



Impacts of Visitor Spending on the Local Economy

Canyon de Chelly National Monument, 2012

Natural Resource Report NPS/NRSS/EQD/NRR—2013/738



ON THE COVER

Visitors at Canyon de Chelly National Monument
Photograph by Park Studies Unit staff

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Contents

	Page
Figures.....	v
Tables.....	v
Appendices.....	v
Executive Summary	vii
Acknowledgments.....	viii
Introduction.....	1
Methods.....	3
Results.....	5
Visits.....	5
Visitor Spending	6
Economic Impacts of Visitor Spending	9
Impacts of All Visitor Spending	10
Impacts of Visitor Spending Attributed to the Park.....	11
Economic Impacts of the NPS Park Payroll	11
Combined Economic Impacts.....	11
Study Limitations and Errors.....	13
Literature Cited	15

Figures

	Page
Figure 1. Canyon de Chelly NM visitor spending by category	8

Tables

	Page
Table 1. Recreation visits and overnight stays, Canyon de Chelly NM, 2012.....	1
Table 2. Selected visit/trip characteristics by segment, 2012	5
Table 3. Recreation visits and visitor group trips by segment, 2012	5
Table 4. Average spending by segment (dollars per visitor group per trip).....	6
Table 5. Average spending per night for visitor groups on overnight trips (dollars per visitor group per night)	7
Table 6. Total visitor spending by segment, 2012 (thousands of dollars)	8
Table 7. Total spending attributed to park visits, 2012 (thousands of dollars)	9
Table 8. Impacts of all visitor spending on the local economy, 2012.....	10
Table 9. Economic impacts of visitor spending attributed to the park, 2012.....	11

Appendices

	Page
Appendix A: Glossary.....	17
Appendix B: Expenditure Sector Assignments.....	19
Appendix C: Economic Ratios and Multipliers	21

Executive Summary

Canyon de Chelly National Monument hosted 828,523 recreation visits in 2012. Adjustments for visitor group size and re-entries resulted in 285,574 visitor group trips to the park in 2012. Based on a 2012 Visitor Services Project survey conducted August 15–21, 54% of these visitor group trips were made by local residents or non-locals on day trips, not including an overnight stay within 10 miles of the park.¹

Visitors reported their group's expenditures in the park and within 10 miles of the park. The average visitor group size was 2.7 people and spent an average of \$154 in the park and within 10 miles of the park. Forty-two percent of the spending took place inside the park.

Total visitor spending in 2012 in the park and within 10 miles of the park was \$43.9 million. The greatest proportions of expenditures were for overnight accommodations (37%). Overnight visitors staying in a lodge, hotel, motel, cabin, B&B, etc. outside the park but within 10 miles of the park accounted for 68% of total spending.

Eighty-two 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 \$42.9 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 Apache County, Arizona, which includes the park and the 10-mile radius from the park for which expenditures were reported.

Including direct and secondary effects, the \$42.9 million in visitor spending attributed to the park generated \$44.4 million in direct sales in the region, which supported 678 jobs. These jobs paid \$10.1 million in labor income, which was part of \$24.7 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 41 people in FY 2010 with a total payroll including benefits of \$2.3 million. Including secondary effects, the local impacts of park payroll in FY 2010 were \$0.5 million in sales, supporting 46 jobs, \$2.5 million in labor income, and \$2.6 million in value added.

Local Economic Impacts of Canyon de Chelly National Monument

	<u>Sales</u>	<u>Jobs</u>	<u>Labor Income</u>	<u>Value Added</u>
Park Visitor Spending	\$44.4M	678	\$10.1M	\$24.7M
Park Payroll	+ \$0.5M	+46	+ \$2.5M	+ \$2.6M
Park Visitor Spending + Payroll	\$44.9M	724	\$12.6M	\$27.3M

¹ Results in this study sometimes differ from those reported in the VSP study report (Begly 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).

