



Impacts of Visitor Spending on the Local Economy

Mount Rainier National Park, 2012

Natural Resource Report NPS/NRSS/EQD/NRR—2013/721



ON THE COVER

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Executive Summary

Mount Rainier National Park hosted 1,049,178 recreation visits in 2012. Adjustments for visitor group size and re-entries resulted in 303,540 visitor group trips to the park in 2012. Based on a 2012 Visitor Services Project survey conducted August 4–10, 73% of these visitor group trips were made by local residents or non-locals on day trips, not including an overnight stay within 30 miles of the park.¹

Visitors reported their group’s expenditures in the park and within 30 miles of the park. The average visitor group size was 3.0 people and spent an average of \$120 in the park and within 30 miles of the park. Thirty-eight percent of the spending took place inside the park.

Total visitor spending in 2012 in the park and within 30 miles of the park was \$36.3 million. The greatest proportions of expenditures were for overnight accommodations (29%) and restaurants and bars (22%). Overnight visitors staying in a lodge, hotel, motel, cabin, B&B, etc. outside the park but within 30 miles of the park accounted for 35% of total spending, and non-locals on day trips to the park accounted for 32% of spending.

Eighty-three percent of visitor groups indicated the visit to the park was the primary reason for their trip to the area. Counting only a portion of visitor expenses if visiting the park was not the primary reason for the trip yields \$33.7 million 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 of the local economy. The local region was defined as Lewis, Pierce, and Yakima counties, Washington, which roughly coincides with the 30-mile radius from the park for which expenditures were reported.

Including direct and secondary effects, the \$33.7 million in visitor spending attributed to the park generated \$43.7 million in direct sales in the region, which supported 526 jobs. These jobs paid \$13.9 million in labor income, which was part of \$25.1 million in value added to the region.²

A separate study estimated impacts of park employee payroll on the local economy in FY 2010³, and the results are reported herein. The park itself employed 232 people in FY 2010 with a total payroll including benefits of \$13.0 million. Including secondary effects, the local impacts of park payroll in FY 2010 were \$6.0 million in sales, supporting 283 jobs, \$15.0 million in labor income, and \$16.6 million in value added.⁴

Local Economic Impacts of Mount Rainier National Park

	<u>Sales</u>	<u>Jobs</u>	<u>Labor Income</u>	<u>Value Added</u>
Park Visitor Spending	\$43.7M	526	\$13.9M	\$25.1M
Park Payroll	+ \$6.0M	+283	+ \$15.0M	+ \$16.6M
Park Visitor Spending + Payroll	\$49.7M	809	\$28.9M	\$41.7M

¹ Results in this study sometimes differ from those reported in the VSP study report (Manni et al. 2013) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

² 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).

³ Stynes (2011).

⁴ A comparison of the results of this study and a similar study conducted in 2000 is contained in Appendix D.

Acknowledgments

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Introduction

Mount Rainier National Park (NP) encompasses Mount Rainier, the tallest mountain of the Cascade Range in Washington state. The 370 square miles of park include old growth forests, subalpine meadows of wildflowers, and glaciers. The park is located in Pierce and Lewis counties, Washington. Mount Rainier NP received 1,049,178 recreation visits in 2012 including 178,781 overnight stays (Table 1).

Table 1. Recreation visits and overnight stays, Mount Rainier NP, 2012

Month	Recreation visits	Overnight stays			Total
		Lodging	Developed camping*	Back country camping	
January	14,361	323	0	574	897
February	16,894	556	0	1,548	2,104
March	15,977	351	0	1,242	1,593
April	25,320	487	0	936	1,423
May	62,732	1,603	1,644	2,215	5,462
June	109,205	5,553	6,682	4,801	17,036
July	240,018	9,922	30,328	11,033	51,283
August	275,146	9,916	38,262	14,046	62,224
September	185,340	8,043	16,704	8,422	33,169
October	59,049	845	1,206	567	2,618
November	28,224	253	0	48	301
<u>December</u>	<u>16,912</u>	<u>538</u>	<u>0</u>	<u>133</u>	<u>671</u>
Total	1,049,178	38,390	94,826	45,565	178,781

*Includes group campers.

