



Impacts of River Visitor Spending on the Local Economy

Delaware Water Gap National Recreation Area, 2010

Natural Resource Report NPS/NRSS/EQD/NRR—2012/609



The Free-flowing Delaware River Reflects the 'Gap' framed by Mt. Tammany and Mt. Minner
Delaware Water Gap National Recreation Area

ON THE COVER

Photograph courtesy of Delaware Water Gap National Recreation Area

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December 2012

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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Please cite this publication as:

Cook, P. S. 2012. Impacts of river visitor spending on the local economy: Delaware Water Gap National Recreation Area, 2010. Natural Resource Report NPS/NRSS/EQD/NRR—2012/609. National Park Service, Fort Collins, Colorado.

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Executive Summary

Delaware Water Gap National Recreation Area (NRA) hosted 2,975,082 river visits in 2010. Adjustments for visitor group size and re-entries resulted in 601,387 river visitor group trips to the park in 2010. Based on a 2010 Visitor Services Project survey of river visitors conducted July 31 – August 8, 74% of these visitor group trips were made by local residents or non-locals on day trips, not including an overnight stay within 20 miles of the park.¹ Eleven percent of river visitor group trips involved an overnight stay in hotels, motels, inns, cabins, B&Bs, etc. in the local area.

River visitors reported their group’s expenditures in the park and within 20 miles of the park. The average visitor group size was 4.3 people and spent an average of \$35 in the park and an average of \$107 outside the park within 20 miles.

Total river visitor spending in 2010 in the park and within 20 miles of the park was \$85.5 million. The greatest proportions of expenditures were for admissions and fees (40%), primarily for rental of water recreation equipment (canoes, kayaks, rafts, etc.). Overnight visitors staying in hotels, motels, inns, cabins, B&Bs, etc. in the local area accounted for 36% of total spending.

Thirty-two percent of visitor groups indicated the park visit was the primary reason for their trip to the area. Counting only a portion of river visitor expenses if the park visit was not the primary reason for the trip yields \$60.0 million in spending attributed directly to the park.

The economic impact of river visitor spending was estimated by applying the spending to an input-output model of the local economy. The local region was defined as a six-county region including Monroe, Pike, and North Hampton counties in Pennsylvania, Warren and Sussex counties in New Jersey, and Orange County, New York. This region roughly coincides with the 20-mile radius around the park for which expenditures were reported.

Including direct and secondary effects, the \$60.0 million in visitor spending attributed to the park generates \$74.0 million in direct sales in the region, which support 999 jobs. These jobs pay \$27.4 million in labor income, which is part of \$44.4 million in value added to the region.²

A separate study estimated impacts of the park employee payroll on the local economy.³ The park itself employed 121 people in FY 2010 with a total payroll including benefits of \$9.2 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$4.2 million in sales, supporting 155 jobs, \$10.6 million in labor income, and \$11.7 million in value added.

Local Economic Impacts of River Visitors and Park Payroll to Delaware Water Gap NRA

	<u>Sales</u>	<u>Jobs</u>	<u>Labor Income</u>	<u>Value Added</u>
River Visitor Spending	\$74.0M	999	\$27.4M	\$44.4M
Park Payroll	<u>+\$4.2M</u>	<u>+155</u>	<u>+\$10.6M</u>	<u>+\$11.7M</u>
River Visitor Spending + Park Payroll	\$78.2M	1,154	\$38.0M	\$56.1M

¹ Results in this study sometimes differ from those reported in the VSP study report (Blotkamp et al. 2011) 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).

Acknowledgments

The author thanks:

- Brinnen Carter, Cultural Resource Manager, Delaware Water Gap NRA, and his staff for their assistance in providing information about visitor counts, and
- Margaret Littlejohn, Visitor Services Project Director, for her review of an early draft of this report.

Introduction

Delaware Water Gap National Recreation Area (NRA) preserves almost 70,000 acres of land along the Delaware River's New Jersey and Pennsylvania shores. The park is the largest natural area in the National Park System between Virginia and Maine and is located in Pike and Monroe counties in Pennsylvania and Sussex and Warren counties in New Jersey. Delaware Water Gap NRA received 5.3 million recreation visits in 2010, including 104,558 overnight stays (Table 1).