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Introduction

Canyon de Chelly National Monument (NM) in northeastern Arizona preserves ruins of early indigenous people that lived in the area. The 131-square mile park encompasses the floors and rims of three major canyons: de Chelly, del Muerto, and Monument. The park is located in Apache County, Arizona. Canyon de Chelly NM received 828,523 recreation visits in 2012 including 36,062 overnight stays (Table 1).

Table 1. Recreation visits and overnight stays, Canyon de Chelly NM, 2012

Month	Recreation visits	Overnight stays			Total
		Lodging	Developed camping*	Back country camping	
January	54,707	982	108	0	1,090
February	44,545	1,355	222	0	1,577
March	62,015	1,656	846	4	2,506
April	74,991	2,863	3,023	43	5,929
May	75,021	1,755	3,112	183	5,050
June	90,702	1,839	1,480	181	3,500
July	94,846	1,677	1,249	95	3,021
August	95,004	2,171	900	61	3,132
September	95,765	2,716	1,920	113	4,749
October	52,802	2,645	0	176	2,821
November	47,437	1,538	0	38	1,576
<u>December</u>	<u>40,688</u>	<u>1,109</u>	<u>0</u>	<u>2</u>	<u>1,111</u>
Total	828,523	22,306	12,860	896	36,062

*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 Canyon de Chelly NM 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 Apache County, Arizona. This one-county region had a population of 70,906 (USCB 2012), gross regional product of \$1.56 billion (MIG, Inc. 2008), median household income of \$31,220, and family poverty rate of 28.4% (USCB 2012). State and local governments including education were the major employers in the region (MIG, Inc. 2008), and the region experienced a 19.6% 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 Canyon de Chelly NM Visitor Services Project (VSP) survey data (Begly 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 Canyon de Chelly NM from August 15–21, 2012.⁴ The VSP survey measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a systematic, random sample of 536 visitor groups. Visitors returned 337 questionnaires resulting in a response rate of 62.9%.

Spending and economic impact estimates for Canyon de Chelly NM are based in part on the 2012 VSP survey data. Visitors were asked to report expenditures inside the park and within 10 miles of the park. The local region for determining economic impact was defined as Apache County, Arizona, which includes the park and the 10-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 Canyon de Chelly NM visitors based on reported trip characteristics and lodging expenditures:

Local: Visitors that were residents of the local region, i.e., within 10 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.⁵

Camp-in: Visitors who reported camping expenses within the park.⁶

Motel-out: Visitors who reported motel expenses outside the park, but within 10 miles of the park.⁷

Camp-out: Visitors who reported camping expenses outside the park, but within 10 miles of the park.⁸

⁴ Results in this study sometimes differ from those reported in the VSP study report (Begly et al. 2013) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

⁵ The questionnaire asked about expenditures for “Lodge, hotel, motel, cabin, B&B, etc.” For convenience, these expenditures are referred to as “motel” in this report. The only motel inside the park is the Thunderbird Lodge.

⁶ The only developed campground inside the park is Cottonwood Campground.

⁷ A Best Western and Holiday Inn motels are located in Chinle, Arizona just west of the park entrance.

⁸ Spider Rock Campground is privately owned and located just outside the park.

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.⁹

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.

⁹ 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, 48% of park entries were classified as day visits either by residents or by visitors from outside the local region within 10 miles of the park (Table 2). The remaining 52% were classified as overnight visits including an overnight stay in the local region. The average visitor group size ranged from 1.6 to 3.0 people across the seven segments with an average visitor group of 2.7 people.¹⁰ The average length of stay in the local region on overnight trips was 1.3 nights. Eighty-two 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)	3%	45%	3%	2%	32%	4%	11%	100%
Average visitor group size	1.6	2.6	2.2	2.4	2.9	3.0	3.5	2.7
Length of stay (days or nights)	1.0	1.0	1.2	1.3	1.2	1.2	1.5	1.3
Re-entry rate (park entries per trip)	1.0	1.0	1.2	1.3	1.1	1.3	1.2	1.1
Percent primary purpose trips	100%	72%	84%	84%	91%	90%	84%	82%

