil Butte National Monument hosted 19,700 recreation visits in 2010. Adjustments for visitor group size and re-entries resulted in 6,918 visitor group trips to the park in 2010. Based on a 2010 Visitor Services Project survey conducted August 1-8, 50% of these visitor group trips were day trips not including an overnight stay within 30 miles of the park.<sup>1</sup> Thirty percent of the visitor group trips involved an overnight stay in motels, lodges or cabins outside the park, and 13% of visitor group trips included overnight stays in campgrounds outside the park.

Visitors reported their group's expenditures inside the park and within 30 miles of the park. In 2010, the average visitor group size was 2.8 people and spent an average of \$121 in the park and local region. Average spending per visitor group trip was \$35 for visitors on day trips, \$264 for visitors staying in motels or lodges outside the park, and \$160 for visitors camping outside the park. Overall, 92% of spending took place outside the park.

Total visitor spending in 2010 in the local region was \$840,000 including \$69,000 inside the park. The greatest proportions of expenditures were for lodging (32%), gas and oil (18%), and souvenirs and other expenses (18%). Overnight visitors staying in motels or lodges outside the park accounted for 66% of total spending, and campers accounted for 17%.

Only 30% of visitor groups indicated the park visit was the primary reason for their trip to the area. Counting only a portion of visitor expenses if the park visit was not the primary trip purpose yields \$676,000 in spending attributed directly to the park.

The economic impact of park visitor spending was estimated by applying the spending to an input-output model (IMPLAN) of the local economy. The local region was defined as a one-county region including Lincoln County, Wyoming. Although the county is larger than the 30-mile radius from the park where visitors reported spending, it is the smallest region for which economic input-output model data are available.

Including direct and secondary effects, the \$676,000 in visitor spending attributed to the park generates \$671,000 in sales in the region, which supports 12 jobs. These jobs pay \$213,000 in labor income, which is part of \$372,000 in value added to the region.<sup>2</sup>

A separate study estimated impacts of the park employee payroll on the local economy.<sup>3</sup> The park itself employed 11 people in FY 2010 with a total payroll including benefits of \$642,000. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$208,000 in sales, supporting 13 jobs, \$700,000 in labor income, and \$764,000 in value added.

<b>Local Economic Impacts of Fossil Butte National Monument</b>				
	<u>Sales</u>	<u>Jobs</u>	<u>Labor Income</u>	<u>Value Added</u>
Park Visitor Spending	\$671K	12	\$213K	\$372K
Park Payroll	+ \$208K	+ 13	+ \$700K	+ \$764K
Park Visitor Spending + Payroll	\$879K	25	\$913K	\$1,136K

<sup>1</sup> Results in this study sometimes differ from those reported in the VSP study report (Boyd and Hollenhorst 2011) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

<sup>2</sup> Jobs include fulltime and part-time jobs. Labor income consists of wages and salaries, payroll benefits and income of sole proprietors. Value added includes labor income as well as property income (dividend, royalties, interest and rents) to area businesses and indirect business taxes (sales, property, and excise taxes). Impacts on the local economy of spending by NPS employees are not included in these results,

<sup>3</sup> Stynes (2011).

## **Acknowledgments**

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# Introduction

Fossil Butte National Monument (NM) preserves some of the world’s best fossils within the 50-million-year-old Green River lake beds of southwestern Wyoming. Fossils preserved include fish, alligators, bats, turtles, dog-sized horses, insects, and many other species of plants and animals. The park became a national monument in 1972 and is located in Lincoln County, Wyoming. Fossil Butte NM received 19,700 recreation visits in 2010 (Table 1).

**Table 1. Recreation visits, Fossil Butte National Monument, 2010**

<b>Month</b>	<b>Recreation Visits</b>
January	121
February	122
March	275
April	441
May	1,962
June	3,218
July	5,211
August	3,981
September	3,055
October	1,071
November	181
<u>December</u>	<u>62</u>
<b>Total</b>	<b>19,700</b>

Source: NPS Public Use Statistics 2010.

The purpose of this study is to estimate the local economic impacts of visitors to Fossil Butte NM in 2010. Economic impacts are measured as the direct and secondary sales, income, and jobs in the local region resulting from spending by park visitors. (See Appendix A: Glossary for definitions of terms.) The local economic region defined for this study includes Lincoln County, Wyoming.<sup>4</sup>

This one-county region of Wyoming has a population of 16,185 (USCB 2010), gross regional product of \$743 million (MIG, Inc. 2008), median household income of \$52,174, and family poverty rate of 3.8% (USCB 2010). State and local governments are the major employers in the region (MIG, Inc. 2008), and the region experienced a 9.1% unemployment rate in 2010 (BLS 2010).

