



Impacts of Visitor Spending on the Local Economy

White Sands National Monument, 2012

Natural Resource Report NPS/NRSS/EQD/NRR—2013/676



ON THE COVER

Ranger talk at White Sands National Monument
Photograph by Park Studies Unit staff

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Executive Summary

White Sands National Monument hosted 447,385 recreation visits in 2012 (Table 1). Adjustments for visitor group size and re-entries resulted in 113,373 visitor group trips to the park in 2012 (Table 3). Based on a 2012 Visitor Services Project survey conducted July 17–23, 52% of these visitor group trips were made by local residents or non-locals on day trips, not including an overnight stay within the surrounding area including Alamogordo, Tularosa, and Las Cruces.¹ Thirty-two percent of visitor group trips involved an overnight stay in a lodge, hotel, motel, cabin, B&Bs, etc. in the local area, and 4% were overnight camping stays in the local area (Table 3).

Visitors reported their group's expenditures in the park and within the surrounding area including Alamogordo, Tularosa, and Las Cruces. The average visitor group size was 3.7 people (Table 2) and spent an average of \$191 in the park and local area (Table 4).

Total visitor spending in 2012 in the park and local area was \$21.7 million (Table 6). The greatest proportions of expenditures were for overnight accommodations (31%) and restaurants and bars (20%; Figure 1). Overnight visitors staying in a lodge, hotel, motel, cabin, B&B, etc. in the local area accounted for 66% of total spending (Table 6).

Fifty-five percent of visitor groups indicated the park visit was the primary reason for their trip to the area (Table 2). Counting only a portion of visitor expenses if the park visit was not the primary reason for the trip yields \$17.0 million in spending attributed directly to the park (Table 7).

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 a two-county region Otero and Doña Ana counties, New Mexico. This region includes the park and the communities of Alamogordo, Tularosa, and Las Cruces for which expenditures were reported.

Including direct and secondary effects, the \$17.0 million in visitor spending attributed to the park generated \$17.8 million in direct sales in the region, which supported 265 jobs (Table 9). These jobs paid \$5.8 million in labor income, which was part of \$10.4 million in value added to the region.²

A separate study estimated impacts of the park employee payroll on the local economy in FY 2010³, and the results are reported herein. The park itself employed 30 people in FY 2010 with a total payroll including benefits of \$1.5 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$359,000 in sales, supporting 34 jobs, \$1.6 million in labor income, and \$1.7 million in value added.

Local Economic Impacts of White Sands National Monument

	<u>Sales</u>	<u>Jobs</u>	<u>Labor Income</u>	<u>Value Added</u>
Park Visitor Spending	\$17.8M	265	\$5.8M	\$10.4M
Park Payroll	<u>+\$0.4M</u>	<u>+ 34</u>	<u>+ \$1.6M</u>	<u>+ \$1.7M</u>
Park Visitor Spending + Payroll	\$18.2M	299	\$7.4M	\$12.1M

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

White Sands National Monument (NM) preserves a 225 square-mile area of rarely found gypsum sand dunes in the Tularosa Basin of south-central New Mexico. White Sands NM was designated a National Monument in 1933. The park is located in Otero and Doña Ana counties, New Mexico. White Sands NM received 447,385 recreation visits in 2012 including 2,272 overnight stays by backcountry campers (Table 1).

Table 1. Recreation visits and backcountry overnight stays, White Sands NM, 2012

Month	Recreation visits	Backcountry campers
January	23,304	99
February	26,876	100
March	50,319	269
April	42,220	203
May	42,016	287
June	40,627	238
July	51,099	245
August	39,290	228
September	41,007	184
October	33,774	244
November	28,169	116
<u>December</u>	<u>28,684</u>	<u>59</u>
Total	447,385	2,272

Source: NPS Public Use Statistics 2012.