Table 1. Recreation visits and overnight stays, Delaware Water Gap NRA, 2010

Month	Recreation Visits	Overnight (OVN) Stays			Total OVN Stays
		Concession Campgrounds	NPS Misc. Campgrounds	Backcountry	
January	263,691	0	295	242	537
February	251,736	0	991	305	1,296
March	400,085	0	1,257	1,004	2,261
April	400,085	0	1,124	1,004	2,128
May	464,418	2,076	4,906	3,084	10,066
June	662,737	5,249	5,966	14,001	25,216
July	651,868	2,932	4,547	14,291	21,770
August	651,809	2,932	5,028	14,291	22,251
September	439,019	2,932	3,862	3,400	10,194
October	454,162	0	3,079	1,540	4,619
November	361,608	0	2,448	50	2,498
December	284,543	0	1,422	300	1,722
Total	5,285,761	16,121	34,925	53,512	104,558

Source: NPS Public Use Statistics 2010.

The purpose of this study is to estimate the annual, local economic impacts of river visitors to Delaware Water Gap NRA in 2010. Economic impacts are measured as the direct and secondary sales, income, and jobs in the local region resulting from spending by park visitors. (See Appendix A: Glossary for definitions of terms.) 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 includes Monroe, Pike, and North Hampton counties in Pennsylvania, Warren and Sussex counties in New Jersey, and Orange County, New York. This six-county region of Pennsylvania, New Jersey, and New York has a population of 1.15 million (USCB 2010), gross regional product of \$35.4 billion (MIG, Inc. 2008), median household income of \$69,768, and family poverty rate of 6.0% (USCB 2010). State and local governments and food services and drinking places are the major employers in the region (MIG, Inc. 2008), and the region experienced a 9.0% unemployment rate in 2010 (BLS 2010).

This study estimates the economic impacts of only “river visitors” to Delaware Water Gap NRA. River visitors are only a portion of all visitors to the park. Their numbers were estimated using the procedures outlined in the Methods section below and Appendix B. The park received an estimated 3.0 million recreation visits by river visitors in 2010 (Table 2), or about 56.3% of recreation visits by all visitors.

Table 2. Estimated number of recreation visits by river visitors by month, Delaware Water Gap NRA, 2010

Month	Estimated number of recreation visits by river visitors
January	80,541
February	73,404
March	185,409
April	185,409
May	249,830
June	508,755
July	492,205
August	492,116
September	223,251
October	238,918
November	151,462
December	93,783
Total	2,975,082

Methods

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

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

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

The VSP visitor survey was conducted at Delaware Water Gap NRA from July 31–August 8, 2010.⁴ The VSP survey measured visitor demographics, activities, and travel expenditures. Questionnaires were distributed to a systematic, random sample of 1,075 visitor groups. Visitors returned 440 questionnaires resulting in a response rate of 41%.

The total number of recreation visits to the park (Table 1) is based on visitor counting procedures established by the park in conjunction with the National Park Service Public Use Statistics Office (1997). Visitor counts are estimated by the park based on inductive loop motor vehicle traffic counters placed at several locations in the park. The park’s recreation visit estimation procedures take into account that traffic counters are located on several highways that serve as commuting and transportation routes for non-recreational traffic.

The population from which the VSP survey sampled was “river visitors.” However, the park does not define, classify, or count river visits or river visitors as a subset of all visits or visitors. The VSP survey sampled visitors at sites along the Delaware River, but it was unknown what proportion of total visitation these visitors represented. Therefore, for this study, the annual number of recreation visits by river visitors was estimated based on the proportion of visitors reporting river-dependent activities (boating, canoeing, fishing, or swimming) in the VSP survey adjusted for seasonal variation in total visitation. (See Appendix B for details.)

Spending and economic impact estimates for Delaware Water Gap NRA are based on the 2010 VSP survey data. Visitors were asked to report expenditures within 20 miles of the park. The local region for determining economic impact was defined as a six-county area around the park including Monroe, Pike, and North Hampton counties in Pennsylvania, Warren and Sussex counties in New Jersey, and Orange County, New York, which roughly coincides with the 20-mile radius for which visitor spending was reported.

⁴ Results in this study sometimes differ from those reported in the VSP study report (Blotkamp et al. 2011) because of the omission of cases considered to be outliers in the current analysis. See Study Limitations and Errors section.

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

Local: Visitors from the local region, not staying overnight inside the park.

Day trip: Visitors from outside the local region, not staying overnight within 20 miles of the park.

Camp-in: Visitors reporting camping expenses at either concession or NPS campgrounds inside the park.

Backcountry: Visitors reporting backcountry or river camping inside the park.

Motel: Visitors reporting motel expenses inside the park or within 20 miles of the park.⁵

Camp-out: Visitors reporting camping expenses outside the park within 20 miles of the park.