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<sup>4</sup> Although park managers indicate there are significant differences in the local economies of northern and southern Lincoln County, the county level is the smallest unit for which economic input-output modeling data are available.

## Methods

The economic impact estimates are produced using the Money Generation Model 2 (MGM2) (Stynes et al. 2007). The three main inputs to the model are:

- 1) number of visits broken down by lodging-based segments;
- 2) spending averages for each segment; and
- 3) economic multipliers for the local region.

Inputs are estimated from the Fossil Butte NM Visitor Services Project (VSP) study data (Boyd and Hollenhorst 2011), National Park Service Public Use Statistics (2010), and IMPLAN input-output modeling software (MIG, Inc. 2008). The MGM2 model provides a spreadsheet template for combining park use, spending, and regional multipliers to compute changes in sales, labor income, jobs, and value added in the region.

The VSP visitor study was conducted at Fossil Butte NM from August 1-8, 2010 (Boyd and Hollenhorst 2011).<sup>5</sup> The VSP study measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a systematic, random sample of 340 visitor groups. Visitors returned 247 questionnaires resulting in a response rate of 72.6%.

Spending and economic impact estimates for Fossil Butte NM are based on the 2010 VSP survey data. Visitors were asked to report expenditures in the park and within 30 miles of the park. The local region for determining economic impact was defined as a one-county area around the park including Lincoln County in southwestern Wyoming. Although the county is larger than the 30-mile radius from the park where visitors reported spending, it is the smallest region for which economic input-output model data are available.

The MGM2 model divides visitors into segments to help explain differences in spending across distinct user groups. Four segments were established for Fossil Butte NM visitors based on reported trip characteristics and lodging expenditures:

**Day trip:** Visitors from outside the local area not staying overnight within 30 miles of the park.<sup>6</sup>

**Motel-out:** Visitors reporting motel expenses in the local area within 30 miles of the park.

**Camp-out:** Visitors reporting camping expenses in the local area within 30 miles of the park.

**Other overnight (Other OVN):** Visitors staying overnight within 30 miles of the park, but not reporting any lodging expenses. This segment includes visitors staying in private homes, with friends or relatives, or in other unpaid lodging.<sup>7</sup>

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<sup>5</sup> Results in this study sometimes differ from those reported in the VSP study report (Boyd and Hollenhorst 2011) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

<sup>6</sup> No visitors in the sample identified themselves as being from the local region.

<sup>7</sup> Visitors reporting multiple lodging types and expenditures were classified based on the greatest reported lodging expense. Some visitors listing motels or campgrounds as lodging types did not report any lodging expenses and were classified in the other overnight (Other OVN) category.

The VSP survey data was used to estimate the percentage of visitors from each segment as well as spending averages, lengths of stay, and visitor group sizes for each segment.

## Results

### Visits

Based on the VSP survey data, 48% of park entries were classified as day trip visits by visitors from outside the region, and 52% were classified as overnight visits including an overnight stay in the local region (Table 2). The average visitor group size ranged from 2.7 to 3.3 people across the four segments with an average visitor group of 2.8 people.<sup>8</sup> The average length of stay in the local region on overnight trips was 1.5 nights.

**Table 2.** Selected visit/trip characteristics by segment, 2010

Characteristic	Segment				All visitors
	Day trip	Motel-out	Camp-out	Other OVN	
Visitor segment share (park entries)	48%	30%	14%	8%	100%
Average visitor group size	2.7	2.7	3.0	3.3	2.8
Length of stay (days or nights)	1.0	1.4	1.4	1.9	1.5
Re-entry rate (park entries per trip)	1.0	1.0	1.0	1.0	1.0
Percent primary purpose trips	26%	36%	33%	29%	30%

Thirty percent of visitor groups indicated that visiting the park was the primary reason for their trip to the area. Other stated reasons included traveling through, visiting other attractions in the area, and visiting friends and relatives in the area.