The purpose of this study is to estimate the annual, local economic impacts of visitors to White Sands 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 Otero and Doña Ana counties, New Mexico. This two-county region had a population of 273,030 (U.S. Census Bureau 2012), gross regional product of \$6.7 billion (MIG, Inc. 2008), median household income of \$38,433, and family poverty rate of 34.6% (U.S. Census Bureau 2012). State and local governments, including education, were the major employers in the region (MIG, Inc. 2008), and the region experienced a 6.7% unemployment rate in 2012 (U.S. Bureau of Labor Statistics 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 White Sands 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 White Sands NM from July 17–23, 2012.⁴ The VSP survey measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a systematic, random sample of 398 visitor groups. Visitors returned 254 questionnaires resulting in a response rate of 63.8%.

Spending and economic impact estimates for White Sands NM are based in part on the 2012 VSP survey data. Visitors were asked to report expenditures inside the park and in the surrounding area outside the park including Alamogordo, Tularosa, and Las Cruces. The local region for determining economic impact was defined as a two-county area around the park including Otero and Doña Ana counties, New Mexico, which includes the park and the communities of Alamogordo, Tularosa, and Las Cruces.

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

Local: Visitors that were residents of the local region, i.e., the surrounding area including Alamogordo, Tularosa, or Las Cruces.

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

Motel: Visitors who reported motel expenses in the local region.⁵

Camping: Visitors who reported camping expenses in the local region.⁶

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

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.

⁶ Only one respondent reported backcountry camping inside the park and was included in the Camping segment.

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.

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, 53% of park entries were classified as day visits either by residents or by visitors from outside the local region, and the remaining 47% were classified as overnight visits including an overnight stay in the surrounding area, including Alamogordo, Tularosa, and Las Cruces (Table 2). The average visitor group size ranged from 3.1 to 4.7 people across the five segments with an average visitor group of 3.7 people.⁸ The average length of stay in the local region on overnight trips was 2.3 nights. Fifty-five 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	Camping	Other OVN	
Visitor segment share (park entries)	8%	45%	28%	5%	14%	100%
Average visitor group size	3.8	3.8	3.1	3.6	4.7	3.7
Length of stay (days or nights)	1.0	1.0	1.7	1.7	3.5	2.3
Re-entry rate (park entries per trip)	1.1	1.0	1.1	1.1	1.1	1.1
Percent primary purpose trips	100%	52%	48%	56%	52%	55%

The 447,385 recreation visits in 2012 were allocated to the five 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 447,385 recreation visits represented 113,373 visitor group trips (Table 3).

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

Measure	Segment					All visitors
	Local	Day trip	Motel	Camping	Other OVN	
Recreation visits	36,686	203,560	123,926	20,580	62,634	447,385
Visitor group trips	8,402	51,448	36,626	5,042	11,855	113,373
Percent of visitor group trips*	7%	45%	32%	4%	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 50 miles of the park.⁹ Spending averages were computed on a visitor group trip basis for each segment. The average visitor group spent \$191.12 on the trip, including expenditures inside the park and in the surrounding communities of Alamogordo, Tularosa, and Las Cruces (Table 4). On a visitor group trip basis, average spending was \$36.78 for day trips by local residents and \$98.50 for day trips by non-local visitors. Visitor groups staying in motels spent an average of \$391.21 on their trips, and those camping spent an average of \$147.14 on their trips. Visitor groups spent about 91% 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	Camping	Other OVN	
<u>Inside Park</u>						
Groceries & takeout food	1.92	2.07	0.91	1.29	1.31	1.57
Admission & fees	9.27	4.73	2.27	1.66	0.45	3.69
<u>Souvenirs & other expenses</u>	<u>7.62</u>	<u>11.01</u>	<u>9.03</u>	<u>9.40</u>	<u>22.47</u>	<u>11.25</u>
Total Inside Park	18.81	17.82	12.21	12.34	24.22	16.51
<u>Outside Park</u>						
Motels	0.00	0.00	180.98	0.00	0.00	58.47
Camping fees	0.00	0.00	0.00	22.06	0.00	0.98
Restaurants & bars	3.17	18.65	79.55	24.60	20.37	37.62
Groceries & takeout food	7.17	8.67	10.40	17.57	11.40	9.80
Gas & oil	6.35	24.41	55.68	63.71	16.64	34.11
Local transportation	0.00	3.63	17.34	0.00	5.61	7.83
Admission & fees	0.00	5.88	7.96	1.83	7.78	6.14
<u>Souvenirs & other expenses</u>	<u>1.27</u>	<u>19.44</u>	<u>27.08</u>	<u>5.03</u>	<u>16.92</u>	<u>19.66</u>
Total Outside Park	17.97	80.69	379.00	134.80	78.71	174.61
Total Inside & Outside Park	36.78	98.50	391.21	147.14	102.93	191.12

*Weighted by percent visitor group trips.

