

Impacts of Visitor Spending on the Local Economy: Zion National Park, 2006



Daniel J. Stynes

Department of Community, Agriculture, Recreation and Resource Studies
Michigan State University
East Lansing, Michigan 48824-1222

September 2008



National Park Service
Social Science Program

Department of Community, Agriculture,
Recreation and Resource Studies
Michigan State University

MICHIGAN STATE
UNIVERSITY

Impacts of Visitor Spending on the Local Economy: Zion National Park, 2006

Executive Summary

Zion National Park hosted 2.57 million recreation visits in 2006. After adjusting for re-entries to the park, there were 1.251 million person trips to the area in 2006. Based on the 2006 visitor surveys and park overnight stays, 7% of these trips were local residents and 22% were day trips from outside the local region. Seventy-one percent of the trips involved an overnight stay within an hour of the park; 39% in motels, lodges and cabins outside the park, 7% in the park lodge. Fourteen percent of visitors were camping, 6% outside the park and 8% inside.

The average visitor group consisted of 2.7 people and spent \$246 within an hour's drive of the park. On a party trip basis, average spending in 2006 was \$67 for day trips, \$178 for campers staying inside the park, \$273 for campers staying outside the park, \$560 for visitors in motels and lodges outside the park and \$639 for visitors staying in park lodges or cabins. On a per night basis, visitors staying in motels, lodges or cabins spent \$278 if staying inside the park and \$253 if staying outside the park. Campers spent roughly \$85 per night inside or outside. The average per night lodging cost reported by the sample of visitors was \$133 for park lodges/cabins, \$111 for lodging outside the park and \$17 for camping in the park.

The segment mix, party size and spending patterns vary by season. In comparison with August visitors, November visitors are more likely to be local residents and are less likely to be camping. Party sizes are significantly smaller in November than August (2.4 versus 3.3) and November visitors overall spend about 25% less per party.

Total visitor spending in 2006 within an hour of the park was \$113 million¹ including \$17 million spent inside the park. Thirty-five percent of the total spending was for lodging, 23% restaurant meals and bar expenses, 12% local transportation, 9% gas and oil, 6% groceries and 13% souvenirs. Overnight visitors staying in motels outside the park accounted for 65% of the spending, visitors in park lodges and cabins 10%, and day trips 10%.

Eighty percent of visitors indicated the park visit was the primary reason for the trip to the area. Counting only a portion of visitor expenses if the park visit was not the primary trip purpose yields \$99 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 to

¹ Revenues received by the park (park admissions and donations) are excluded. Impacts of spending that accrues to the park are covered as part of park operations.

cover a four county area in southwestern Utah. This region roughly coincides with the one hour driving radius for which spending was reported.

Including direct and secondary effects, the \$113 million spent by park visitors supported 2,432 jobs in the area and generated \$143 million in sales, \$57 million in labor income and \$83 million in value added². After adjusting for non-primary purpose trips, local economic impacts of the \$99 million in spending attributed to the park were 2,084 jobs, \$49 million in labor income and \$72 million value added.

The park itself employed 190 people in FY 2006 with a total payroll of \$7.1 million. Including secondary effects, the local impact of the park payroll in 2006 was 257 jobs, \$11 million in personal income and \$12.5 million total value added³. Including both visitor spending and park operations, the total impact of the park on the local economy in 2006 was 2,689 jobs and \$96 million value added. Park operations account for 10% of the employment effects and 13% of the value added

² 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.

³ Impacts of park operations are estimated as the induced effects of the park payroll on the region's economy. Impacts include the wages and salaries of park employees and the economic activity resulting from their household spending in the region. Impacts are estimated using IMPLAN's spending patterns for households with incomes of \$50-\$75,000. Seasonal park jobs are converted to annual equivalents, i.e., four jobs for three months equates to one job on an annual basis. .

Impacts of Visitor Spending on the Local Economy: Zion National Park , 2006

Daniel J. Stynes
September 2008

Introduction

The purpose of this study is to estimate the local economic impacts of visitors to Zion National Park in 2006. Economic impacts are measured as the direct and secondary sales, income and jobs in the local area resulting from spending by park visitors. The economic estimates are produced using the Money Generation Model 2 (MGM2) (Stynes and Propst, 2000). Three major 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 Zion NP Visitor Survey, National Park Service Public Use Statistics, and IMPLAN input-output modeling software. 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.

Zion National park and the Local Region

The local region was defined to include Garfield, Iron, Kane and Washington counties in southwestern Utah. Zion National Park received 2,567,350 recreation visits in 2006 and 274,878 overnight stays (person nights) in the park (Table 1). There were 72,914 overnight stays in park lodges/cabins and 157,604 overnight stays in park campgrounds.

Park visitor studies were conducted at Zion NP from August 2-8 and November 1-7, 2006 (Le, Evans, and Hollenhorst, 2007). The surveys measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed at park entrances to a sample of 978 visitors in the summer survey and 584 visitors in the fall survey. Visitors returned 1,063 questionnaires (626 summer , 437 fall) for an overall 68% response rate. Data generated in the visitor survey were used as the basis to develop spending profiles, segment shares and trip characteristics for Zion NP visitors.