The 19,700 recreation visits in 2010 were allocated to the four segments using the visit segment shares in Table 2. Since spending is reported for the stay in the area, park entries were converted to trips to the area by dividing by the average number of times each visitor group entered the park during their stay. Park re-entry rates were estimated based on the number of entries into the park reported by survey respondents, which were approximately equal to 1.0 for all visitor segments (Table 2). Recreation visits were converted to 6,918 visitor group trips by dividing recreation visits by the average visitor group size and park entry rate for each segment (Table 3).

<sup>8</sup> Visitor group size reported herein is based on the number of people covered by expenditures reported in the VSP survey.

**Table 3.** Recreation visits and visitor group trips by segment, 2010

Measure	Segment				All visitors
	Day trip	Motel-out	Camp-out	Other OVN	
Recreation visits	9,359	5,939	2,740	1,663	19,700
Visitor group trips	3,448	2,105	871	493	6,918
Percent of visitor group trips	50%	30%	13%	7%	100%

## Visitor Spending

The visitor survey collected data about expenditures of the visitor group inside the park and within 30 miles of the park. Spending averages were computed on a visitor group trip basis for each segment. The average visitor group in 2010 spent \$121 on the trip inside the park and in the local region (Table 4). On a visitor group trip basis, average spending was \$35 for day trips, \$264 for visitors staying in motels, cabins, lodges or B&B's outside the park, and \$160 for those camping outside the park. Visitor groups spent about 92% of their total spending outside the park.

**Table 4.** Average spending by segment (\$ per visitor group per trip).

Expenditures	Segment				All visitors*
	Day trip	Motel-out	Camp-out	Other OVN	
<b>Inside Park</b>					
<u>Souvenirs &amp; other expenses</u>	<u>12.00</u>	<u>8.66</u>	<u>9.28</u>	<u>2.43</u>	<u>9.96</u>
<b>Total Inside Park</b>	<b>12.00</b>	<b>8.66</b>	<b>9.28</b>	<b>2.43</b>	<b>9.96</b>
<b>Outside Park</b>					
Motel, hotel, cabin or B&B	.00	117.15	.00	.00	35.66
Camping fees	.00	1.15	19.18	.00	2.76
Restaurants & bars	4.80	35.82	22.32	9.43	16.78
Groceries & takeout food	1.85	13.58	36.21	7.94	10.18
Gas & oil	10.52	32.19	45.83	17.86	22.08
Local transportation	.00	11.92	.17	.00	3.65
Admission & fees	1.46	23.74	5.55	.00	8.65
<u>Souvenirs &amp; other expenses</u>	<u>4.72</u>	<u>19.52</u>	<u>21.80</u>	<u>8.37</u>	<u>11.64</u>
<b>Total Outside Park</b>	<b>23.36</b>	<b>255.07</b>	<b>151.07</b>	<b>43.60</b>	<b>111.40</b>
<b>Total Inside &amp; Outside Park</b>	<b>35.36</b>	<b>263.74</b>	<b>160.35</b>	<b>46.03</b>	<b>121.36</b>

\*Weighted by percent visitor group trips.

The relative standard error at a 95% confidence level for the overall spending average is 17%. A 95% confidence interval for the overall visitor group spending average is therefore \$121 plus or minus \$20 or between \$101 and \$141.

On a per night basis, visitor groups staying in motels or lodges outside the park spent \$185 in the local region, and campers spent \$115. The average reported per night lodging expense was \$82 for motels outside the park and \$14 for camping fees outside the park (Table 5).

**Table 5.** Average spending per night for visitor groups on overnight trips (\$ per visitor group per night).

<b>Expenditures</b>	<b>Segment</b>		
	<b>Motel-out</b>	<b>Camp-out</b>	<b>Other OVN</b>
Motel, hotel, cabin or B&B	82.37	0.00	0.00
Camping fees	0.81	13.79	0.00
Restaurants & bars	25.18	16.05	4.88
Groceries & takeout food	9.55	26.02	4.11
Gas & oil	22.64	32.94	9.24
Local transportation	8.38	0.12	0.00
Admission & fees	16.70	3.99	0.00
<u>Souvenirs &amp; other expenses</u>	<u>19.82</u>	<u>22.34</u>	<u>5.59</u>
<b>Total per visitor group per night</b>	<b>185.44</b>	<b>115.25</b>	<b>23.81</b>