The 828,523 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 828,532 recreation visits represented 285,574 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	24,856	372,835	24,856	16,570	265,127	33,141	91,138	828,523
Visitor group trips	15,535	140,269	9,820	5,374	84,307	8,593	21,676	285,574
Percent of visitor group trips*	5%	49%	3%	2%	30%	3%	8%	100%

¹⁰ 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 10 miles of the park.¹¹ Spending averages were computed on a visitor group trip basis for each segment. The average visitor group spent \$154 on the trip, including expenditures inside the park and within 10 miles of the park (Table 4). On a visitor group trip basis, average spending was \$21 for day trips by local residents and \$57 for day trips by non-local visitors. Visitor groups staying in motels in the park spent an average of \$341 on their trips, while those staying in motels outside the park spent \$354. Those camping inside the park spent an average of \$95 on their trips, while those camping outside the park spent \$130. Visitor groups spent about 42% of their total spending inside the park and 58% of their total spending outside the park.

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

Table 1: 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	
<u>Inside Park</u>								
Motel	0.00	0.00	143.44	0.00	26.28	0.00	0.00	12.69
Camping fees	0.00	0.00	1.00	15.00	2.04	23.98	0.00	1.64
Restaurants & bars	0.00	1.01	26.16	3.23	11.31	0.00	2.73	5.01
Groceries & takeout food	0.00	0.00	0.79	3.70	3.18	4.00	1.82	1.30
Gas & oil	0.00	1.33	8.65	6.94	5.22	10.67	5.46	3.36
Local transportation	0.00	0.00	5.51	0.00	1.27	3.33	0.00	0.67
Admission & fees	0.00	13.53	62.89	13.18	30.71	16.00	2.13	18.77
<u>Souvenirs & other expenses</u>	<u>6.44</u>	<u>22.22</u>	<u>38.83</u>	<u>20.51</u>	<u>24.80</u>	<u>30.17</u>	<u>5.40</u>	<u>21.62</u>
Total Inside Park	6.44	38.09	287.27	62.55	104.82	88.15	17.55	65.05
<u>Outside Park</u>								
Motel	0.00	0.00	0.00	0.00	144.41	0.00	0.00	42.63
Camping fees	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.03
Restaurants & bars	2.78	5.69	15.73	11.72	46.46	3.00	5.65	17.94
Groceries & takeout food	0.00	2.37	3.76	3.91	5.34	10.00	5.46	3.66
Gas & oil	7.78	9.27	14.27	14.68	20.16	9.00	4.08	12.27
Local transportation	3.33	0.00	0.00	0.85	13.05	13.00	0.00	4.44
Admission & fees	0.56	0.00	9.18	0.00	9.17	0.00	1.46	3.16
<u>Souvenirs & other expenses</u>	<u>0.00</u>	<u>1.20</u>	<u>10.49</u>	<u>0.83</u>	<u>10.67</u>	<u>5.50</u>	<u>1.71</u>	<u>4.41</u>
Total Outside Park	14.44	18.52	53.43	31.99	249.26	41.50	18.36	88.55
Total Inside & Outside Park	20.89	56.62	340.70	94.54	354.08	129.65	35.91	153.60

* Weighted by percent visitor group trips.

¹¹ 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 13%. A 95% confidence interval for the overall visitor group spending average was therefore \$154 plus or minus \$21 or between \$133 and \$175.

On a per night basis, visitor groups staying in motels in the park spent \$292 in the local region, while visitor groups staying in motels outside the park spent \$296 per night (Table 5). The average reported per-night lodging expense was \$123 for motels inside the park and \$142 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
Motel	122.95	0.00	142.90	0.00	0.00
Camping fees	0.85	11.62	1.71	21.14	0.00
Restaurants & bars	35.91	11.59	48.37	2.54	5.52
Groceries & takeout food	3.90	5.89	7.14	11.85	4.80
Gas & oil	19.65	16.76	21.25	16.64	6.29
Local transportation	4.72	0.66	11.99	13.82	0.00
Admission & fees	61.78	10.21	33.39	13.54	2.36
<u>Souvenirs & other expenses</u>	<u>42.27</u>	<u>16.54</u>	<u>29.70</u>	<u>30.18</u>	<u>4.69</u>
Total per visitor group per night	292.03	73.26	296.44	109.70	23.65