Source: NPS Public Use Statistics 2012.

The purpose of this study is to estimate the annual, local economic impacts of visitors to Mount Rainier NP in 2012. Economic impacts were 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.) In addition, a separate study estimated the impacts of the NPS park payroll on the local region (Stynes 2011), and those results are reported herein. Neither study estimated the economic impacts of park operations or construction spending on the local region.

The local economic region defined for this study included Lewis, Pierce, and Yakima counties, Washington. This three-county region had a population of 1,106,531 (USCB 2012), gross regional product of \$38.9 billion (MIG, Inc. 2008), median household income of \$52,003, and family poverty rate of 10.2% (USCB 2012). State and local governments including education were the major employers in the region (MIG, Inc. 2008), and the region experienced a 9.3% unemployment rate in 2012 (BLS 2012).

Methods

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

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 were estimated from the Mount Rainier NP Visitor Services Project (VSP) survey data (Manni et al. 2013), National Park Service Public Use Statistics (2012), 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 survey was conducted at Mount Rainier NP from August 4–10, 2012.⁵ The VSP survey measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a systematic, random sample of 1,113 visitor groups. Visitors returned 702 questionnaires resulting in a response rate of 63.1%.

Spending and economic impact estimates for Mount Rainier NP are based in part on the 2012 VSP survey data. Visitors were asked to report expenditures inside the park and within 30 miles of the park. The local region for determining economic impact was defined as Lewis, Pierce, and Yakima counties, Washington, which includes the park and roughly approximates the 30-mile radius around the park for which expenditures were reported.

The MGM2 model divides visitors into segments to help explain differences in spending across distinct user groups. Seven segments were established for Mount Rainier NP visitors based on reported trip characteristics and lodging expenditures:

Local: Visitors that were residents of the local region, i.e., within 30 miles of the park.

Day trip: Visitors from outside the local region, that did not stay overnight in the local region.

Motel-in: Visitors who reported motel expenses within the park.⁶

Camp-in: Visitors who reported camping expenses within the park.

Motel-out: Visitors who reported motel expenses outside the park, but within 30 miles of the park.

Camp-out: Visitors who reported camping expenses outside the park, but within 30 miles of the park.

⁵ Results in this study sometimes differ from those reported in the VSP study report (Manni et al. 2013) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

⁶ The questionnaire asked about expenditures for “Lodge, hotel, motel, cabins B&B, etc.” For convenience, these expenditures are referred to as “motel” in this report.

Other overnight (Other OVN): Non-local visitors who stayed overnight in the local region, but did not report any lodging expenses. This segment included visitors who stayed in private homes, with friends or relatives, or in other unpaid lodging.⁷

The VSP survey data were 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. Segment shares from the VSP survey were adjusted to be consistent with the park's NPS Public Use Statistics (2012) overnight stay figures.

⁷ 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.

Results

Visits

Based on VSP survey data, 64.5% of park entries were classified as day visits either by residents or by visitors from outside the local region (Table 2). The remaining 35.5% were classified as overnight visits including an overnight stay in the local region. The average visitor group size ranged from 2.4 to 3.2 people across the seven segments with an average visitor group of 3.0 people.⁸ The average length of stay in the local region on overnight trips was 2.5 nights. Eighty-three percent of visitor groups indicated that visiting the park was the primary reason for their trip to the area.

Table 2. Selected visit/trip characteristics by segment, 2012

Characteristic	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Visitor segment share (park entries)	8.0%	58.5%	2.5%	7.5%	9.0%	3.5%	11.0%	100.0%
Average visitor group size	2.4	3.1	3.2	3.0	3.1	3.1	2.9	3.0
Length of stay (days or nights)	1.0	1.0	1.9	2.7	2.4	2.6	2.7	2.5
Re-entry rate (park entries per trip)	1.1	1.1	1.3	1.4	1.6	1.5	1.3	1.2
Percent primary purpose trips	100%	78%	88%	93%	86%	76%	83%	83%

The 1,049,178 recreation visits in 2012 were allocated to the seven segments using the visit segment shares in Table 2. Because spending was reported for the stay in the area, recreation visits were converted to visitor group trips to the area by dividing recreation visits by the average number of times each visitor entered the park during their stay and the average visitor group size. The 1,049,178 recreation visits represented 303,504 visitor group trips (Table 3).