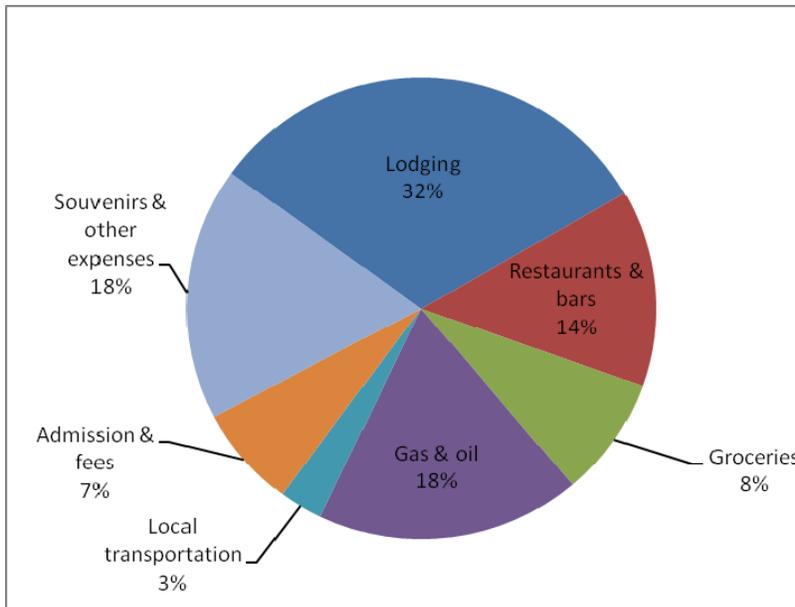
Total spending was estimated by multiplying the number of visitor group trips for each segment by the average spending per trip and summing across segments. Fossil Butte NM visitors spent a total of \$840,000 in the local region in 2010, including \$69,000 inside the park (Table 6).<sup>9</sup> Overnight visitors staying in motels outside the park account for 66% of the total spending. Lodging expenses represent 32% of the total spending, and gas & oil and souvenirs & other expenses each represent 18% (Figure 1).

**Table 6.** Total visitor spending by segment, 2010 (\$000's).

<b>Expenditures</b>	<b>Segment</b>				<b>All visitors</b>
	<b>Day trip</b>	<b>Motel-out</b>	<b>Camp-out</b>	<b>Other OVN</b>	
<b><u>Inside Park</u></b>					
<u>Souvenirs &amp; other expenses</u>	<u>41</u>	<u>18</u>	<u>8</u>	<u>1</u>	<u>69</u>
<b>Total Inside Park</b>	<b>41</b>	<b>18</b>	<b>8</b>	<b>1</b>	<b>69</b>
<b><u>Outside Park</u></b>					
Motel, hotel, cabin or B&B	0	247	0	0	247
Camping fees	0	2	17	0	19
Restaurants & bars	17	75	19	5	116
Groceries & takeout food	6	29	32	4	70
Gas & oil	36	68	40	9	153
Local transportation	0	25	0	0	25
Admission & fees	5	50	5	0	60
<u>Souvenirs &amp; other expenses</u>	<u>16</u>	<u>41</u>	<u>19</u>	<u>4</u>	<u>80</u>
<b>Total Outside Park</b>	<b>81</b>	<b>537</b>	<b>132</b>	<b>22</b>	<b>771</b>
<b>Total Inside &amp; Outside Park</b>	<b>122</b>	<b>555</b>	<b>140</b>	<b>23</b>	<b>840</b>
Segment Percent of Total*	15%	66%	17%	3%	100%

\*Percentages do not total 100% due to rounding.

<sup>9</sup> The Intermountain Natural History Association, which runs the bookstore and is the only place to purchase merchandise within the park, reported 2010 gross sales of \$45,671. Although the souvenir & other expenses category includes donations, respondents to the VSP survey appear to have overestimated their expenditures inside the park.



**Figure 1.** Fossil Butte National Monument visitor spending by category.

Not all visitor spending can be attributed to the park because some people would come to the region whether or not the park existed. Only 30% of visitor groups made the trip primarily to visit Fossil Butte NM, so 70% did not. Spending directly attributed to park visits was estimated by counting all spending on trips for which the park was the primary reason for the trip. If the park was not the primary trip purpose, one night of spending was counted for overnight trips and half of the spending outside the park was counted for day trips. All spending inside the park was treated as park-related spending. With these assumptions, a total of \$676,000 in visitor spending is attributed to the park visit (Table 7). This represents 80% of the overall visitor spending total. In summary, all of the spending by 30% of the visitor groups that made the trip primarily to visit Fossil Butte National Monument, and a fraction of the spending by 70% of visitors who did not make the trip primarily to visit the park is attributed to the park visit.