Other overnight (Other OVN): Visitors staying overnight in the local region but not reporting any lodging expenses. This segment includes visitors staying in private homes, with friends or relatives, or in other unpaid lodging.⁶

The VSP survey was used to estimate the percentage of visitors from each segment as well as spending averages, lengths of stay, and visitor group sizes for each segment. Segment shares from the VSP surveys were adjusted to be consistent with the park's NPS Public Use Statistics (2010) overnight stay figures.

⁵ The questionnaire asked about expenditures for "Hotels, motels, inns, cabins, B&Bs, etc." For convenience, these expenditures are referred to as "motels" in this report.

⁶ 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 the VSP survey data, 70% of park entries were classified as day visits by either residents or visitors from outside the region, and the remaining 30% were classified as overnight visits including an overnight stay in the local region (Table 3). The average visitor group size ranged from 3.3 to 7.2 people across the seven segments with an average visitor group of 4.3 people.⁷ The average length of stay in the park and local region on overnight trips was 2.1 nights.

Table 3. Selected visit/trip characteristics by segment, 2010

Characteristic	Segment							All visitors
	Local	Day trip	Camp-in	Back-country	Motel	Camp-out	Other OVN	
Visitor segment share (park entries)	31%	39%	1%	1%	10%	3%	15%	100%
Average visitor group size	4.0	4.3	3.4	6.7	3.3	7.2	4.6	4.3
Length of stay (days or nights)	1.0	1.0	2.1	1.5	1.9	2.5	2.4	2.1
Re-entry rate (park entries per trip)	1.1	1.1	1.3	1.2	1.4	1.5	1.3	1.2
Percent primary purpose trips	100%	44%	53%	71%	46%	50%	24%	32%

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

The 2,975,082 river visits in 2010 were allocated to the seven segments using the visit segment shares in Table 3. Because spending is reported for the stay in the area, visits were converted to visitor group trips to the area by dividing river visits by the average number of times each visitor entered the park during their trip and the average visitor group size. The 2,975,082 river visits represented 601,387 visitor group trips (Table 4).

Table 4. Estimated recreation visits and visitor group trips by river visitor segment, 2010

Measure	Segment							All visitors
	Local	Day trip	Camp-in	Back-country	Motel	Camp-out	Other OVN	
Recreation visits	922,275	1,160,282	29,751	29,751	297,508	89,252	446,262	2,975,082
Visitor group trips	202,626	238,562	6,627	3,740	64,526	8,218	77,088	601,387
Percent of visitor group trips*	34%	40%	1%	1%	11%	1%	13%	100%

*Percentages do not total 100% due to rounding.

⁷ 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 in the park and within 20 miles of the park.⁸ Spending averages were computed on a visitor group trip basis for each segment. The average visitor group spent \$142 on the trip in the park and within 20 miles of the park (Table 5). On a visitor group trip basis, average spending was \$61 for day trips by local residents and \$102 for day trips by non-local visitors. Visitor groups staying in motels spent an average of \$482 on their trips. Visitor groups camping inside the park in developed campgrounds spent \$162 per trip, while those camping outside the park spent \$384 per trip. Visitor groups camping in backcountry or river camping areas spent an average of \$311 per trip.

Table 5. Average spending by segment (dollars per visitor group per trip).

Expenditures	Segment							
	Local	Day trip	Camp- in	Back- country	Motel	Camp- out	Other OVN	All visitors*
Inside Park								
Motels	0.00	0.00	2.87	0.00	22.90	0.00	0.00	2.49
Camping fees	0.00	0.00	47.15	5.78	0.00	0.00	0.00	0.56
Restaurants & bars	0.21	2.60	1.33	1.79	15.24	0.00	5.30	3.44
Groceries & takeout food	0.23	0.90	15.40	3.87	8.26	0.00	9.09	2.68
Local transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admission & fees	10.07	25.45	38.51	83.83	26.43	0.00	60.48	25.02
<u>Souvenirs & other expenses</u>	<u>0.56</u>	<u>1.57</u>	<u>4.78</u>	<u>0.00</u>	<u>0.89</u>	<u>2.73</u>	<u>1.45</u>	<u>1.18</u>
Total Inside Park	11.07	30.53	110.04	95.27	73.71	2.73	76.32	35.37
Outside Park								
Motels	0.00	0.00	0.00	0.00	184.63	3.41	0.00	19.86
Camping fees	0.00	0.00	1.99	0.00	0.55	136.77	0.00	1.95
Restaurants & bars	11.44	11.22	3.03	0.89	80.22	10.91	15.23	19.05
Groceries & takeout food	7.89	9.16	16.95	50.94	37.94	37.18	38.07	16.25
Gas & oil	7.71	9.98	19.87	6.26	24.84	41.91	12.87	11.70
Local transportation	1.18	0.55	0.00	0.00	1.38	13.64	4.50	1.53
Admission & fees	20.63	35.46	10.04	157.89	65.38	106.66	5.06	31.23
<u>Souvenirs & other expenses</u>	<u>1.20</u>	<u>5.26</u>	<u>0.27</u>	<u>0.00</u>	<u>13.38</u>	<u>30.36</u>	<u>6.97</u>	<u>5.24</u>
Total Outside Park	50.05	71.63	52.15	215.99	408.32	380.84	82.70	106.81
Total Inside & Outside Park	61.12	102.16	162.18	311.26	482.03	383.57	159.02	142.18