Table 3. Recreation visits and visitor group trips by segment, 2012

Measure	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Recreation visits	83,934	613,769	26,229	78,688	94,426	36,721	115,410	1,049,178
Visitor group trips	32,646	188,616	6,483	18,198	19,069	8,027	30,467	303,504
Percent of visitor group trips*	11%	62%	2%	6%	6%	3%	10%	100%

*Segment percentages do not sum to 100% due to rounding.

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

Visitor Spending

The VSP survey collected data about expenditures of visitor groups inside the park and within 30 miles of the park.⁹ Spending averages were computed on a visitor group trip basis for each segment. The average visitor group spent \$120 on the trip, including expenditures inside the park and within 30 miles of the park (Table 4). On a visitor group trip basis, average spending was \$37 for day trips by local residents and \$61 for day trips by non-local visitors. Visitor groups staying in motels in the park spent an average of \$675 on their trips, while those staying in motels outside the park spent \$661. Those camping inside the park spent an average of \$165 on their trips, while those camping outside the park spent \$245. Visitor groups spent about 38% of their total spending inside the park and 62% of their total spending outside the park.

Table 4. Average spending by segment (dollars per visitor group per trip)

Expenditures	Segment							All visitors*
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Inside Park								
Inn	0.00	0.00	334.53	0.00	3.37	0.00	0.00	7.36
Camping fees	0.00	0.00	2.92	41.09	2.84	0.87	0.00	2.73
Restaurants & bars	7.08	13.05	148.03	11.94	18.63	10.55	1.98	14.40
Groceries & takeout food	0.00	1.10	7.63	11.78	1.55	1.63	1.68	1.86
Gas & oil	2.20	1.50	4.17	10.35	1.08	0.00	1.92	2.14
Local transportation	0.00	0.24	27.83	0.00	0.61	0.00	0.84	0.87
Admission & fees	4.62	5.91	10.91	9.78	16.66	8.58	4.76	6.74
<u>Souvenirs & other expenses</u>	<u>4.74</u>	<u>8.43</u>	<u>37.14</u>	<u>19.46</u>	<u>14.77</u>	<u>14.44</u>	<u>5.42</u>	<u>9.56</u>
Total Inside Park	18.64	30.25	573.17	104.38	59.50	36.08	16.59	45.66
Outside Park								
Motel	0.00	0.00	12.52	0.05	353.15	0.00	0.00	22.46
Camping fees	0.00	0.00	0.00	0.00	1.58	76.75	0.00	2.13
Restaurants & bars	6.94	7.32	15.47	10.35	70.92	18.51	6.06	11.80
Groceries & takeout food	1.50	4.30	5.59	16.03	26.55	28.26	10.26	7.36
Gas & oil	8.74	15.07	17.79	29.07	38.08	48.40	12.46	17.35
Local transportation	0.35	0.81	33.45	1.78	96.91	34.92	5.26	8.90
Admission & fees	0.69	2.01	2.61	0.51	7.19	2.04	1.26	2.04
<u>Souvenirs & other expenses</u>	<u>0.00</u>	<u>1.46</u>	<u>14.26</u>	<u>2.78</u>	<u>7.13</u>	<u>0.17</u>	<u>0.79</u>	<u>1.91</u>
Total Outside Park	18.22	30.98	101.69	60.56	601.51	209.05	36.10	73.96
Total Inside & Outside Park	36.86	61.23	674.85	164.94	661.01	245.13	52.69	119.62

*Weighted by percent visitor group trips.

⁹ Some expenditure categories in the VSP questionnaire were combined for reporting herein and MGM2 analysis. See Appendix B.

The relative standard error at a 95% confidence level for the overall spending average was 15%. A 95% confidence interval for the overall visitor group spending average was therefore \$120 plus or minus \$18 or between \$102 and \$138.