**Table 7.** Total spending attributed to park visits, 2010 (\$000's).

Expenditures	Segment				All visitors
	Day trip	Motel-out	Camp-out	Other OVN	
Motel, hotel, cabin or B&B	0	200	0	0	200
Camping fees	0	2	14	0	16
Restaurants & bars	10	61	16	3	90
Groceries & takeout food	4	23	26	3	55
Gas & oil	23	55	32	6	116
Local transportation	0	20	0	0	20
Admission & fees	3	41	4	0	48
<u>Souvenirs &amp; other expenses</u>	<u>52</u>	<u>52</u>	<u>24</u>	<u>4</u>	<u>131</u>
<b>Total Attributed to Park</b>	<b>92</b>	<b>453</b>	<b>115</b>	<b>15</b>	<b>676</b>
Percent of Spending Attributed to the Park	75%	82%	82%	68%	80%
Percent of Attributed Spending	14%	67%	17%	2%	100%

## Economic Impacts of Visitor Spending

The economic impacts of Fossil Butte NM visitor spending on the local economy are estimated by applying visitor spending to a set of economic ratios and multipliers in MGM2 representing the economy of the one-county region.<sup>10</sup> Economic ratios and multipliers for the region were estimated using the *Impact Analysis for Planning (IMPLAN) Professional software* (version 3, MIG, Inc. 2008) with 2008 data.<sup>11</sup> Employment multipliers were adjusted to take into account price changes from 2008 to 2010 (see Study Limitations and Errors section below).

Not all visitor spending is counted as direct sales to the region. The amount a visitor spends for a retail good is made up of the cost of the good from the producer, a markup by a wholesaler, and a markup by a retailer. In MGM2, retail and wholesale margins for grocery & takeout food, gas & oil, and souvenirs & other expenses are applied to visitor spending to account for mark-ups by retailers and wholesalers. The retail margins for the three sectors are 25.3%, 22.3%, and 50.0%, respectively, and the wholesale margins are 12.3%, 8.3%, and 11.4%. In addition, regional purchase coefficients from IMPLAN for all sectors are used to account for the proportion of demand within the region satisfied by imports into the region.

The tourism output sales multiplier for the region is 1.38. Every dollar of direct sales to visitors generates another \$0.38 in secondary sales through indirect and induced effects.<sup>12</sup> (See Appendix A: Glossary for further explanation of terms.)

The economic impacts to the local region are presented in two ways: (1) based on all visitor spending and (2) based only on visitor spending attributable to the park. The first estimate—including all visitor spending—shows the overall contribution park visitors make to the local region. The second estimate—including only visitor spending attributable to the park—shows the impact or contribution the park makes to the economy of the local region.

Using all visitor spending and including direct and secondary effects, the \$840,000 spent by park visitors generates \$831,000 in sales, which supports 14 jobs in the local region (Table 8). These jobs pay \$263,000 in labor income, which is part of \$459,000 in value added to the region.<sup>13</sup>

Value added is the preferred measure of the contribution of visitors to the local economy as it includes all sources of income to the area—payroll benefits to workers, profits and rents to businesses, and sales and other indirect business taxes that accrue to government units. Value added impacts are also comparable to Gross Regional Product, the broadest measure of total economic activity in a region. The largest direct effects are in lodging establishments and restaurants.

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<sup>10</sup> Economic ratios convert between various economic measures, e.g., direct spending to the directly associated jobs, labor income, and value added in each sector. Economic multipliers capture the secondary effects of economic measures.

<sup>11</sup> See Appendix B: Economic Ratios and Multipliers for the region.

<sup>12</sup> Indirect effects result from tourism businesses buying goods and services from local firms, while induced effects stem from household spending of income earned from visitor spending.

<sup>13</sup> Jobs include full and part time jobs. Labor income consists of wages and salaries, payroll benefits and income of sole proprietors. Value added includes labor income as well as profits and rents to area businesses and sales and excise taxes.