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. Canyon de Chelly NM visitors spent a total of \$43.9 million in the local region in 2012 (Table 6). Visitors who stayed in motels outside the park accounted for 68% of the total spending. Motel expenses represented 36% of total spending (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								
Motel	0	0	1,409	0	2,216	0	0	3,624
Camping fees	0	0	10	81	172	206	0	468
Restaurants & bars	0	142	257	17	954	0	59	1,429
Groceries & takeout food	0	0	8	20	268	34	39	370
Gas & oil	0	187	85	37	440	92	118	959
Local transportation	0	0	54	0	107	29	0	190
Admission & fees	0	1,898	618	71	2,589	137	46	5,359
<u>Souvenirs & other expenses</u>	<u>100</u>	<u>3,116</u>	<u>381</u>	<u>110</u>	<u>2,091</u>	<u>259</u>	<u>117</u>	<u>6,175</u>
Total Inside Park	100	5,343	2,821	336	8,837	757	380	18,576
Outside Park								
Motel	0	0	0	0	12,174	0	0	12,174
Camping fees	0	0	0	0	0	9	0	9
Restaurants & bars	43	798	155	63	3,917	26	122	5,124
Groceries & takeout food	0	333	37	21	450	86	118	1,045
Gas & oil	121	1,300	140	79	1,699	77	88	3,505
Local transportation	52	0	0	5	1,100	112	0	1,268
Admission & fees	9	0	90	0	773	0	32	903
<u>Souvenirs & other expenses</u>	<u>0</u>	<u>168</u>	<u>103</u>	<u>4</u>	<u>900</u>	<u>47</u>	<u>37</u>	<u>1,260</u>
Total Outside Park	224	2,598	525	172	21,014	357	398	25,288
Total Inside & Outside Park	325	7,941	3,346	508	29,851	1,114	778	43,863
Segment Percent of Total	1%	18%	8%	1%	68%	3%	2%	100%