*Average weighted by percent visitor group trips.

Admission & fees expenditures, which were primarily water recreation equipment rental, made up a large proportion of expenditures for all segments. Visitor groups spent about 25% of their total spending inside the park and 75% outside the park.

⁸ Some expenditure categories in the VSP questionnaire were combined for reporting herein and MGM2 analysis. See Appendix C.

The relative standard error at a 95% confidence level for the overall spending average is 15%. A 95% confidence interval for the overall visitor group spending average is therefore \$142 plus or minus \$21 or between \$121 and \$163.

On a per night basis, visitor groups staying in motels spent \$259 in the local region, campers in developed park campgrounds spent \$78, and campers outside the park spent \$153 (Table 6). Backcountry camping visitor groups spent an average of \$204 per night, much of it on water recreation equipment rental (canoes, kayaks, rafts, etc.). The average reported per night lodging expense was \$111 for motels outside the park, \$55 for camping fees outside the park, and \$24 for camping fees inside the park.

Table 6. Average spending per night for visitor groups on overnight trips (dollars per visitor group per night).

Expenditures	Segment				
	Camp-in	Back-country	Motel	Camp-out	Other OVN
Motels	1.39	0.00	111.36	1.36	0.00
Camping fees	23.78	3.78	0.30	54.71	0.00
Restaurants & bars	2.11	1.75	51.22	4.36	8.59
Groceries & takeout food	15.65	35.84	24.79	14.87	19.74
Gas & oil	9.61	4.09	13.33	16.76	5.39
Local transportation	0.00	0.00	0.74	5.45	1.89
Admission & fees	23.50	158.05	49.26	42.66	27.44
Souvenirs & other expenses	2.44	0.00	7.66	13.24	3.52
Total per visitor group per night	78.47	203.52	258.65	153.43	66.56

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. River visitors to Delaware Water Gap NRA spent a total of \$85.5 million in the local region in 2010 (Table 7). Overnight visitors staying in motels accounted for 36% of the total spending and non-local visitors on day trips accounted for 29%. Admissions & fees, primarily water recreation equipment rentals, represented 40% of the total spending, and lodging expenses represented 36% of the total spending (Figure 1).

Table 7. Total river visitor spending by segment, 2010 (thousands of dollars).

Expenditures	Segment							All visitors
	Local	Day trip	Camp-in	Back-country	Motel	Camp-out	Other OVN	
Inside Park								
Motels	0	0	19	0	1,478	0	0	1,497
Camping fees	0	0	312	22	0	0	0	334
Restaurants & bars	43	621	9	7	983	0	408	2,071
Groceries & takeout food	46	215	102	14	533	0	701	1,612
Local transportation	0	0	0	0	0	0	0	0
Admission & fees	2,040	6,071	255	314	1,705	0	4,662	15,048
Souvenirs & other expenses	114	375	32	0	57	22	111	711
Total Inside Park	2,243	7,282	729	356	4,756	22	5,883	21,273
Outside Park								
Motels	0	0	0	0	11,913	28	0	11,941
Camping fees	0	0	13	0	36	1,124	0	1,173
Restaurants & bars	2,318	2,677	20	3	5,176	90	1,174	11,459
Groceries & takeout food	1,599	2,184	112	191	2,448	306	2,934	9,774
Gas & oil	1,562	2,380	132	23	1,603	344	992	7,036
Local transportation	240	131	0	0	89	112	347	920
Admission & fees	4,179	8,459	67	591	4,219	877	390	18,781
Souvenirs & other expenses	244	1,256	2	0	863	250	537	3,151
Total Outside Park	10,142	17,088	346	808	26,347	3,130	6,375	64,235
Total Inside & Outside Park	12,385	24,370	1,075	1,164	31,103	3,152	12,258	85,508
Segment Percent of Total*	14%	29%	1%	1%	36%	4%	14%	100%

*Percentages do not total 100% due to rounding.