On a per night basis, visitor groups staying in motels in the park spent \$350 in the local region, while visitor groups staying in motels outside the park spent \$275 per night (Table 5). The average reported per-night lodging expense was \$180 for motels inside the park and \$149 for motels outside the park.

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

Expenditures	Segment				
	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN
Inn/motel	179.95	0.02	148.55	0.00	0.00
Camping fees	1.51	15.14	1.84	29.99	0.00
Restaurants & bars	84.77	8.21	37.31	11.23	2.98
Groceries & takeout food	6.86	10.25	11.71	11.55	4.42
Gas & oil	11.39	14.52	16.32	18.70	5.32
Local transportation	31.77	0.65	40.63	13.49	2.26
Admission & fees	7.01	3.79	9.94	4.10	2.23
<u>Souvenirs & other expenses</u>	<u>26.65</u>	<u>8.19</u>	<u>9.12</u>	<u>5.65</u>	<u>2.30</u>
Total per visitor group per night	349.92	60.77	275.42	94.71	19.50

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. Mount Rainier NP visitors spent a total of \$36.3 million in the local region in 2012 (Table 6). Visitors who stayed in motels outside the park accounted for 35% of the total spending, and visitors on day trips accounted for 32%. Motel expenses represented 25% of total spending, and restaurants and bars represented 22% (Figure 1).

Table 6. Total visitor spending by segment, 2012 (thousands of dollars)

Expenditures	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Inside Park								
Inn	0	0	2,169	0	64	0	0	2,233
Camping fees	0	0	19	748	54	7	0	828
Restaurants & bars	231	2,462	960	217	355	85	60	4,370
Groceries & takeout food	0	208	49	214	29	13	51	566
Gas & oil	72	284	27	188	21	0	59	650
Local transportation	0	46	180	0	12	0	25	263
Admission & fees	151	1,115	71	178	318	69	145	2,046
<u>Souvenirs & other expenses</u>	<u>155</u>	<u>1,590</u>	<u>241</u>	<u>354</u>	<u>282</u>	<u>116</u>	<u>165</u>	<u>2,902</u>
Total Inside Park	608	5,705	3,716	1,900	1,135	290	506	13,858
Outside Park								
Motel	0	0	81	1	6,734	0	0	6,816
Camping fees	0	0	0	0	30	616	0	646
Restaurants & bars	226	1,382	100	188	1,352	149	185	3,582
Groceries & takeout food	49	811	36	292	506	227	313	2,234
Gas & oil	285	2,843	115	529	726	388	380	5,266
Local transportation	11	154	217	32	1,848	280	160	2,702
Admission & fees	23	379	17	9	137	16	38	619
<u>Souvenirs & other expenses</u>	<u>0</u>	<u>276</u>	<u>92</u>	<u>51</u>	<u>136</u>	<u>1</u>	<u>24</u>	<u>581</u>
Total Outside Park	595	5,843	659	1,102	11,470	1,678	1,100	22,447
Total Inside & Outside Park	1,203	11,548	4,375	3,002	12,605	1,968	1,605	36,305
Segment Percent of Total	3%	32%	12%	8%	35%	5%	4%	100%