Table 1. Recreation Visits and Overnight Stays, Zion NP 2006

Month	Recreation Visits	Overnight stays				Total OVN Stays
		Lodge/Cabin	Camp	Backcountry	Misc	
January	71,680	2,079	966	83	0	3,128
February	70,170	1,693	1,196	110	0	2,999
March	144,186	2,858	7,485	691	0	11,034
April	264,821	8,087	20,236	1,934	1,618	31,875
May	277,849	6,942	20,277	3,893	1,767	32,879
June	325,124	10,410	21,710	5,277	2,857	40,254
July	347,105	8,932	20,600	4,776	3,059	37,367
August	337,212	9,232	19,872	4,647	2,359	36,110
September	298,587	8,692	21,138	4,042	1,996	35,868
October	235,952	6,915	17,149	2,691	1,676	28,431
November	128,339	4,940	5,922	764	0	11,626
<u>December</u>	66,325	<u>2,134</u>	<u>1,053</u>	<u>120</u>	<u>0</u>	<u>3,307</u>
Total	2,567,350	72,914	157,604	29,028	15,332	274,878

Source: NPS Public Use Statistics

MGM2 Visitor Segments

The MGM2 model divides visitors into segments to help explain differences in spending across distinct user groups. Seven segments were established for Zion National Park visitors based on reported trip characteristics and lodging expenditures⁴:

Local Visitors : Residents of the local area

Day trips: Visitors not staying overnight away from home within a one hour drive of the park. This segment includes day trips as well as pass-through travelers, who may be staying overnight on their trip outside the local region.

Motel-in: Visitors reporting lodging expenses (lodges or cabins) inside the park

Camp-in: Visitors reporting camping expenses inside the park (developed campgrounds).

Motel-out: Visitors reporting motel expenses outside the park within one hour of the park

Camp-out: Visitors reporting camping expenses outside the park within one hour of the park.

Other OVN: Visitors staying overnight in the area but not reporting any lodging expenses. This segment includes visitors staying in private homes, with friends or relatives or other unpaid lodging.

⁴ Visitors reporting multiple lodging types and expenditures were classified based on the highest lodging expense.

The 2006 visitor survey was used to estimate the percentage of visitors from each segment as well as spending averages, lengths of stay and party sizes for each segment. Summer and fall survey results were weighted based upon monthly visitation. The summer survey was assumed to represent visitors between June and August, while the fall survey was assumed to represent visitors during the rest of the year. Thirty-nine percent of recreation visits took place during the summer months. Segment shares from the survey were adjusted to be consistent with park overnight stay figures. As the sample size for backcountry visitors was very small, this segment was grouped with the “other overnight” segment when estimating spending.

Based on the visitor survey and park overnight stay figures, 7% of visits (park entries) were local residents and 22% were classified as day trips. Seventy-one percent of visits were classified as overnight trips that included an overnight stay in the local area. (Table 3). The average spending party ranged from 2.6 to 3.0 across the seven segments with the average visitor party consisting of 2.7 people. The average length of stay in the area on overnight trips was 2.4 nights⁵.

Eighty percent of visitors indicated that visiting the park was the primary reason for the trip to the area⁶. Other stated reasons were visiting friends and relatives in the area, business or visiting other area attractions.

Table 2. Selected Visit/Trip Characteristics by Segment, Zion NP 2006

Characteristic	Local	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other ovn	All Visitors
Survey segment share	7%	22%	7%	8%	39%	6%	11%	100%
Adjusted share ^a	7.0%	22.2%	5.1%	10.0%	39.0%	5.7%	11%	100%
Average Party size	2.8	2.7	2.6	2.6	2.7	2.7	3.0	2.7
Length of stay (nights)			2.3	2.1	2.2	3.2	2.8	2.4
Re-entry rate (park entries/trip)	1.3	1.2	3.0	3.2	2.8	3.1	2.3	2.4
Percent primary purpose trips	100%	63%	90%	86%	83%	92%	76%	80%

a. Shares are adjusted to be consistent with park overnight stays.

The 2,567,350 recreation visits in 2006 were allocated to the seven segments using the visit segment shares in Table 2. Since spending is reported for the stay in the area, park visits (entries) were converted to trips to the area by dividing by the average number of times each visitor entered the park during their stay.

⁵ These figures vary slightly from the VSP report (Le, Evans and Hollenhorst, 2007) due to omission of outliers. Some visitors listing motels or campgrounds as lodging types did not report any lodging expenses and are classified here in the other OVN category.

⁶ Non-primary purpose trips included visitors passing thru, those visiting friends and relatives and business trips.

Recreation visits were converted to 460,335 party trips by dividing recreation visits by the average party size and park entry rate for each segment (Table 3). Total person trips in 2006 were 1.25 million. Total visitor spending is estimated by multiplying the number of party trips from each segment by the average spending for that segment estimated in the survey.

Table 3. Recreation Visits and Party Trips by Segment, 2006

Segment	Recreation visits	Person Trips	Party visits/trips	Percent of party trips	Percent of overnight trips
Local	179,715	138,242	48,650	11%	
Day Trips	569,952	467,377	174,793	38%	
Motel-in	130,935	44,545	17,022	4%	7.2%
Camp-in	256,735	79,878	30,202	7%	12.7%
Motel-out	1,001,267	351,899	131,165	28%	55.4%
Camp-out	146,339	47,064	17,645	4%	7.4%
Other ovrn	<u>282,409</u>	<u>121,954</u>	<u>40,858</u>	<u>9%</u>	<u>17%</u>
All Visitors	2,567,350	1,250,958	460,335	100%	100%

The segment mix based on party trips is somewhat different than based on park visits (entries) as visitors staying outside the park enter the park more times than those staying inside the park and most visitors on day trips only enter once. Almost half of the visitor parties are classified as local visitors or day trips. Twenty-eight percent are staying in motels and other commercial lodging outside the park. Eleven percent of visitor parties are staying overnight inside the park compared to 41% staying outside. Park lodges and cabins account for 4% of visitor parties, while 7% of visitor parties are staying in park campgrounds.