**Table 8.** Impacts of all visitor spending on the local economy, 2010.

<b>Sector/Expenditure category</b>	<b>Sales (\$000's)</b>	<b>Jobs</b>	<b>Labor Income (\$000's)</b>	<b>Value Added (\$000's)</b>
<b>Direct Effects</b>				
Motel, hotel, cabin or B&B	247	3.8	73	128
Camping fees	19	0.3	5	11
Restaurants & bars	116	2.7	35	48
Groceries & takeout food	18	0.4	9	15
Gas & oil	34	0.8	17	28
Local transportation	25	0.6	12	16
Admission & fees	60	1.4	15	23
Souvenirs & other expenses	75	2.2	35	57
Wholesale trade	8	0.1	3	5
<u>Local production of goods</u>	<u>1</u>	<u>0.0</u>	<u>0</u>	<u>0</u>
<b>Total Direct Effects</b>	<b>603</b>	<b>12.1</b>	<b>204</b>	<b>331</b>
<u>Secondary Effects</u>	<u>228</u>	<u>2.2</u>	<u>60</u>	<u>128</u>
<b>Total Effects</b>	<b>831</b>	<b>14.3</b>	<b>263</b>	<b>459</b>

Note: Impacts of \$840,000 in visitor spending reported in Table 6.

Using only visitor spending attributable to the park by including only some spending on trips where the primary trip purpose was not to visit Fossil Butte NM reduces the overall impacts by about 19% (Table 9; see spending inclusion assumptions in previous section). Including direct and secondary effects, the \$676,000 spent by park visitors and attributable to the park generates \$671,000 in sales, which supports 12 jobs in the local region. These jobs pay \$213,000 in labor income, which is part of \$372,000 in value added to the region.

**Table 9.** Economic impacts of visitor spending attributed to the park, 2010.

<b>Sector/Expenditure category</b>	<b>Sales (\$000's)</b>	<b>Jobs</b>	<b>Labor Income (\$000's)</b>	<b>Value Added (\$000's)</b>
<b>Direct Effects</b>				
Motel, hotel, cabin or B&B	200	3.1	59	104
Camping fees	16	0.2	4	9
Restaurants & bars	90	2.1	27	38
Groceries & takeout food	14	0.3	7	12
Gas & oil	26	0.6	13	22
Local transportation	20	0.5	10	13
Admission & fees	48	1.1	12	18
Souvenirs & other expenses	65	1.9	31	50
Wholesale trade	7	0.1	2	4
<u>Local production of goods</u>	<u>1</u>	<u>0.0</u>	<u>0</u>	<u>0</u>
<b>Total Direct Effects</b>	<b>487</b>	<b>9.8</b>	<b>165</b>	<b>268</b>
<u>Secondary Effects</u>	<u>184</u>	<u>1.8</u>	<u>48</u>	<u>104</u>
<b>Total Effects</b>	<b>671</b>	<b>11.6</b>	<b>213</b>	<b>372</b>

Note: Impacts of \$676,000 in visitor spending attributed to park reported in Table 7.

## **Impacts of the NPS Park Payroll**

In addition to visitor spending, spending by park employees also impacts the local region. A separate study (Stynes 2011) estimated the impacts of park payroll by applying economic multipliers to wage and salary data to capture the induced effects of NPS employee spending on local economies. Fossil Butte NM itself employed 11 people in FY 2010 with a total payroll including benefits of \$642,000. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$208,000 in sales, 13 jobs, \$700,000 in labor income, and \$764,000 value added (Stynes 2011).

The combined impacts to the region of visitor spending attributable to the park and NPS payroll are \$879,000 in sales, which support 25 jobs with labor income of \$913,000, which is part of a total value added of \$1.1 million.

## **Study Limitations and Errors**

The accuracy of the MGM2 estimates rests on the accuracy of three inputs: visits, spending averages, and multipliers. Visits are taken from NPS Public Use Statistics (2010). Recreation visit estimates rely on counting procedures at the park, which may miss some visitors and count others more than once during their visit. Re-entry rates are important to adjust the park visit counts to reflect the number of visitor trips to the region rather than park entries. Re-entry rates were estimated based on visitor responses to a VSP survey question about the number of times they entered the park.

Spending averages are derived from the 2010 Fossil Butte NM VSP visitor survey data (Boyd and Hollenhorst 2011). Estimates from the surveys are subject to sampling errors, measurement errors, and potential seasonal/sampling biases. The overall spending averages are subject to sampling errors of 17%.

Spending averages are also sensitive to decisions about outliers and treatment of missing data. In order to estimate spending averages, incomplete spending data was filled with zeros. Visitor groups of more than 8 people (3 cases), visiting the local region for more than 7 nights (2 cases), or spending greater than \$875 (the mean plus two times the standard deviation of the mean for spending, 10 cases) were omitted from the analysis. These are conservative assumptions about outliers and likely result in conservative estimates of economic impacts.