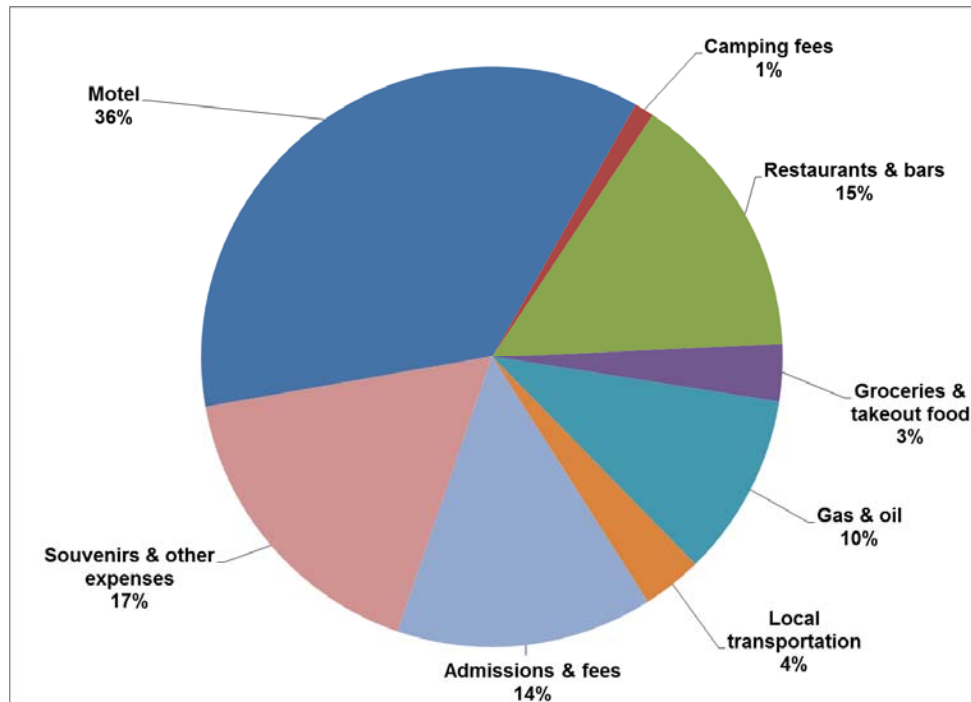


Figure 1. Canyon de Chelly NM visitor spending by category

Because visitors would come to the region whether or not the park existed, not all visitor spending can be attributed to the park. Eighteen percent of visitor groups did not make the trip primarily to visit Canyon de Chelly NM. 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 \$42.9 million in visitor spending was attributed to the park visit (Table 7). This represented 98% of the overall visitor spending total.

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

Expenditures	Segment							All visitors
	Local	Day trip	Motel-in	Camp-in	Motel-out	Camp-out	Other OVN	
Motel	0	0	1,409	0	14,214	0	0	15,623
Camping fees	0	0	10	81	172	215	0	477
Restaurants & bars	0	827	408	78	4,815	25	175	6,328
Groceries & takeout food	0	286	44	40	712	119	151	1,352
Gas & oil	0	1,303	222	113	2,115	168	202	4,123
Local transportation	0	0	54	4	1,192	139	0	1,389
Admission & fees	0	1,898	706	71	3,351	137	76	6,239
<u>Souvenirs & other expenses</u>	<u>100</u>	<u>3,261</u>	<u>482</u>	<u>115</u>	<u>2,977</u>	<u>306</u>	<u>152</u>	<u>7,393</u>
Total Attributed to Park	100	7,574	3,334	502	29,548	1,109	757	42,923
Percent of Spending Attributed to the Park	31%	95%	100%	99%	99%	100%	97%	98%
Percent of Attributed Spending	0%	18%	8%	1%	69%	3%	2%	100%

Economic Impacts of Visitor Spending

The economic impacts of Canyon de Chelly NM 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 Apache County, Arizona.¹² 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.¹³ 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, 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.

¹² 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.

¹³ See Appendix C: Economic Ratios and Multipliers for the region.

The tourism output sales multiplier for the region is 1.26. Every dollar of direct sales to visitors generated another \$0.26 in secondary sales through indirect and induced effects.¹⁴ (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 \$43.9 million spent by park visitors generated \$45.2 million in sales, which supported 689 jobs in the local region (Table 8). These jobs paid \$10.3 million in labor income, which was part of \$25.2 million in value added to the region.¹⁵

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	15,799	171	3,396	8,407
Camping fees	477	6	151	223
Restaurants & bars	6,553	121	2,150	3,480
Groceries & takeout food	6,262	168	252	2,873
Gas & oil	1,458	34	564	1,046
Local transportation	358	6	162	252
Admission & fees	995	13	317	649
Souvenirs & other expenses	3,717	90	1,242	2,577
Wholesale trade	148	1	58	112
<u>Local production of goods</u>	<u>13</u>	<u>0</u>	<u>3</u>	<u>6</u>
Total Direct Effects	35,780	612	8,296	19,625
<u>Secondary Effects</u>	<u>9,373</u>	<u>77</u>	<u>1,981</u>	<u>5,533</u>
Total Effects	45,154	689	10,276	25,158

Note: Impacts of \$43.9 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 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.

¹⁴ 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.

¹⁵ 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.