Visitor spending

The visitor survey covered expenditures of the travel party inside the park or within a one hour drive of the park. Spending averages were computed on a party trip basis for each segment. The average visitor group in 2006 spent \$246 within an hour's drive of the park, excluding park admission fees⁷. On a party trip basis, average spending was \$39 for local visitors, \$67 for day trips, \$639 for visitors in park lodges or cabins, and \$178 for park campers (Table 4). Visitors staying in motels, cabins, lodges or B&B's outside the park spent \$560 on their trip and those camping outside the park spent \$274 (Table 4). About 15% of the spending was inside the park, 85% outside.

⁷ The average of \$246 is lower than the spending averages in the VSP survey report (Le, Evans and Hollenhorst, 2007) due to the omission of some outliers and treatment of missing spending data. The VSP study reported \$530 in spending for summer visitors and \$360 for fall visitors. The estimate of \$246 here is a weighted average of estimates of \$311 (summer) and \$210 (fall) after omitting outliers. See Appendix B for further explanation of these differences.

Table 4. Average Visitor Spending by Segment (\$ per party per trip)

	Local	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other ovn	All Visitors
In Park								
Motel, hotel cabin or B&B	0.00	0.00	277.04	0.00	0.00	0.00	0.00	10.24
Camping fees	0.00	0.00	0.00	34.11	2.07	0.00	0.00	2.83
Restaurants & bars	3.33	3.83	109.45	12.02	9.76	5.97	11.11	10.64
Local transportation	0.00	3.29	13.86	6.36	2.74	2.48	4.50	3.45
Souvenirs	3.20	6.64	50.30	20.33	11.90	16.59	9.55	10.93
Outside Park								
Motel, hotel cabin or B&B	0.00	0.00	28.93	0.00	246.93	0.00	0.00	71.43
Camping fees	0.00	0.00	0.00	0.46	1.09	88.13	0.00	3.72
Restaurants & bars	7.10	17.37	50.13	32.17	110.39	36.41	22.45	46.15
Groceries, take-out	2.58	3.96	10.51	29.04	27.45	29.60	17.88	14.61
Gas & oil	9.12	9.60	27.06	25.91	37.17	42.17	21.85	21.45
Local transportation	0.00	14.77	46.35	1.82	53.84	21.72	19.16	25.32
Admissions & fees	0.90	0.17	3.85	1.66	13.36	10.66	1.51	4.76
Souvenirs and other	13.24	6.97	21.27	14.55	43.61	19.92	17.90	20.56
Grand Total	39.47	66.59	638.74	178.45	560.31	273.64	125.92	246.10
Total in park	6.53	13.75	450.64	72.83	26.47	25.04	25.16	38.09
Total Outside park	32.94	52.84	188.10	105.62	533.83	248.60	100.76	208.01

Note: Excludes park admission fees

The sampling error at a 95% confidence level for the overall spending average is 11%. A 95% confidence interval for the overall visitor spending average is therefore \$246 plus or minus \$28 or between \$218 and \$274.

On a per party night basis, visitors in park lodges or cabins spent \$278 in the local region compared to \$253 per night for visitors staying in motels or lodges outside the park. Campers staying inside or outside the park spent roughly \$85 per night. The average reported per night lodging expense was \$170 for park lodges⁸ or cabins, \$111 for motels outside the park, \$17 for camping fees inside the park and \$27 outside the park (Table 5).

Total spending was estimated by multiplying the number of party trips for each segment by the average spending per trip and summing across segments. Zion National Park visitors spent a total of \$113 million in the local area in 2006 (Table 6). Overnight visitors staying in motels outside the park account for 65% of the total spending, visitors in park lodges and cabins 10% and day trips 10%. Lodging expenses represent 35% of the total spending and restaurants and bars 23%. Souvenirs account for 13% of the total (Figure 1).

⁸ Visitors were classified in the “motel-in” segment if they reported any spending on hotels, motels, or cabins inside the park. Some of these visitors also spent one or more nights in campgrounds or motels outside the park. The per night spending average for lodging inside the park is \$170 if only nights inside the park are included, while the overall average for visitors classified as “motel-in” is \$133.

Twelve percent of the total spending was local transportation expenses. These appear to primarily be car rentals, which may have been rented outside the local region. A few large local transportation expense reports appear to be airfares that were not supposed to be included⁹.