The relative standard error at a 95% confidence level for the overall spending average was 20%. A 95% confidence interval for the overall visitor group spending average was therefore \$191.12 plus or minus \$38.76 or between \$152.35 and \$229.88.

On a per night basis, visitor groups staying in motels spent \$228.63 in the local region, and campers spent \$85.83 (Table 5). The average reported per-night lodging expense was \$105.77 for motels and \$12.87 for camping fees.

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

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

Expenditures	Segment		
	Motel	Camping	Other OVN
Motels	105.77	0.00	0.00
Camping fees	0.00	12.87	0.00
Restaurants & bars	46.49	14.35	5.85
Groceries & takeout food	6.61	11.00	3.65
Gas & oil	32.54	37.17	4.78
Local transportation	10.13	0.00	1.61
Admission & fees	5.98	2.03	2.36
<u>Souvenirs & other expenses</u>	<u>21.11</u>	<u>8.42</u>	<u>11.32</u>
Total per visitor group per night	228.63	85.83	29.58

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. White Sands NM visitors spent a total of \$21.7 million in the local region in 2012 (Table 6). Visitors who stayed in motels accounted for 66% of the total spending. Motel expenses represented 31% of total spending and restaurant and bar expenses represented 20% (Figure 1).

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

Expenditures	Segment				Other OVN	All visitors
	Local	Day trip	Motel	Camping		
<u>Inside Park</u>						
Groceries & takeout food	16	107	33	6	16	178
Admission & fees	78	244	83	8	5	418
<u>Souvenirs & other expenses</u>	<u>64</u>	<u>566</u>	<u>331</u>	<u>47</u>	<u>266</u>	<u>1,275</u>
Total Inside Park	158	917	447	62	287	1,871
<u>Outside Park</u>						
Motels	0	0	6,629	0	0	6,629
Camping fees	0	0	0	111	0	111
Restaurants & bars	27	960	2,913	124	242	4,265
Groceries & takeout food	60	446	381	89	135	1,111
Gas & oil	53	1,256	2,039	321	197	3,867
Local transportation	0	187	635	0	66	888
Admission & fees	0	303	292	9	92	696
<u>Souvenirs & other expenses</u>	<u>11</u>	<u>1,000</u>	<u>992</u>	<u>25</u>	<u>201</u>	<u>2,229</u>
Total Outside Park	151	4,151	13,881	680	933	19,796
Total Inside & Outside Park	309	5,068	14,329	742	1,220	21,668
Segment Percent of Total*	1%	23%	66%	3%	6%	100%