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 Canyon de Chelly NM reduced the overall impacts by about 2% (Table 9; see spending inclusion assumptions in previous section). Including direct and secondary effects, the \$42.9 million spent by park visitors and attributable to the park generated \$44.4 million in sales, which supported 678 jobs in the local region. These jobs paid \$10.1 million in labor income, which was part of \$24.7 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	15,623	170	3,358	8,313
Camping fees	477	6	151	223
Restaurants & bars	6,328	117	2,077	3,361
Groceries & takeout food	6,239	167	251	2,863
Gas & oil	1,389	33	537	996
Local transportation	342	6	155	241
Admission & fees	919	12	293	599
Souvenirs & other expenses	3,696	89	1,235	2,563
Wholesale trade	143	1	56	109
<u>Local production of goods</u>	<u>13</u>	<u>0</u>	<u>3</u>	<u>6</u>
Total Direct Effects	35,169	602	8,116	19,273
<u>Secondary Effects</u>	<u>9,215</u>	<u>76</u>	<u>1,947</u>	<u>5,439</u>
Total Effects	44,384	678	10,063	24,711

Note: Impacts of \$42.9 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. Canyon de Chelly NM itself employed 41 people in FY 2010 with a total payroll including benefits of \$2.3 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$0.5 million in sales, 46 jobs, \$2.5 million in labor income, and \$2.6 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 \$44.9 million in sales, which supported 724 jobs with labor income of \$12.6 million, which was part of a total value added of \$27.3 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 days spent visiting the park. Visitors were assumed to enter the park once each day.

Spending averages outside the park were derived from the 2012 Canyon de Chelly NM VSP survey data (Begly 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 13%.

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 spending more than \$937 (the mean plus two times the standard deviation of the mean for spending, 12 cases) were omitted from the analysis. This is a conservative assumption about outliers and likely results 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 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 18% of visitors to Canyon de Chelly NM did not make the trip primarily to visit the park and 58% of all spending occurred outside the park, adjustments for non-primary purpose trips have an effect on the overall spending and impact estimates.

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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. That is: • 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. • 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 Canyon de Chelly NM VSP questionnaire. Some expenditure categories were combined and renamed for MGM2 analysis.

Table B1. Expenditure categories in Canyon de Chelly NM questionnaire and MGM2 sector assignment

Questionnaire expenditure categories	Inside park	Outside park	MGM2 sector
Lodge, hotel, motel, cabin, 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

	IMPLAN		
MGM2 sector	No.	Name	2007 NAICS
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, Canyon de Chelly NM 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	10.40	0.21	0.53	1.19	1.27	12.63	0.28	0.70
Camping fees	12.51	0.32	0.47	1.26	1.38	15.71	0.41	0.70
Restaurants & bars	17.61	0.33	0.53	1.15	1.27	19.83	0.38	0.70
Groceries & takeout food	16.45	0.45	0.70	1.13	1.28	18.80	0.51	0.88
Gas & oil	10.28	0.32	0.65	1.15	1.26	12.43	0.37	0.82
Local transportation	20.97	0.39	0.72	1.06	1.19	22.75	0.44	0.84
Admission & fees	26.03	0.04	0.46	1.21	1.24	28.02	0.09	0.62
Souvenirs & other expenses	22.99	0.33	0.69	1.13	1.25	25.06	0.38	0.85
Local production of goods	6.09	0.27	0.44	1.08	1.08	7.46	0.30	0.54
Wholesale trade	6.13	0.39	0.76	1.07	1.20	7.94	0.44	0.88

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 motels sector row to illustrate

Direct Effects: Every million dollars in motel sector sales (i.e., short-term lodging room rentals) creates 10.4 jobs in the motel sector. Fifty-three percent of motel sector sales are value added, including 21% that goes to wages and salaries of motel employees. That means 47% 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 47% of sales spent on purchases by motels starts the rounds of indirect effects.

Multiplier effects: There is an additional 19 cents of indirect sales in the region for every dollar of direct motel sector sales (type I sales multiplier = 1.19). Total secondary sales are 27 cents per dollar of direct sales, which means 19 cents in indirect effects and 8 cents in induced effects. An

additional 2.2 jobs are created from secondary effects of each million dollars in motel sector sales (12.6 total jobs – 10.4 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 7% (28%-21%), and the secondary effects on value added for each dollar of motel sector sales are 17% (70%-53%). Including secondary effects, every million dollars of motel sector sales in the region yields \$1.27 million in sales, \$280,000 in income, and \$700,000 in value added.

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