The sample only covers visitors during one week in August. To extrapolate to annual totals, it was assumed that this sample represented visitors throughout the year.

Multipliers are derived from an input-output model of the local economy using IMPLAN (MIG, Inc. 2008). The basic assumptions of input-output models are that sectors have homogeneous, fixed and linear production functions, that prices are constant, and that there are no supply constraints. The IMPLAN system uses national average production functions for each of 440 sectors based on the NAICS system (see Appendix B, Table B2). The most recent local IMPLAN datasets available for this analysis were 2008. National IMPLAN multiplier data were available for 2009, so local employment, labor income, and value added multipliers were

updated to 2009 using 2008/2009 national ratios. In addition, local employment multipliers were updated to 2010 based on changes in consumer price indices.

Sorting out how much spending to attribute to the park when the park was not the primary reason for the trip is somewhat subjective. All of the spending by the 30% of Fossil Butte NM visitor groups who indicated that visiting the park was the primary reason of their trip to the region is attributable to the park. However, some assumptions must be made (page 6) about how to attribute to the park the spending of the 70% of visitor groups that did not make the trip to the region primarily to visit the park. Varying these assumptions will have a significant effect on the spending and impact estimates because most visitor groups did not make the trip primarily to visit the park and most spending occurred outside the park.

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## Appendix A: Glossary

Term	Definition
Direct effects	Changes in sales, income and jobs in those business or agencies that directly receive visitor spending.
Economic multiplier	Captures the size of secondary effects and are usually expressed as a ratio of total effects to direct effects.
Economic ratio	Converts various economic measures from one to another. For example, direct sales can be used to estimate direct effects on jobs, personal income, and value added by applying economic ratios. I.e., $\text{Direct jobs} = \text{direct sales} * \text{jobs to sales ratio}$ $\text{Direct personal income} = \text{direct sales} * \text{personal income to sales ratio}$ $\text{Direct value added} = \text{direct sales} * \text{value added to sales ratio}$
Indirect effects	Changes in sales, income and jobs in industries that supply goods and services to the businesses that sell directly to visitors, i.e., businesses in the supply chain. For example, linen suppliers benefit from visitor spending at lodging establishments.
Induced effects	Changes in economic activity in the region resulting from household spending of income earned through a direct or indirect effect of visitor spending. For example, motel and linen supply employees live in the region and spend their incomes on housing, groceries, education, clothing and other goods and services. IMPLAN's Social Accounting Matrix (SAM) multipliers also include induced effects resulting from local/state/federal government spending.
Jobs	The number of jobs in the region supported by visitor spending. Job estimates are not full time equivalents, but include both fulltime and part-time positions.
Labor income	Wage and salary income, sole proprietor (business owner) income and employee payroll benefits.
Regional purchase coefficient (RPC)	The proportion of demand within a region supplied by producers within that region.
Retail margin	The markup to the price of a product when a product is sold through a retail trade activity. Retail margin is calculated as sales receipts minus the cost of goods sold.
Sales	Direct sales (retail goods and services) by firms within the region to park visitors.

<b>Term</b>	<b>Definition</b>
Secondary effects	Changes in the economic activity in the region that result from the re-circulation of money spent by visitors. Secondary effects include indirect and induced effects.
Total effects	Sum of direct, indirect and induced effects. <ul style="list-style-type: none"> <li>• Direct effects accrue largely to tourism-related businesses in the area</li> <li>• Indirect effects accrue to a broader set of businesses that serve these tourism firms.</li> <li>• Induced effects are distributed widely across a variety of local businesses.</li> </ul>
Value added	Labor income plus property income (rents, dividends, royalties, interest) and indirect business taxes. As the name implies, it is the net value added to the region's economy. For example, the value added by a hotel includes wages and salaries paid to employees, their payroll benefits, profits of the hotel, and sales, property, and other indirect business taxes. The hotel's non-labor operating costs such as purchases of supplies and services from other firms are not included as value added by the hotel.
Visitor group	A group of people traveling together to visit the park. Visitor group is the basic sampling unit for VSP surveys; each visitor group receives only one questionnaire.
Wholesale margin	The markup to the price of a product when a product is sold through wholesale trade. Wholesale margin is calculated as wholesale sales minus the cost of the goods sold.