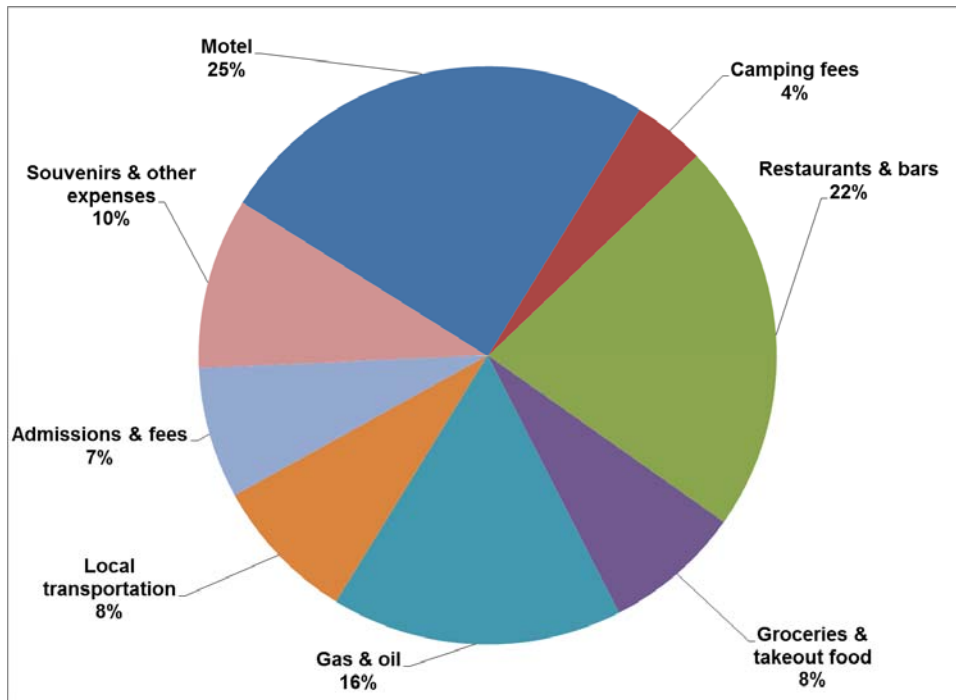


Figure 1. Mount Rainier NP visitor spending by category

Because visitors would come to the region whether or not the park existed, not all visitor spending can be attributed to the park. Seventeen percent of visitor groups did not make the trip primarily to visit Mount Rainier NP. 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 in the region was counted for day trips. With these assumptions, a total of \$33.1 million in visitor spending was attributed to the park visit (Table 7). This represented 93% of the overall visitor spending total.

Table 7. Total spending attributed to park visits, 2012 (thousands of dollars)

Expenditures	Segment							
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	All visitors
Inn/motel	0	0	2,245	1	6,263	0	0	8,509
Camping fees	0	0	19	748	82	534	0	1,383
Restaurants & bars	231	3,691	1,054	397	1,600	212	226	7,411
Groceries & takeout food	0	930	84	493	496	207	331	2,540
Gas & oil	72	2,813	136	694	689	332	398	5,133
Local transportation	0	182	385	31	1,712	240	169	2,719
Admission & fees	151	1,452	87	187	444	83	179	2,582
<u>Souvenirs & other expenses</u>	<u>155</u>	<u>1,836</u>	<u>328</u>	<u>402</u>	<u>407</u>	<u>117</u>	<u>187</u>	<u>3,431</u>
Total Attributed to Park	608	10,903	4,337	2,953	11,692	1,725	1,490	33,709
Percent of Spending Attributed to the Park	51%	94%	99%	98%	93%	88%	93%	93%
Percent of Attributed Spending	2%	32%	13%	9%	35%	5%	4%	100%

Economic Impacts of Visitor Spending

The economic impacts of Mount Rainier NP visitor spending on the local economy were estimated by applying visitor spending to a set of economic ratios and multipliers in MGM2 representing the economy of Lewis, Pierce, and Yakima counties, Washington.¹⁰ Economic ratios and multipliers for the region were estimated using the *Impact Analysis for Planning (IMPLAN) Professional software* (version 3, MIG, Inc. 2008) with 2010 data.¹¹ Multipliers were adjusted to 2012 based on price changes between 2010 and 2012 (see Study Limitations and Errors section below).

Not all visitor spending was 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 were applied to visitor spending to account for mark-ups by retailers and wholesalers. The retail margins for the three sectors were 25.3%, 22.3%, and 50.0%, respectively, and the wholesale margins were 12.3%, 8.3%, and 11.4%. In addition,

¹⁰ 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.

¹¹ See Appendix C: Economic Ratios and Multipliers for the region.

regional purchase coefficients from IMPLAN for all sectors were 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 1.52. Every dollar of direct sales to visitors generated another \$0.52 in secondary sales through indirect and induced effects.¹² (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.