Table 5. Average Spending per Night for Visitors on Overnight Trips (\$ per party per night)

	Motel- in	Camp- in	Motel- out	Camp- out	Other OVN
Motel, hotel cabin or B&B	133.39 ^a	0.00	111.32	0.00	0.00
Camping fees	0.00	16.62	1.42	27.20	0.00
Restaurants & bars	69.57	21.25	54.17	13.08	11.85
Groceries, take-out	4.58	13.97	12.38	9.13	6.31
Gas & oil	11.80	12.46	16.76	13.01	7.71
Local transportation	26.25	3.94	25.51	7.47	8.35
Admissions & fees	1.68	0.80	6.02	3.29	0.53
<u>Souvenirs and other</u>	<u>31.20</u>	<u>16.77</u>	<u>25.02</u>	<u>11.27</u>	<u>9.69</u>
Total per party per night	278.47	85.81	252.60	84.45	44.45

Table 6. Total Visitor Spending by Segment, 2006 (\$000's)

	Local	Day Trip	Motel- in	Camp- in	Motel- out	Camp- out	Other OVN	All Visitors
In Park								
Motel, hotel cabin or B&B	0	0	4,716	0	0	0	0	4,716
Camping fees	0	0	0	1,030	271	0	0	1,301
Restaurants & bars	162	669	1,863	363	1,280	105	454	4,897
Local transportation	0	574	236	192	360	44	184	1,589
Amusements	0	0	0	0	0	0	0	0
Souvenirs	155	1,160	856	614	1,561	293	390	5,030
In Community								
Motel, hotel cabin or B&B	0	0.00	493	0	32,388	0	0	32,881
Camping fees	0	0	0	14	143	1,555	0	1,712
Restaurants & bars	346	3,037	853	972	14,479	642	917	21,246
Groceries, take-out	126	691	179	877	3,601	522	731	6,727
Gas & oil	443	1,678	461	783	4,875	744	893	9,876
Local transportation	0	2,582	789	55	7,062	383	783	11,655
Admissions & fees	44	30	66	50	1,752	188	62	2,191
<u>Souvenirs and other</u>	<u>644</u>	<u>1,218</u>	<u>362</u>	<u>439</u>	<u>5,720</u>	<u>351</u>	<u>731</u>	<u>9,466</u>
Grand Total	1,920	11,640	10,873	5,389	73,492	4,828	5,145	113,288
Total in park	318	2,404	7,671	2,199	3,472	442	1,028	17,534
Total outside park	1,602	9,237	3,202	3,190	70,020	4,386	4,117	95,754
Segment Percent of Total	2%	10%	10%	5%	65%	4%	5%	100%

⁹ Fourteen percent of the cases (152 cases) reported local transportation expenses outside the park. Most of these were \$100 or more. Six cases reported \$1,000 or more in local transportation expenses.

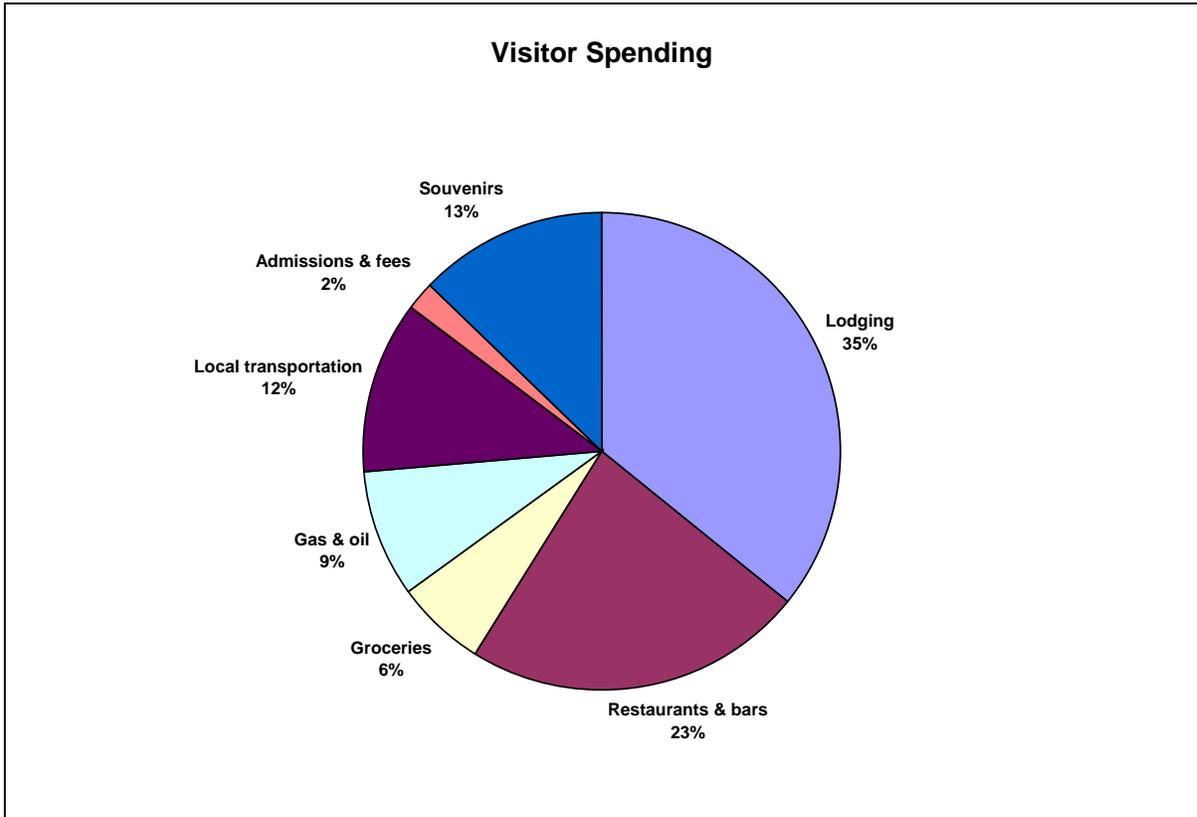


Figure 1. Zion National Park Visitor Spending by Spending Category

Not all visitor spending would be lost to the region in the absence of the park, as some visitors did not make the trip primarily to visit the park. Spending directly attributed to park visits was estimated by counting all spending for trips where 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 \$99 million in visitor spending is attributed to the park visit. This represents 87% of the overall visitor spending total (Table 7).