## Appendix B: Economic Multipliers and IMPLAN Sectors

**Table B1.** Economic ratios and multipliers for selected tourism-related sectors, Fossil Butte NM region, 2010.

Sector	Direct effects			Total effects multipliers				
	Jobs /\$MM sales	Income /sales	Value added/ sales	Sales I	Sales SAM	Job II/ MM sales	Income II/ sales	Value added II/sales
Motel, hotel, cabin or B&B	15.26	0.29	0.52	1.24	1.38	19.15	0.40	0.72
Camping fees	13.30	0.28	0.58	1.25	1.35	16.97	0.38	0.77
Restaurants & bars	22.94	0.30	0.42	1.24	1.36	26.20	0.39	0.62
Groceries & takeout food	19.75	0.51	0.83	1.21	1.38	23.41	0.61	1.05
Gas & oil	24.82	0.50	0.83	1.18	1.30	27.73	0.58	1.01
Local transportation	23.20	0.47	0.62	1.10	1.25	25.81	0.54	0.76
Admission & fees	22.86	0.25	0.38	1.40	1.49	27.67	0.37	0.66
Souvenirs & other expenses	29.48	0.47	0.76	1.24	1.40	33.32	0.57	0.99
Local production of goods	8.03	0.14	0.24	1.14	1.21	9.93	0.20	0.36
Wholesale trade	7.81	0.37	0.64	1.14	1.29	10.78	0.45	0.80

Source: IMPLAN (MIG, Inc. 2008).

### Explanation of table

**Direct effects** are economic ratios to convert sales in each sector to jobs, income and value added.

Jobs/\$MM sales is jobs per million dollars in sales.

Income/sales is the percentage of sales going to wages, salaries, and employee benefits.

Value added/sales is the percentage of sales that is value added (Value added covers all income, rents and profits and indirect business taxes).

**Total effects** are multipliers that capture the total effect relative to direct sales.

Sales I captures only direct and indirect sales.

Sales SAM is the SAM sales multiplier = (direct + indirect + induced sales) / direct sales.

Job II/ MM sales = total jobs (direct + indirect + induced) per \$ million in direct sales.

Income II /sales = total income (direct + indirect + induced) per \$ of direct sales.

Value added II/sales = total value added (direct + indirect + induced) per \$ of direct sales.

### Using the hotel sector row to illustrate

**Direct Effects:** Every million dollars in hotel sales creates 19.2 jobs in hotels. Fifty-two percent of hotel sales are value added, including 29% that goes to wages and salaries of hotel employees. That means 48% of hotel sales goes to purchase inputs by hotels (e.g., linens, cleaning supplies). The wage and salary income creates the induced effects and the 48% spent on purchases by the hotel starts the rounds of indirect effects.

**Multiplier effects:** There is an additional 24 cents of indirect sales in the region for every dollar of direct hotel sales (type I sales multiplier = 1.24). Total secondary sales are 38 cents per dollar of direct sales, which means 24 cents in indirect effects and 14 cents in induced effects. An additional 3.9 jobs are created from secondary effects of each million dollars in hotel sales (19.2

total jobs – 15.3 direct jobs per \$million). These jobs are distributed across other sectors of the local economy. Similarly, the secondary effects on income for each dollar of hotel sales are 11% (40%-29%), and the secondary effects on value added for each dollar of hotel sales are 20% (72%-52%). Including secondary effects, every million dollar of hotel sales in the region yields \$1.38 million in sales, \$400,000 in income, and \$720,000 in value added.

**Table B2.** MGM2 sector correspondence to IMPLAN and 2007 NAICS sectors.

<b>MGM sector</b>	<b>IMPLAN</b>		<b>2007 NAICS</b>
	<b>No.</b>	<b>Name</b>	
Motel, hotel, cabin or B&B	411	Hotels and motels, including casino hotels	72111-2
Camping fees	412	Other accommodations	72119, 7212-3
Restaurants & bars	413	Food services and drinking places	722
Groceries & takeout food	324	Retail - Food and beverage	445
Gas & oil	326	Retail - Gasoline stations	447
Local transportation	336	Transit and ground passenger transportation	485
Admission & fees	410	Other amusement and recreation industries	71391-3, 71399
Souvenirs & other expenses	329	Retail - General merchandise	452
Local production of goods	317	All other miscellaneous manufacturing	339993, 339995, 339999
Wholesale trade	319	Wholesale trade	42

Source: IMPLAN (MIG, Inc. 2008).

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