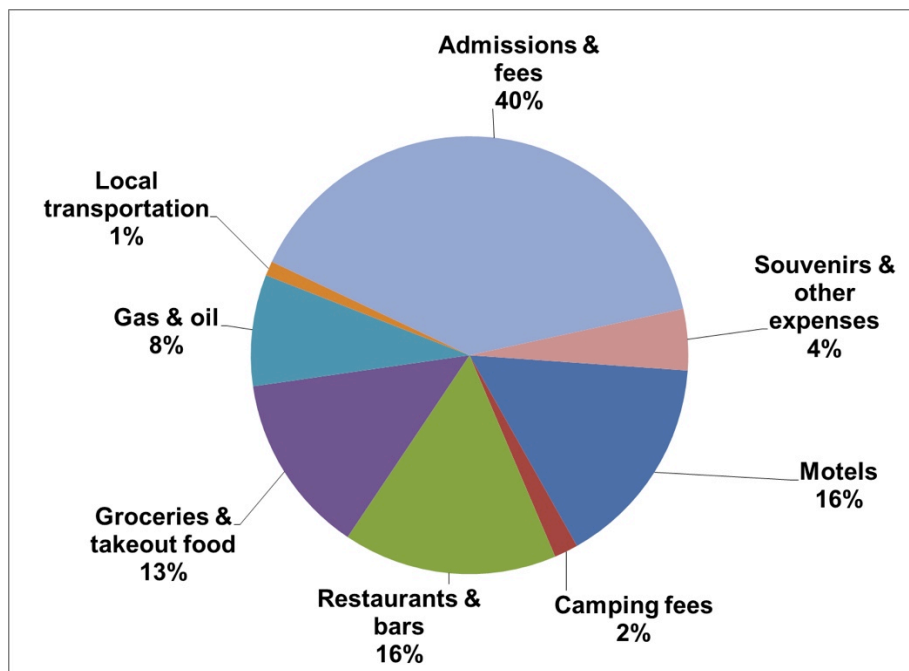


Figure 1. Delaware Water Gap NRA river visitor spending by category

Because visitors would come to the region whether or not the park existed, not all visitor spending can be attributed to the park. Sixty-eight percent of visitor groups did not make the trip primarily to visit Delaware Water Gap NRA. 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 \$60.0 million in visitor spending is attributed to the park visit (Table 8). This represents 70% of the overall visitor spending total.

Table 8. Total spending attributed to park visits, 2010 (thousands of dollars)

Expenditures	Segment							All visitors
	Local	Day trip	Camp-in	Back-country	Motel	Camp-out	Other OVN	
Motels	0	0	19	0	10,418	20	0	10,457
Camping fees	0	0	322	22	27	787	0	1,158
Restaurants & bars	43	2,543	24	10	4,868	63	1,062	8,611
Groceries & takeout food	46	1,783	187	186	2,371	214	2,334	7,120
Gas & oil	0	1,709	99	21	1,203	241	552	3,825
Local transportation	0	94	0	0	67	78	193	433
Admission & fees	2,040	12,143	306	844	4,871	614	4,879	25,697
Souvenirs & other expenses	114	1,276	33	0	705	197	410	2,735
Total Attributed to Park	2,243	19,548	990	1,082	24,529	2,213	9,430	60,035
Percent of Spending Attributed to the Park	18%	80%	92%	93%	79%	70%	77%	70%
Percent of Attributed Spending*	4%	33%	2%	2%	41%	4%	16%	100%

*Percentages do not total 100% due to rounding.

Economic Impacts of Visitor Spending

The economic impacts of Delaware Water Gap NRA river 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 six-county region—Monroe, Pike, and North Hampton counties in Pennsylvania, Warren and Sussex counties in New Jersey, and Orange County, New York.⁹ Economic ratios and multipliers for the region were estimated using the *Impact Analysis for Planning (IMPLAN) Professional software* (version 3, MIG, Inc. 2008) with 2008 data.¹⁰ Multipliers were adjusted to 2010 based on structural changes in the national IMPLAN models between 2008 and 2009 and price changes between 2009 and 2010 (see Study Limitations and Errors section below).

⁹ 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.

¹⁰ See Appendix D: Economic Ratios and Multipliers for the region.