Table 7. Total Spending Attributed to Park Visits, 2006 (\$000s)

	Local	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	All Visitors
Motel, hotel cabin or B&B		0	5,104	0	29,339	0	0	34,443
Camping fees		0	0	1,043	401	1,470	0	2,914
Restaurants & bars		669	2,536	1,267	14,396	713	1,230	20,810
Groceries, take-out food/drinks		1,156	141	816	3,262	494	618	6,486
Gas & oil		2,945	363	728	4,416	703	755	9,910
Local transportation		574	858	243	6,757	406	846	9,684
Admissions & fees		0	52	47	1,587	178	52	1,915
<u>Souvenirs and other expenses</u>		1,960	1,142	1,023	6,742	625	1,009	12,500
Total Attributed to Park	0	7,304	10,196	5,166	66,899	4,589	4,509	98,663
Percent of spending attributed to the park	0%	63%	94%	96%	91%	95%	88%	87%

Economic Impacts of Visitor Spending

The economic impacts of Zion National Park visitor spending on the local economy are estimated by applying the spending to a set of economic ratios and multipliers representing the economy of the local region. The local region was defined to include four counties in southwestern Utah (Garfield, Iron, Kane and Washington).

Economic ratios convert spending to the associated jobs, income and value added in each sector. Multipliers for the region were estimated with the IMPLAN system using 2001 data¹⁰. The tourism sales multiplier for the region is 1.50. Every dollar of direct sales to visitors generates another \$.50 in secondary sales through indirect and induced effects¹¹.

Impacts are estimated based first on all visitor spending (Table 8) and then based on the visitor spending attributed to the park (Table 9). Including direct and secondary effects, the \$113 million spent by park visitors¹² supports 2,432 jobs in the area and generates \$143 million in sales, \$57 million in labor income and \$83 million in value added (Table 8).

¹⁰ Economic ratios and multipliers for the region are reported in Appendix C.

¹¹ 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.

¹² Revenues received by the park (park admissions and donations) are excluded in estimating visitor spending impacts as the impacts resulting from park revenues are covered as part of park operations.

Table 8. Economic Significance of Zion NP Visitor Spending to the Local Economy, 2006.

Sector/Spending category	Sales \$000's	Jobs	Labor Income \$000's	Value Added \$000's
Direct Effects				
Motel, hotel cabin or B&B	37,597	731	16,449	26,626
Camping fees	3,013	38	286	674
Restaurants & bars	26,144	560	10,676	12,048
Admissions & fees	2,191	25	814	1,367
Local transportation	13,244	170	8,043	9,111
Grocery stores	1,702	31	717	956
Gas stations	2,202	30	833	1,083
Other retail	7,248	131	3,496	4,884
Wholesale Trade	1,035	20	628	712
<u>Local Production of goods</u>	<u>603</u>	<u>3</u>	<u>63</u>	<u>96</u>
Total Direct Effects	94,979 ^a	1,739	42,004	57,557
<u>Secondary Effects</u>	47,584	693	15,185	25,898
Total Effects	142,563	2,432	57,189	83,455
Multiplier	1.50	1.40	1.36	1.45

a. Total direct sales are less than visitor spending as direct sales excludes the cost of goods sold at retail unless the good is locally made.

Labor income covers wages and salaries, including payroll benefits and incomes of sole proprietors. Value added is the preferred measure of the contribution 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. The largest direct effects are in lodging establishments and restaurants.

Excluding some spending on trips where the primary trip purpose was not to visit Zion NP reduces the overall impacts by about 14% (Table 9).

Impacts of Park Operations

The park itself employed 190 people in FY 2006 with a total payroll of \$7.1 million. Including secondary effects, the local impact of the park payroll in 2006 was 257 jobs, \$11 million in personal income and \$12.5 million total value added¹³. Including both visitor spending and park operations, the total impact of the park on the local economy in 2006 was 2,689 jobs and \$96 million value added. Park operations account for 10% of the employment effects and 13% of the value added

¹³ Impacts of park operations are estimated as the induced effects of the park payroll on the region's economy. Impacts include the wages and salaries of park employees and the economic activity resulting from their household spending in the region. Impacts are estimated using IMPLAN's spending patterns for households with incomes of \$50-\$75,000. Seasonal park jobs are converted to annual equivalents, i.e., four jobs for three months equates to one job on an annual basis. .

Table 9. Local Economic Impacts of Visitor Spending Attributed to the Park Visit, 2006.

Sector/Spending category	Sales \$000's	Jobs	Labor Income \$000's	Value Added \$000's
Direct Effects				
Motel, hotel cabin or B&B	34,443	670	15,069	24,392
Camping fees	2,914	37	276	652
Restaurants & bars	20,810	446	8,498	9,590
Admissions & fees	1,915	22	711	1,195
Local transportation	9,684	124	5,881	6,662
Grocery stores	1,641	30	691	922
Gas stations	2,210	31	836	1,087
Other retail	6,250	113	3,014	4,211
Wholesale Trade	955	19	580	657
<u>Local Production of goods</u>	<u>582</u>	<u>2</u>	<u>61</u>	<u>92</u>
Total Direct Effects	81,404	1,493	35,618	49,461
<u>Secondary Effects</u>	<u>40,527</u>	<u>591</u>	<u>12,922</u>	<u>22,076</u>
Total Effects	121,932	2,084	48,540	71,537
Multiplier	1.50	1.40	1.36	1.45

a. Total direct sales are less than visitor spending as direct sales excludes the cost of goods sold at retail unless the good is locally made.