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

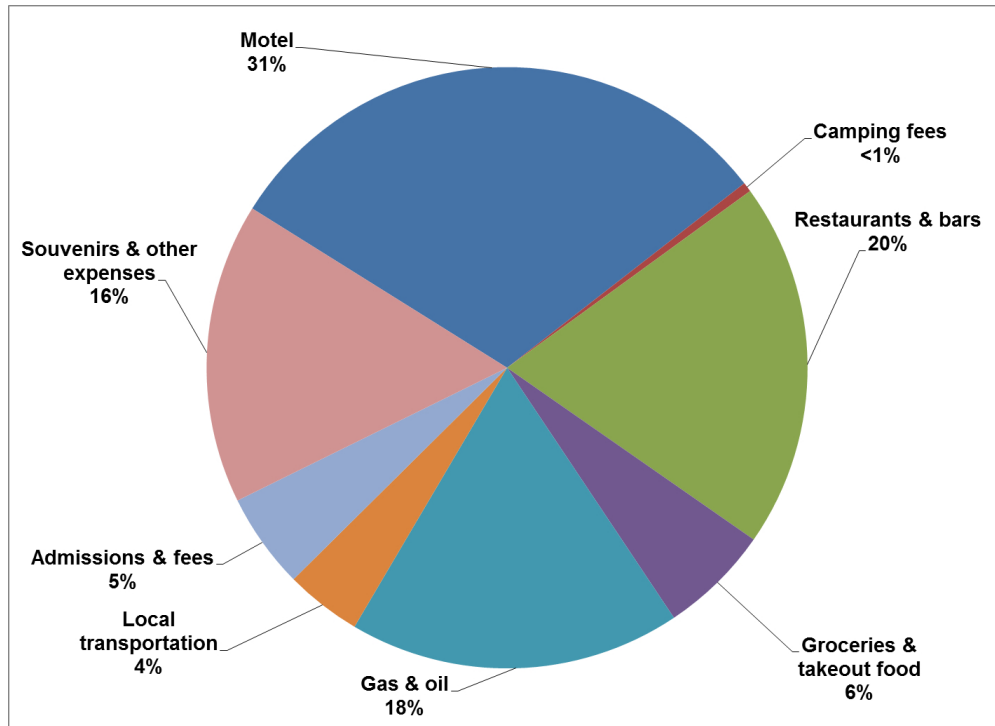


Figure 1. White Sands NM visitor spending by category

Because visitors would come to the region whether or not the park existed, not all visitor spending can be attributed to the park. Forty-five percent of visitor groups did not make the trip primarily to visit White Sands 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 \$17.0 million in visitor spending was attributed to the park visit (Table 7). This represented 78% 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	Camping	Other OVN	
Motels	0	0	5,198	0	0	5,198
Camping fees	0	0	0	86	0	86
Restaurants & bars	0	729	2,157	96	183	3,165
Groceries & takeout food	16	445	332	79	104	977
Gas & oil	0	954	1,599	262	130	2,944
Local transportation	0	142	498	0	44	683
Admission & fees	78	473	312	16	66	945
Souvenirs & other expenses	64	1,326	1,109	68	398	2,965
Total Attributed to Park	158	4,068	11,206	607	925	16,964
Percent of Spending Attributed to the Park	51%	80%	78%	82%	76%	78%
Percent of Attributed Spending	1%	24%	66%	4%	5%	100%

Economic Impacts of Visitor Spending

The economic impacts of White Sands 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 the two-county region— Otero and Doña Ana counties, New Mexico.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, 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 1.41. Every dollar of direct sales to visitors generated another \$0.41 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 \$21.7 million spent by park visitors generated \$22.8 million in sales, which supported 338 jobs in the local region (Table 8). These jobs paid \$7.4 million in labor income, which was part of \$13.2 million in value added to the region.¹³

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.

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.

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	6,629	86	1,657	3,512
Camping fees	111	1	28	51
Restaurants & bars	4,265	81	1,441	2,275
Groceries & takeout food	1,114	24	376	682
Gas & oil	888	24	462	693
Local transportation	326	6	158	235
Admission & fees	862	14	343	598
Souvenirs & other expenses	1,752	35	828	1,326
Wholesale trade	223	2	90	170
<u>Local production of goods</u>	<u>23</u>	<u>0</u>	<u>2</u>	<u>4</u>
Total Direct Effects	16,194	273	5,385	9,546
<u>Secondary Effects</u>	<u>6,577</u>	<u>65</u>	<u>2,033</u>	<u>3,703</u>
Total Effects	22,771	338	7,418	13,250

Note: Impacts of \$21.7 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 restaurants & bars and motels.

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 White Sands NM reduced the overall impacts by about 22% (Table 9; see spending inclusion assumptions in previous section). Including direct and secondary effects, the \$17.0 million spent by park visitors and attributable to the park generated \$17.8 million in sales, which supported 265 jobs in the local region. These jobs paid \$5.8 million in labor income, which was part of \$10.4 million in value added to the region.