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

The tourism output sales multiplier for the region is 1.43. Every dollar of direct sales to visitors generates another \$0.43 in secondary sales through indirect and induced effects.¹¹ (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 river visitor spending and (2) based only on river visitor spending attributable to the park. The first estimate—including all river visitor spending—shows the overall contribution park river visitors make to the local region. The second estimate—including only river visitor spending attributable to the park—shows the impact or contribution the park makes to the economy of the local region.

Impacts of All River Visitor Spending

Using all river visitor spending and including direct and secondary effects, the \$85.5 million spent by park visitors generated \$102.4 million in sales, which supported 1,389 jobs in the local region (Table 9). These jobs paid \$38.1 million in labor income, which was part of \$61.6 million in value added to the region.¹²

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 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 9. Impacts of all river visitor spending on the local economy, 2010

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	13,438	146	4,165	7,432
Camping fees	1,507	18	698	790
Restaurants & bars	13,530	242	4,931	6,944
Groceries & takeout food	2,881	53	1,483	2,415
Gas & oil	1,569	26	794	1,306
Local transportation	920	17	488	606
Admission & fees	33,829	602	13,924	21,285
Souvenirs & other expenses	1,931	40	992	1,615
Wholesale trade	1,503	8	570	983
Local production of goods	394	1	87	136
Total Direct Effects	71,500	1,152	28,131	43,512
<u>Secondary Effects</u>	<u>30,947</u>	<u>236</u>	<u>10,000</u>	<u>18,051</u>
Total Effects	102,447	1,389	38,131	61,563

Note: Impacts of \$85.5 million in river visitor spending reported in Table 7. 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 admissions and fees.

Impacts of River Visitor Spending Attributed to the Park

Using only river visitor spending attributable to the park by including only some spending on trips where the primary trip purpose was not to visit Delaware Water Gap NRA reduced the overall impacts by about 28% (Table 10; see spending inclusion assumptions in previous section). Including direct and secondary effects, the \$60.0 million spent by park river visitors and attributable to the park generated \$74.0 million in sales, which supported 999 jobs in the local region. These jobs paid \$27.4 million in labor income, which was part of \$44.4 million in value added to the region.

Table 10. Economic impacts of river visitor spending attributed to the park, 2010

Sector/Expenditure category	Sales (thousands of dollars)	Jobs	Labor Income (thousands of dollars)	Value Added (thousands of dollars)
Direct Effects				
Motels	10,457	113	3,241	5,783
Camping fees	1,158	13	536	607
Restaurants & bars	8,611	154	3,138	4,419
Groceries & takeout food	1,801	33	928	1,510
Gas & oil	853	14	432	710
Local transportation	433	8	229	285
Admission & fees	25,697	457	10,577	16,169
Souvenirs & other expenses	1,368	28	703	1,143
Wholesale trade	933	5	354	610
Local production of goods	<u>259</u>	<u>1</u>	<u>58</u>	<u>92</u>
Total Direct Effects	51,569	828	20,196	31,329
<u>Secondary Effects</u>	<u>22,431</u>	<u>171</u>	<u>7,253</u>	<u>13,076</u>
Total Effects	74,000	999	27,448	44,405

Note: Impacts of \$60.0 million in river visitor spending attributed to park reported in Table 8. 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 by applying economic multipliers to wage and salary data to capture the induced effects of NPS employee spending on local economies. Delaware Water Gap NRA itself employed 121 people in FY 2010 with a total payroll including benefits of \$9.2 million. Including secondary effects, the local impacts of the park payroll in FY 2010 were \$4.2 million in sales, 155 jobs, \$10.6 million in labor income, and \$11.7 million value added (Stynes 2011).

Combined Economic Impacts

The combined impacts to the region of river visitor spending attributable to the park and NPS payroll were \$78.2 million in sales, which supported 1,154 jobs with labor income of \$38.0 million which was part of a total value added of \$56.1 million.¹³

¹³ To the extent NPS recreation fees reported as visitor spending contribute to NPS payroll, there is some double counting of the impacts of recreation fees. Data about recreation fee contributions to NPS payroll are unavailable, but the overlap is believed to be minor.

Study Limitations and Errors

The accuracy of the MGM2 estimates rests on the accuracy of three inputs: visits, spending averages, and multipliers. Estimates of recreation visits were taken from NPS Public Use Statistics (2010). Recreation visit estimates rely on counting procedures at the park, which may miss some visitors and count others more than once during their visit (National Park Service Public Use Statistics Office 1997). Visit counts are estimated based on inductive loop motor vehicle traffic counters placed at several locations in the park. The estimation procedures take into account that traffic counters are located on several highways that serve as commuting and transportation routes for non-recreational traffic.