Study Limitations and Error

The accuracy of the MGM2 estimates rests on the accuracy of the three inputs: visits, spending averages, and multipliers. 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 the number of times visitors reported entering the park during their trip to the area.

Spending averages are derived from the 2006 Zion NP Visitor Surveys. Estimates from the survey are subject to sampling errors, measurement errors and potential seasonal/sampling biases. Some visitors may have reported expenses outside the local area. The overall spending average is subject to sampling errors of 11%. 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. Cases reporting large party sizes (> 8 people), long stays (>14 nights) or spending greater than \$4,000 were omitted from the analysis (see Appendix B for details).

The sample covers visitors during one week in August and one week in November. To extrapolate to annual totals, it was assumed that the August sample represents visitors between June and August and the November sample represents visitors during the rest of the

year. Total visits and overnight stays for the year are taken from the NPS public use statistics.

Multipliers are derived from an input-output model of the local economy using IMPLAN (MIG., Inc. 1999). Input-output models rest on a number of assumptions. 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 509 sectors based on the NAICS system.

Sorting out how much of the spending to attribute to the park when the park is not the primary motivation for the trip is somewhat subjective. However, since most visitors to Zion NP made the trip primarily to visit the park, adjustments for non-primary purpose trips only reduces the overall spending and impact estimates by 14%.

REFERENCES

MIG.Inc. IMPLAN Professional Version 2.0. Minnesota IMPLAN Group: Stillwater, MN.

Le, L, Evans, J. ,and S. Hollenhorst,S. (2007). Zion National Park Visitor Study. Summer and Fall 2006. Visitor Services Project Report #183. Moscow, ID: National Park Service and University of Idaho, Cooperative Park Studies Unit.

National Park Service Public Use Statistics Office. (2006). Visitation DataBase. <http://www2.nature.nps.gov/stats/>. Data retrieved on March 1, 2008.

Stynes, D. J., Propst, D.B., Chang, W. and Sun, Y. (2000). Estimating National Park Visitor Spending and Economic Impacts: The MGM2 model. May, 2000. Final report to National Park Service. East Lansing, Michigan: Department of Park, Recreation and Tourism Resources, Michigan State University.

Appendix A: Definitions of Economic Terms

Term	Definition
Sales	Sales of firms within the region to park visitors.
Jobs	The number of jobs in the region supported by the visitor spending. Job estimates are not full time equivalents, but include part time positions.
Labor income	Wage and salary income, sole proprietor's income and employee payroll benefits.
Value added	Labor income plus rents and profits 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 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.
Direct effects	Direct effects are the changes in sales, income and jobs in those business or agencies that directly receive the visitor spending.
Secondary effects	These are the changes in the economic activity in the region that result from the re-circulation of the money spent by visitors. Secondary effects include indirect and induced effects.
Indirect effects	Changes in sales, income and jobs in industries that supply goods and services to the businesses that sell directly to the visitors. 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 the 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.
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.

Appendix B: Handling of Missing Spending Data and Outliers

Missing Spending Data

To compute spending averages and to sum spending across categories, spending categories with missing spending data had to be filled. The spending question included two columns, one for spending inside the park and one for spending outside the park. If spending was reported in any category within each column, the remaining categories in that column were assumed to be zero.

Eighty-eight percent of the sample reported some spending either inside or outside the park. Fifty-two cases entered zeros in all spending categories and 71 cases (7% of the sample) left the entire spending question blank (Table B-1).

With written mailback questionnaires, it is difficult to sort out whether blanks in spending questions represent refusals or a lack of spending. We adopted a conservative approach and treated omitted spending data as representing zeros. This decreases the overall spending averages by about 7% compared to treating blanks as missing observations. Since the camping and motel segments are defined based on their expenditures, only the day trip and other overnight segments include cases that did not report spending. Fourteen percent of the cases classified as day trips or other overnight visitors had missing spending data. Nineteen percent reported zero spending..

Table B-1. Valid, Zero and Missing Spending Data by Segment

	Local	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	Total
Report some spending	32	161	70	104	439	67	67	940
Missing spending data	7	29	0	0	0	0	35	71
<u>Zero spending</u>	<u>12</u>	<u>31</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>9</u>	<u>52</u>
Total cases	51	221	70	104	439	67	111	1063
Percent zero	24%	14%	0%	0%	0%	0%	8%	5%
Percent missing	14%	13%	0%	0%	0%	0%	32%	7%

Outliers

The treatment of outliers can also influence the spending estimates. Our general procedures are to omit cases involving large parties, long stays or very high spending. These omissions typically do not significantly alter estimates of total spending for a given park, as reductions in per trip spending averages are generally offset by corresponding reductions in average party sizes. With lower party sizes, the spending averages per party are applied to a larger number of parties (estimated by dividing person visits by party size). Similarly, the omission of longer stay trips reduces trip spending averages, but it usually increases per night spending averages as longer trips typically entail lower rates of spending per day.

Omitting outliers reduces the variances in the estimates and especially the sensitivity of estimates for individual segments to the inclusion or exclusion of a handful of atypical cases. Treating large parties arriving in multiple vehicles as representing multiple spending

units is more consistent with how they are handled in the park visit statistics. For example, one case at Zion reported paying for 60 people for a four night stay and spending over \$3,500. By omitting this case, it is essentially treated as fifteen groups of 4 people each spending \$233 per group, an average consistent with the overall average spending of \$246 per party for visitors after omitting outliers.