Impacts of All Visitor Spending

Using all visitor spending and including direct and secondary effects, the \$36.3 million spent by park visitors generated \$46.9 million in sales, which supported 562 jobs in the local region (Table 8). These jobs paid \$14.9 million in labor income, which was part of \$26.8 million in value added to the region.¹³

Table 8. Impacts of all visitor spending on the local economy, 2012

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	9,049	100	2,215	4,926
Camping fees	1,474	17	568	776
Restaurants & bars	7,952	146	2,667	4,269
Groceries & takeout food	2,665	50	947	1,686
Gas & oil	2,966	65	1,643	2,356
Local transportation	708	11	348	513
Admission & fees	1,319	16	480	890
Souvenirs & other expenses	1,741	27	819	1,317
Wholesale trade	636	4	238	479
<u>Local production of goods</u>	<u>2,395</u>	<u>1</u>	<u>90</u>	<u>363</u>
Total Direct Effects	30,907	438	10,013	17,576
<u>Secondary Effects</u>	<u>15,977</u>	<u>125</u>	<u>4,874</u>	<u>9,238</u>
Total Effects	46,884	562	14,887	26,813

Note: Impacts of \$36.3 million in visitor spending reported in Table 6. Totals may not equal sum of individual categories due to rounding.

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

¹² 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.

¹³ 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.

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 motels and restaurants & bars.

Impacts of Visitor Spending Attributed to the Park

Using only visitor spending attributable to the park by including only some spending on trips where the primary trip purpose was not to visit Mount Rainier NP reduced the overall impacts by about 7% (Table 9; see spending inclusion assumptions in previous section). Including direct and secondary effects, the \$33.7 million spent by park visitors and attributable to the park generated \$43.7 million in sales, which supported 526 jobs in the local region. These jobs paid \$13.9 million in labor income, which was part of \$25.1 million in value added to the region.

Table 9. Economic impacts of visitor spending attributed to the park, 2012

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	8,509	94	2,083	4,632
Camping fees	1,383	16	532	728
Restaurants & bars	7,411	136	2,486	3,979
Groceries & takeout food	2,582	49	917	1,634
Gas & oil	2,719	59	1,506	2,160
Local transportation	643	10	316	465
Admission & fees	1,145	14	417	772
Souvenirs & other expenses	1,716	27	807	1,297
Wholesale trade	583	4	218	439
<u>Local production of goods</u>	<u>2,091</u>	<u>1</u>	<u>81</u>	<u>321</u>
Total Direct Effects	28,781	410	9,362	16,427
<u>Secondary Effects</u>	<u>14,940</u>	<u>117</u>	<u>4,559</u>	<u>8,641</u>
Total Effects	43,721	526	13,921	25,068

Note: Impacts of \$33.7 million in visitor spending attributed to park reported in Table 7. Totals may not equal sum of individual categories due to rounding.

Economic 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 in FY 2010 by applying economic multipliers to wage and salary data to capture the induced effects of NPS employee spending on local economies. Mount Rainier NP itself employed 232 people in FY 2010 with a total payroll including benefits of \$13.0 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$6.0 million in sales, 283 jobs, \$15.0 million in labor income, and \$16.6 million value added (Stynes 2011).

Combined Economic Impacts

The combined impacts to the region of visitor spending attributable to the park and NPS payroll were \$49.7 million in sales, which supported 809 jobs with labor income of \$28.9 million, which was part of a total value added of \$41.7 million.

Study Limitations and Errors

The accuracy of the MGM2 estimates rests on the accuracy of three inputs: visits, spending averages, and multipliers. Visits were taken from NPS Public Use Statistics (2012). 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 group 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 the visitor entered the park.

Spending averages outside the park were derived from the 2012 Mount Rainier NP VSP survey data (Manni et al. 2013). Estimates from the survey are subject to sampling errors, measurement errors, and potential seasonal biases. The overall spending average is subject to sampling error of 15%.

Spending averages are also sensitive to decisions about outliers and treatment of missing data. In order to estimate spending averages, incomplete spending data were filled with zeros. Visitor groups of more than 12 people (8 cases), visiting the local region for more than 12 nights (3 cases), or spending more than \$2,361 (the mean plus two times the standard deviation of the mean for spending, 2 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 early August. To extrapolate to annual totals, it was assumed that this sample represented visitors throughout the year.