For this study the number of river visits, a subset of all recreation visits to the park, was estimated. The estimation procedure was based on best available knowledge about the number of recreation visits to the park and activities of park visitors, but included numerous assumptions which may have affected the accuracy of the estimate (See Appendix B for details). Better definition of what makes a park visitor a river visitor and improved methods for counting river visits at the park would improve the accuracy of results in this study.

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 best available knowledge about park visitor-counting methods and visitors' responses to a park re-entry question in the VSP visitor survey (Blotkamp et al. 2011).

Spending averages were derived from the VSP survey data. Estimates from the survey are subject to sampling errors, measurement errors, and potential seasonal biases. The overall spending average is subject to a sampling error of 15%.

Spending averages are also sensitive to decisions about outliers and treatment of missing data. In order to estimate spending averages, incomplete spending data were filled with zeros. Visitor groups of more than 20 people (11 cases), visiting the local region for more than 7 nights (3 cases), spending greater than \$1,475 (the mean plus two times the standard deviation of the mean for spending, 14 cases), or arriving in more than seven vehicles (3 cases) were omitted from the analysis. These are conservative assumptions about outliers and likely resulted in conservative estimates of economic impacts.

The sample only covers visitors during late July and early August. To extrapolate to annual totals, it was assumed that this sample represented visitors throughout the year. Sampling visitors during other seasons would improve the accuracy of results in this study.

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 C, Table C2). The most recent local IMPLAN datasets available for this analysis were 2008. National IMPLAN multiplier data were available for 2009, so local employment, labor income, and value added multipliers were

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

Sorting out how much spending to attribute to the park when the park is not the primary reason for the trip is somewhat subjective. Because 68% of visitors to Delaware Water Gap NRA did not make the trip primarily to visit the park and 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: <ul style="list-style-type: none">• Direct jobs = direct sales * jobs to sales ratio• Direct personal income = direct sales * personal income to sales ratio• Direct value added = direct sales * value added to sales ratio.
Indirect effects	Changes in sales, income and jobs in industries that supply goods and services to the businesses that sell directly to visitors, i.e., businesses in the supply chain. For example, linen suppliers benefit from visitor spending at motels.
Induced effects	Changes in economic activity in the region resulting from household spending of income earned through a direct or indirect effect of visitor spending. For example, motel and linen supply employees live in the region and spend their incomes on housing, groceries, education, clothing and other goods and services. IMPLAN's Social Accounting Matrix (SAM) multipliers also include induced effects resulting from local/state/federal government spending.
Jobs	The number of jobs in the region supported by visitor spending. Job estimates are not full time equivalents, but include both fulltime and part-time positions.
Labor income	Wage and salary income, sole proprietor (business owner) income and employee payroll benefits.
Regional purchase coefficient (RPC)	The proportion of demand within a region supplied by producers within that region.
Retail margin	The markup to the price of a product when a product is sold through a retail trade activity. Retail margin is calculated as sales receipts minus the cost of goods sold.
Sales	Direct sales (retail goods and services) of firms within the region to park visitors.

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

Appendix B: Estimating the Number of River Visits in 2010

The VSP surveyed “river visitors” which are only a portion of all visitors to Delaware Water Gap NRA. The park records total visitation (NPS Public Use Statistics 2010), but does not define, classify, or record the number of river visits or visitors. Therefore, the number of river visits to Delaware Water Gap NRA for all of 2010 had to be estimated using NPS Public Use Statistics (2010) and data from the VSP survey.

It was assumed that the proportion of park visits that are river visits varies by season, with a higher proportion of park visits being river visits during the warmer months of the year. It also was assumed that participation in river-dependent activities (boating, canoeing, fishing, and swimming) by visitors varies by season, with higher participation during warmer months. Using these assumptions, estimates of participation in river-dependent activities and number of river visits by month were developed.

The VSP survey was conducted during early August, when both visitation and the propensity of visitors to participate in river-dependent activities are near their highest levels. The VSP survey found that 75.5% of visitor groups participated in at least one river-dependent activity (boating, canoeing, fishing, or swimming).

To estimate participation in river-dependent activities in other months, the August participation proportion of 75.5% was weighted by the percent change in total park visits from the visitation level in August (Table B1). Using this methodology, the estimate of the percentage of park visitors participating in a river-dependent activity ranged from a low of 30.5% in January to 76.8% in June. Total park visits were then multiplied by these percentages for each month to estimate the number of river visits (Table B1). For the entire year, it was estimated that nearly three million visits were river visits, or 56.3% of all park visits.

Table B1. Estimates of total visits and river visits by month, Delaware Water Gap NRA, 2010.