For the Zion visitor sample, cases were considered to be outliers if (a) nights in the area > 8, (b) party size (people paid for) >8, or (c) total spending > \$4,000. The sample of visitors at Zion NP included 42 cases reporting expenses for more than eight people, 15 cases with stays of more than 8 nights, and 7 cases spending more than \$4,000 in total on the trip (Table B-2)..

Table B-3. Zion NP Sample Outliers by Season

<u>Category</u>	<u>Summer</u>	<u>Fall</u>	<u>Total</u>
Valid case	581	418	999
peopaid >8	34	8	42
stay > 8 nights	5	10	15
<u>Total spending > \$4,000</u>	<u>6</u>	<u>1</u>	<u>7</u>
Total	626	437	1063

Tables B-3 shows the estimates of spending averages for the sample with and without outliers. The overall spending average drops from \$366 to \$246 when outliers are omitted. Drops in the spending averages when outliers are omitted are generally explained by a few bad cases. For example, one case classified as “motel-in” reported \$17,940 in spending for four people for a one night stay including \$340 for lodging inside the park and \$11,900 for lodging expenses outside the park. The case may have reported trip expenses outside the park on an extended trip. The large drop in spending for the “Motel-in” segment is largely explained by this one case.

Table B-3. Spending Averages with and without outliers

Segment	Including Outliers			Excluding Outliers			
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Pct Error ^a
Local	39	51	77	39	51	77	53%
Day Trip	68	221	165	67	214	167	34%
Motel-in	907	70	1,413	639	65	480	18%
Camp-in	193	104	160	178	93	145	17%
Motel-out	643	439	714	560	414	512	9%
Camp-out	325	67	372	274	61	307	28%
<u>Other OVN</u>	<u>125</u>	<u>111</u>	<u>211</u>	<u>126</u>	<u>101</u>	<u>212</u>	<u>33%</u>
Total ^b	366	1,063	648	246	999	447	11%

a. Pct errors computed at a 95% confidence level

b. Totals calculated as a weighted average of segment means using adjusted segment shares in table 2.

The overall trip spending average of \$246 per party is lower than the average of \$426 based on the VSP report (Le, Evans and Hollenhorst, 2007). The estimate in Table B-3 including outliers of \$366 excludes park admission fees. Dropping questionable cases like

those mentioned above, adjusting the segment mix based on overnight stay figures, and omitting other outliers reduces the estimated spending average to \$246 per party per trip. As it is difficult to judge a spending average across such diverse visitor segments as day trips, campers and visitors staying in cabins, motels or the park lodge, the validity of the spending averages are better assessed by examining the spending patterns of individual segments in Table 4. The fact that per night room and campsite spending averages are consistent with local room and campsite rates helps to validate these figures.

Appendix C: Multipliers

Table M2. Zion NP Region Multipliers for selected tourism-related sectors, 2006

Sector	Direct effects			Sales Multipliers	
	Jobs/ MM sales	Labor inc/sales	Value Added /sales	Type I	Type II
Hotels and motels	19.45	0.44	0.71	1.14	1.44
Other accommodations	12.60	0.09	0.22	1.47	1.61
Food services and drinking places	21.43	0.41	0.46	1.23	1.53
Amusements and recreation	11.53	0.37	0.62	1.22	1.49
Automotive repair and maintenance	14.01	0.19	0.43	1.22	1.38
Transit and ground passenger transp.	12.84	0.61	0.69	1.15	1.58
Sporting goods stores	27.45	0.32	0.45	1.30	1.55
Gasoline stations	13.83	0.38	0.49	1.27	1.56
Food and beverage stores	18.26	0.42	0.56	1.23	1.54
General merchandise stores	18.02	0.48	0.67	1.17	1.50
Wholesale trade	12.64	0.37	0.64	1.17	1.44
Misc manufacturing	9.30	0.14	0.23	1.25	1.38

SOURCE: Input-output model of four county region economy (Garfield, Iron, Kane and Washington counties) estimated with the IMPLAN system using 2001 data. Job to sales ratios are adjusted to 2006 based on changes in national job to sales ratios between 2001 and 2006. Other ratios and multipliers are assumed unchanged from 2001.

Brief 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 and salaries

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 II is the usual Type II sales multiplier = (direct + indirect + induced sales)/ direct sales

Sales I captures only direct and indirect sales

Using the Hotel sector row to illustrate.

Direct Effects: Every million dollars in hotel sales creates 19 jobs in hotels. Forty-four percent of hotel sales goes to wages and salaries of hotel employees and 71% of hotel sales is value added. That means 29% of hotel sales goes to purchase inputs by hotels. The wage and salary income creates the induced effects and the 29% spent on purchases by the hotel starts the rounds of indirect effects.

Multiplier effects: There is an additional 14 cents of indirect sales in the region for every dollar of direct hotel sales (type I sales multiplier = 1.14). Total secondary sales is 44 cents per dollar of direct sales, which means 14 cents in indirect effects and 30 cents in induced effects. Including secondary effects, every million dollar of hotel sales in the region yields \$1.44 million in sales.

Appendix D. Fall and Summer Results

The segment mix, party size and spending patterns vary by season. In comparison with August visitors, November visitors are more likely to be local residents and are less likely to be camping. Party sizes are significantly smaller in November than August (2.4 versus 3.3) and November visitors overall spend about a third less per party. Lengths of stay for overnight visitors are slightly longer in November than August.