Multipliers were 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 2010. Local employment multipliers were updated to 2012 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. Because 17% of visitors to Mount Rainier NP did not make the trip primarily to visit the park and 62% of all spending occurred outside the park, adjustments for non-primary purpose trips have an effect on the overall spending and impact estimates.

Similar VSP and economic impact studies were conducted at Mount Rainier NP in 2000 (Simmons et al. 2001, Sun et al. 2002). A comparison of the results of this 2012 economic impact study and the 2000 study is difficult for a variety of reasons, as explained in Appendix D.

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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	<p>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. That is:</p> <ul style="list-style-type: none"> • Direct jobs = direct sales * jobs to sales ratio • Direct personal income = direct sales * personal income to sales ratio • Direct value added = direct sales * 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 motels.
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) of firms within the region to park visitors.

Term	Definition
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"> • Direct effects accrue largely to tourism-related businesses in the area. • Indirect effects accrue to a broader set of businesses that serve these tourism firms. • Induced effects are distributed widely across a variety of local businesses.
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 motel includes wages and salaries paid to employees, their payroll benefits, profits of the motel, and sales, property, and other indirect business taxes. The motel's non-labor operating costs such as purchases of supplies and services from other firms are not included as value added by the motel.
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: Expenditure Sector Assignments

Table B1 shows expenditure categories visitors were asked to estimate in the Mount Rainier NP VSP questionnaire. Some expenditure categories were combined and renamed for MGM2 analysis.

Table B1. Expenditure categories in Mount Rainier NP questionnaire and MGM2 sector assignment

Questionnaire expenditure categories	Inside park	Outside park	MGM2 sector
Lodge, hotel, motel, cabins B&B, etc.	X	X	Motel
Camping fees and charges	X	X	Camping fees
Guide fees and charges	X	X	Admissions & fees
Restaurants and bars	X	X	Restaurants & bars
Groceries and takeout food	X	X	Groceries & takeout food
Gas and oil (auto, RV, boat, etc.)	X	X	Gas & oil
Other transportation expenses (rental cars, taxis, auto repairs, but NOT airfare)	X	X	Local transportation
Admission, recreation, entertainment fees	X	X	Admissions & fees
All other purchases (souvenirs, books, postcards, sporting goods, clothing, donations, etc.)	X	X	Souvenirs & other expenses

X = category included in questionnaire.

MGM2 sectors names correspond to similar sector names and numbers in IMPLAN (Table B2). IMPLAN sectors also correspond to 2007 North American Industry Classification System (NAICS) sectors.

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

MGM2 sector	IMPLAN		2007 NAICS
	No.	Name	
Motel	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
Admissions & fees	410	Other amusement and recreation industries	71391-3, 71399
Souvenirs & other expenses	329	Retail - General merchandise	452
Local production of goods	69	All other food manufacturing	31199
	88	Men's and boys' cut and sew apparel manufacturing	31522
	115	Petroleum refineries	32411
	311	Sporting and athletic goods manufacturing	33992
	317	All other miscellaneous manufacturing	339993,
			339995, 339999
Wholesale trade	319	Wholesale trade	42

Source: IMPLAN (MIG, Inc. 2008).

Appendix C: Economic Ratios and Multipliers

Table C1. Economic ratios and multipliers for selected tourism-related sectors, Mount Rainier NP region, 2012

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	10.58	0.24	0.54	1.28	1.54	14.88	0.42	0.87
Camping fees	11.31	0.38	0.53	1.31	1.68	16.84	0.62	0.95
Restaurants & bars	17.42	0.34	0.54	1.23	1.54	21.52	0.50	0.87
Groceries & takeout food	14.44	0.49	0.72	1.19	1.61	19.22	0.69	1.11
Gas & oil	9.53	0.36	0.67	1.23	1.56	13.87	0.54	1.03
Local transportation	19.36	0.55	0.79	1.10	1.54	23.48	0.73	1.12
Admission & fees	18.30	0.36	0.63	1.22	1.54	22.69	0.53	0.97
Souvenirs & other expenses	14.88	0.47	0.76	1.17	1.57	19.32	0.65	1.11
Local production of goods	0.41	0.04	0.15	1.10	1.41	1.17	0.07	0.21
Wholesale trade	6.26	0.37	0.75	1.14	1.46	9.94	0.53	1.04

Source: IMPLAN (MIG, Inc. 2008), updated to 2012.