Table 9. Economic impacts of visitor spending attributed to the park, 2011

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	5,198	67	1,299	2,754
Camping fees	86	1	22	40
Restaurants & bars	3,165	60	1,070	1,688
Groceries & takeout food	945	21	319	578
Gas & oil	683	19	356	533
Local transportation	247	5	120	178
Admission & fees	657	11	261	455
Souvenirs & other expenses	1,482	29	701	1,122
Wholesale trade	178	2	72	136
Local production of goods	<u>18</u>	<u>0</u>	<u>2</u>	<u>3</u>
Total Direct Effects	12,660	214	4,220	7,488
<u>Secondary Effects</u>	<u>5,147</u>	<u>51</u>	<u>1,591</u>	<u>2,899</u>
Total Effects	17,808	265	5,812	10,387

Note: Impacts of \$17.0 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. White Sands NM itself employed 30 people in FY 2010 with a total payroll including benefits of \$1.5 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$359,000 in sales, 34 jobs, \$1.6 million in labor income, and \$1.7 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 \$18.2 million in sales, which supported 299 jobs with labor income of \$7.4 million, which was part of a total value added of \$12.1 million.

Study Limitations and Errors

The accuracy of the MGM2 estimates rests on the accuracy of three inputs: visits, spending averages, and multipliers. Visits 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 White Sands 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 20%.

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 10 people (5 cases), visiting the local region for more than 7 nights (1 case), or spending greater than \$2,323 (the mean plus two times the standard deviation of the mean for spending, 4 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 July. 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 is not the primary reason for the trip is somewhat subjective. Because 45% of visitors to White Sands NM did not make the trip primarily to visit the park and 91% of all spending occurs outside the park, adjustments for non-primary purpose trips have a significant 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 White Sands NM VSP questionnaire. Some expenditure categories were combined and renamed for MGM2 analysis.

Table B1. Expenditure categories in White Sands NM questionnaire and MGM2 sector assignment

Questionnaire expenditure categories	Inside park	Outside park	MGM2 sector
Lodge, hotel, motel, cabin, B&B, etc.		X	Motels
Camping fees and charges		X	Camping fees
Guide fees and charges		X	Admissions & fees
Restaurants and bars		X	Restaurants & bars
Groceries and takeout food	X	X	Groceries & takeout food
Gas and oil (auto, RV, boat, etc.)		X	Gas & oil
Other transportation expenses (rental cars, taxis, auto repairs, but NOT airfare)		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		
	No.	Name	2007 NAICS
Motels	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, White Sands 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, hotel, cabin or B&B	12.42	0.25	0.53	1.23	1.42	16.65	0.39	0.77
Camping fees	12.84	0.25	0.46	1.27	1.47	17.63	0.42	0.74
Restaurants & bars	17.94	0.34	0.53	1.15	1.38	21.58	0.46	0.76
Groceries & takeout food	17.49	0.48	0.72	1.15	1.46	21.95	0.63	1.00
Gas & oil	12.45	0.40	0.69	1.16	1.42	16.62	0.53	0.95
Local transportation	24.12	0.52	0.78	1.06	1.38	27.87	0.65	1.01
Admission & fees	21.36	0.34	0.61	1.16	1.39	25.19	0.46	0.85
Souvenirs & other expenses	18.82	0.47	0.76	1.13	1.43	23.00	0.61	1.02
Local production of goods	3.19	0.09	0.17	1.23	1.33	5.92	0.20	0.36
Wholesale trade	8.16	0.40	0.77	1.11	1.36	11.78	0.53	0.98

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 12.4 jobs in the motel sector. Fifty-three percent of motel sector sales are value added, including 25% 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 23 cents of indirect sales in the region for every dollar of direct motel sector sales (type I sales multiplier = 1.23). Total secondary sales are 42 cents per dollar of direct sales, which means 23 cents in indirect effects and 19 cents in induced effects.

An additional 4.2 jobs are created from secondary effects of each million dollars in motel sector sales (16.6 total jobs – 12.4 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 14% (39%-25%), and the secondary effects on value added for each dollar of motel sector sales are 24% (77%-53%). Including secondary effects, every million dollars of motel sector sales in the region yields \$1.42 million in sales, \$390,000 in income, and \$770,000 in value added.

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