Tables D2 and D3 give the detailed spending averages by segment for the summer and fall surveys.

Table D1. Comparison of August and November Samples

Variable	Local	Day Trip	Motel-in	Segment Camp-in	Motel-out	Camp-out	Other OVN	All Visitors
Number of Cases								
Summer	9	115	32	66	265	44	50	581
Fall	42	99	33	27	149	17	51	418
Segment Share^a								
Summer	3%	20%	5%	10%	44%	8%	10%	100%
Fall	10%	24%	5%	10%	36%	4%	11%	100%
Length of stay (days/nights)								
Summer	1.0	1.0	2.1	2.0	2.1	2.5	2.5	1.9
Fall	1.0	1.1	2.4	2.1	2.3	3.7	3.0	2.0
Party Size (people paid)								
Summer	2.6	3.2	3.3	3.4	3.3	3.2	3.6	3.3
Fall	3.0	2.4	2.2	2.2	2.3	2.4	2.6	2.4
Primary Purpose Trips								
Summer	100%	64%	84%	89%	86%	91%	84%	83%
Fall	100%	61%	93%	85%	81%	93%	71%	79%
Re-entry factor (park entries per trip)								
Summer	2.0	1.1	2.1	3.0	2.7	2.6	2.1	2.3
Fall	1.1	1.3	3.5	3.4	3.0	3.4	2.5	2.4
Trip Spending (\$ per party per trip)								
Summer	38	85	613	207	632	355	73	311
Fall	40	55	655	160	514	222	160	210
Per Night Spending (\$ per party per night)								
Summer			296	102	298	141	29	221 ^b
Fall			269	76	226	60	53	167 ^b

a. Segment shares adjusted to be consistent with park overnight stays.

b. Total for overnight trips

Table D2. Zion NP Visitor Spending Averages by Segment - August 2006 Sample (\$ per party per trip)

Spending Category	Local	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	All Visitors
In Park								
Motel, hotel cabin or B&B	0.00	0.00	236.25	0.00	0.00	0.00	0.00	11.27
Camping fees	0.00	0.00	0.00	37.06	2.05	0.00	0.00	3.06
Restaurants & bars	3.33	5.91	89.91	20.98	14.27	8.41	6.54	13.73
Local transportation	0.00	5.74	4.06	13.71	5.98	3.59	0.64	5.45
Souvenirs	0.00	10.30	40.19	20.95	13.74	26.43	12.90	14.39
Outside Park								
Motel, hotel cabin or B&B	0.00	0.00	52.81	0.00	274.05	0.00	0.00	91.78
Camping fees	0.00	0.00	0.00	1.18	1.70	84.20	0.00	5.97
Restaurants & bars	0.00	6.87	41.56	32.27	131.82	46.70	11.54	53.53
Groceries, take-out	2.56	5.43	9.41	37.05	31.30	35.41	7.30	18.04
Gas & oil	9.22	14.41	24.59	29.36	42.98	59.55	11.82	27.61
Local transportation	0.00	28.24	89.22	4.09	56.84	55.68	15.80	38.49
Admissions & fees	0.00	0.26	7.50	2.98	16.16	8.93	2.04	6.65
Souvenirs/other	23.33	8.04	17.09	7.65	41.07	26.14	4.74	20.65
Grand Total	38.44	85.22	612.59	207.30	631.95	355.05	73.32	310.63
Total in park	3.33	21.96	370.41	92.71	36.04	38.43	20.08	47.90
Total Outside park	35.11	63.26	242.19	114.59	595.91	316.61	53.24	262.73

Table D3. Zion NP Visitor Spending Averages by Segment - November 2006 Sample (\$ per party per trip)

Spending Category	Local	Day Trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	All Visitors
In Park								
Motel, hotel cabin or B&B	0.00	0.00	303.12	0.00	0.00	0.00	0.00	9.69
Camping fees	0.00	0.00	0.00	32.22	2.07	0.00	0.00	2.68
Restaurants & bars	3.33	2.49	121.94	6.30	6.88	4.41	14.04	8.83
Local transportation	0.00	1.72	20.12	1.67	0.67	1.76	6.96	2.22
Souvenirs	5.24	4.29	56.76	19.93	10.73	10.29	7.41	9.21
Outside Park								
Motel, hotel cabin or B&B	0.00	0.00	13.67	0.00	229.59	0.00	0.00	59.35
Camping fees	0.00	0.00	0.00	0.00	0.70	90.65	0.00	2.42
Restaurants & bars	11.64	24.09	55.61	32.11	96.68	29.82	29.43	43.00
Groceries, take-out	2.60	3.01	11.21	23.93	24.99	25.88	24.65	12.62
Gas & oil	9.05	6.53	28.64	23.70	33.45	31.06	28.25	18.08
Local transportation	0.00	6.16	18.94	0.37	51.93	0.00	21.31	18.12
Admissions & fees	1.48	0.11	1.52	0.81	11.56	11.76	1.18	3.72
Souvenirs and other expenses	6.79	6.28	23.94	18.96	45.23	15.94	26.31	19.67
Grand Total	40.12	54.69	655.45	160.00	514.50	221.59	159.55	209.63
Total in park	8.57	8.51	501.94	60.11	20.36	16.47	28.41	32.63
Total Outside park	31.55	46.18	153.52	99.89	494.14	205.12	131.14	176.99