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 motel sector row to illustrate

Direct Effects: Every million dollars in motel sector sales (i.e., short-term lodging room rentals) creates 10.6 jobs in the motel sector. Fifty-four percent of motel sector sales are value added, including 24% that goes to wages and salaries of motel employees. That means 46% of motel sector sales goes to purchase inputs by motels (e.g., linens, cleaning supplies). The wage and salary income creates the induced effects, and the 46% of sales spent on purchases by motels starts the rounds of indirect effects.

Multiplier effects: There is an additional 28 cents of indirect sales in the region for every dollar of direct motel sector sales (type I sales multiplier = 1.28). Total secondary sales are 54 cents per dollar of direct sales, which means 28 cents in indirect effects and 26 cents in induced effects.

An additional 4.3 jobs are created from secondary effects of each million dollars in motel sector sales (14.9 total jobs – 10.6 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 motel sector sales are 18% (42%-24%), and the secondary effects on value added for each dollar of motel sector sales are 33% (87%-54%). Including secondary effects, every million dollars of motel sector sales in the region yields \$1.54 million in sales, \$420,000 in income, and \$870,000 in value added.

Appendix D: Comparison of 2000 and 2012 Economic Impacts

Mount Rainier NP conducted a VSP study and economic impact analysis in 2000 (Simmons et al. 2001, Sun et al. 2002). Comparing the results of the 2000 economic impact study with the results of this 2012 study is difficult for a variety of reasons.

Unfortunately, Dr. Daniel Stynes, who developed the MGM2 model and was a co-author of the report in 2000, passed away in 2012. His research team at Michigan State University has disbanded, and the only documentation from the 2000 study is the final economic impact report. Dr. Stynes and his colleagues made numerous improvements to the MGM2 model and their economic impact estimation methods between 2000 and 2012. This 2012 study uses the improved model and methods. Unfortunately, there is no way to precisely document and recreate all the methods, assumptions, and data analysis techniques that were used in the 2000 study.

The following briefly describes overall differences between the results of the 2000 and 2012 economic impact studies. However, the exact reasons for the differences are unknowable because the exact methodology of the 2000 study cannot be reproduced.

The 2000 study reported total annual visitor spending in the Mount Rainier NP region of \$29,769,000. To be compared to the 2012 study result, the 2000 result must be adjusted to 2012 to reflect changes in real prices (inflation). Using the change in the general Consumer Price Index from 2000 to 2012 (33%), total annual visitor spending of \$29,769,000 in 2000 is equivalent to spending \$39,691,000 in 2012 dollars. This 2012 study found that total annual visitor spending was \$36,305,000 (Table 6), 9% lower than the adjusted 2000 study result.

Table D-1 shows economic impact measures from the 2000 and 2012 studies and the differences between them. The study results from 2000 for sales, labor income, and value added are all adjusted to 2012 dollars. All measures show reduction in the economic impact of visitor spending at Mount Rainier NP between 2000 and 2012.

Table D-1. Comparison of economic impacts of Mount Rainier NP, 2000 and 2012.

Total Effects in Year	Sales (thousands of dollars)*	Jobs	Labor Income (thousands of dollars)*	Value Added (thousands of dollars)*
2000	47,259	812	17,485	27,186
2012	46,844	562	14,887	26,813
Percent change 2000 to 2012	-1%	-31%	-15%	-1%

*Dollars in 2000 inflated to 2012 using general Consumer Price Index.

The reduction in both visitor spending and its economic impacts between 2000 and 2012 is not surprising given that visitation to Mount Rainier NP was 22% less in 2012 than in 2000 (1.05 million recreation visits in 2012 vs. 1.34 million recreation visits in 2000). A different mix of types of visitors (e.g., local, day trip, motel, campers) between the two samples also contributed to the differences in spending and economic impacts. In addition, the economy of the region likely changed between 2000 and 2012, so that the dollars spent by visitors in those years had different impacts on sales, jobs, labor income, and value added in the region.

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