Month	All recreation visits	Percent of August's visits level	Estimate of percent participation in river-dependent activity	Estimate of number of river visitors
January	263,691	40.5%	30.5%	80,541
February	251,736	38.6%	29.2%	73,404
March	400,085	61.4%	46.3%	185,409
April	400,085	61.4%	46.3%	185,409
May	464,418	71.3%	53.8%	249,830
June	662,737	101.7%	76.8%	508,755
July	651,868	100.0%	75.5%	492,205
August	651,809	100.0%	75.5%	492,116
September	439,019	67.4%	50.9%	223,251
October	454,162	69.7%	52.6%	238,918
November	361,608	55.5%	41.9%	151,462
December	<u>284,543</u>	43.7%	33.0%	<u>93,783</u>
Total	5,285,761			2,975,082

Appendix C: Expenditure Sector Assignments

Table C1 shows expenditure categories visitors were asked to estimate in the Delaware Water Gap NRA VSP questionnaire. Some expenditure categories were combined and renamed for MGM2 analysis.

Table C1. Expenditure categories in Delaware Water Gap NRA questionnaire and MGM2 sector assignment

Questionnaire expenditure categories	Inside park	Outside park	MGM2 sector
Hotels, motels, inns, cabins, B&B, etc.	X	X	Motels
Camping fees	X	X	Camping fees
Guide fees and charges		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	Gas & oil
Other transportation expenses (rental cars, auto repairs, taxis, not airfare)		X	Local transportation
Admission, recreation, entertainment fees	X	X	Admissions & fees
Water recreation equipment rental (canoes, kayaks, rafts, etc.)	X	X	Admissions & fees
All other purchases (souvenirs, film, books, sporting goods, clothing, etc.)	X	X	Souvenirs & other expenses
Donations	X	X	Souvenirs & other expenses

X = category included in questionnaire.

MGM2 sectors names correspond to similar sector names and numbers in IMPLAN (Table C2). IMPLAN sectors also correspond to 2007 North American Industry Classification System (NAICS) sectors.

Table C2. MGM2 sector correspondence to IMPLAN and 2007 NAICS sectors

MGM2 sector	IMPLAN		2007 NAICS
	No.	Name	
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	317	All other miscellaneous manufacturing	339993, 339995, 339999
Wholesale trade	319	Wholesale trade	42

Source: IMPLAN (MIG, Inc. 2008).

Appendix D: Economic Ratios and Multipliers

Table D1. Economic ratios and multipliers for selected tourism-related sectors, Delaware Water Gap NRA region, 2011

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
Motels	10.84	0.31	0.55	1.21	1.42	14.11	0.45	0.79
Camping fees	11.65	0.46	0.52	1.26	1.50	15.65	0.63	0.82
Restaurants & bars	17.88	0.36	0.51	1.20	1.40	20.84	0.49	0.75
Groceries & takeout food	18.34	0.51	0.84	1.19	1.43	21.68	0.65	1.10
Gas & oil	16.46	0.51	0.83	1.16	1.34	19.10	0.62	1.04
Local transportation	18.19	0.53	0.66	1.11	1.35	21.06	0.65	0.87
Admission & fees	17.80	0.41	0.63	1.30	1.46	21.28	0.56	0.90
Souvenirs & other expenses	20.59	0.51	0.84	1.19	1.44	23.98	0.65	1.10
Local production of goods	4.68	0.32	0.51	1.12	1.32	7.07	0.43	0.70
Wholesale trade	5.54	0.38	0.65	1.18	1.40	8.67	0.52	0.89

Source: IMPLAN (MIG, Inc. 2008), updated to 2010.

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 10.8 jobs in the motel sector. Fifty-five percent of motel sector sales are value added, including 31% that goes to wages and salaries of motel employees. That means 45% 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 45% spent on purchases by motels starts the rounds of indirect effects.

Multiplier effects: There is an additional 27 cents of indirect sales in the region for every dollar of direct motel sector sales (type I sales multiplier = 1.21). Total secondary sales are 42 cents per dollar of direct sales, which means 21 cents in indirect effects and 21 cents in induced effects.

An additional 3.3 jobs are created from secondary effects of each million dollars in motel sector sales (14.1 total jobs – 10.8 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% (45%-31%), and the secondary effects on value added for each dollar of motel sector sales are 24% (79%-55%). Including secondary effects, every million dollars of motel sector sales in the region yields \$1.42 million in sales, \$450,000 in income, and \$790,000 in value added.

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NPS 620/119313, December 2012

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