Economic Impacts of Badlands National Park Visitor Spending on the Local Economy, 2000

Dennis Probst, Ph.D.
Daniel J. Stynes, Ph.D.
Ya-Yen Sun, M.S.
Michigan State University

January 2002

National Park Service
Social Science Program

Department of Park, Recreation and Tourism Resources
Michigan State University

Economic Impacts of Badlands National Park Visitor Spending on the Local Economy, 2000

Dennis Propst, Daniel Stynes and Ya-Yen Sun

Department of Park, Recreation and Tourism Resources
Michigan State University
East Lansing, MI, 48824-1222

January 2002

This report was completed as part of a grant from the Cooperative Park Studies Unit, University of Idaho/National Park Service to assist parks in applying the MGM2 model.

Executive Summary

Economic Impacts of Badlands National Park Visitor Spending on the Local Economy, 2000

Badlands National Park hosted 1.1 million recreation visits in 2000. Park visitors spent $19 million dollars in the local area[1], generating $5.2 million in direct personal income (wages and salaries) for local residents and supporting 438 tourism-related jobs in the area. Through secondary effects, park visitor spending supported an additional 72 area jobs, involving $4.6 million dollars in additional sales and $1.5 million in personal income.

Economic impacts were estimated with the newly updated National Park Service Money Generation Model (Version 2). The MGM2 model estimates spending, income and jobs attributable to the park based upon park visitation data, visitor spending averages, and regional multipliers. Impacts of Badlands NP Visitors are based on a recent visitor survey[2], the Public Use Statistics for 2000, and MGM2 multipliers for rural regions. The 1.1 million recreation visits equates to 378,000 party days/nights in the area (Table E1).

The three largest visitor segments, based on party days/nights spent in the region, were day visitors[3] (83%), visitors staying overnight in motels outside the park (11%) and campers staying outside the park (7%). About 60% of the 41,000 camper party nights by park visitors were spent outside the park. Park visitors also accounted for about 40,000 room nights in area motels outside the park and 2,800 room nights at the Cedar Pass lodge.

Table E1. Badlands NP visits and spending by segment

Lodging segment	Recreation visits (000's)	Party nights (000's)	Avg. spending ($per party night)	Total spending ($000's)	Pct of spending
Day visitor	834.8	293.7	$27.74	$8,147	43%
Motel-In	8.8	2.8	$118.06	$334	2%
Camp-In	25.5	16.0	$35.55	$570	3%
Backcountry	0.4	0.6	$21.35	$12	0%
Motel-Out	139.3	40.1	$195.26	$7,831	41%
Camp-Out	97.0	24.8	$91.51	$2,267	12%
Total	1,105.8	378.0	$50.68	$19,161	100%

On average, park visitors spent $51 per party per day in the local area. Visitor staying in motels outside the park spent $195 per night in the area while day visitors spent $28 per day. Day visitors, including many pass through travelers on longer trips, accounted for 43% of the total visitor spending, while visitors staying in motels outside the park contributed 41% of the total.

[1] The local area is defined as a 60-mile (one hour) radius around Badlands NP, excluding Rapid City and the Black Hills. The area encompasses predominantly rural sections of Jackson, Pennington and Shannon Counties.
[2] Simmons,T. and Graman, J.H. 2000. Badlands National Park Visitor Study. VSP Report 123.
[3] Pass-though travelers staying overnight outside the study area, as well as visitors staying with friends and relatives or in an owned seasonal home in the area are treated as day visitors.

Visitor spending supports 438 direct jobs in local tourism businesses, generating $5.2 million in personal income and $7.9 million in direct value added[4]. Including secondary effects, the total impact was $19million in sales, $6.7 million in personal income, $10.7 million in value added and 511 jobs. The restaurant sector received around one third of the direct impacts, followed by retail trade, and the lodging sector (Table E2). Visitors staying overnight outside the park accounted for 46% of hotel/motel sales and 60% of camping sales in the local region.

Table E-2. Economic Impacts of Badlands NP visitor spending, 2000

Sector/Spending category	Direct Sales $000's	Jobs	Personal Income $000's	Value Added $000's
Direct Effects				
Motel, hotel cabin or B&B	$3,466	91	$1,006	$1,529
Camping fees	$603	16	$175	$266
Restaurants & bars	$4,324	139	$1,362	$1,897
Admissions & fees	$1,988	60	$683	$1,118
Local transportation	$199	7	$105	$123
Retail Trade	$3,291	120	$1,679	$2,622
Wholesale Trade	$429	6	$172	$293
Local Production of goods	$198	0	$7	$14
Total Direct Effects	**$14,498**	**438**	**$5,189**	**$7,862**
Secondary Effects	$4,587	72	$1,540	$2,849
Total Effects	**$19,085**	**511**	**$6,729**	**$10,711**
Multiplier	1.32	1.16	1.30	1.36

It is important to note that spending in Rapid City and the Black Hills is not included in these estimates. Most visitors to Badlands NP are treated as day visitors to the area, even though many are on extended overnight trips. For most visitors (91%), Badlands NP is one of several destinations. Eighty-six percent of Badlands NP visitors also visit Mt. Rushmore, 68% visit Wall Drug, 65% the Black Hills and 42% Yellowstone NP (VSP Study). The analysis here captures spending associated primarily with the visit to Badlands NP and estimates economic impacts on the rural region around the park. Nineteen million dollars in spending represents a significant economic impact for this rural area.

Spending and associated regional economic impacts can be increased by expanding spending opportunities near the park and encouraging more visitors to stay overnight. Planning and management for Badlands NP must take into account the regional setting and the travel patterns of park visitors. The economic impacts of the park are best seen within a regional tourism context, which includes Mt. Rushmore, the Black Hills, and other area attractions. Cooperative research and marketing activities with other parks and tourism partners in the region should be encouraged.

[4] Value added includes personal income (wages, salaries and payroll benefits) plus rents and profits to businesses and indirect business taxes.

Economic Impacts of Visitors to Badlands National Park, 2000

Dennis B. Propst, Daniel J. Stynes and Ya-Yen Sun
February 2002

Introduction

The purpose of this study is to document the local economic impacts of visitors to Badlands National Park (BADL) in 2000. Economic impacts are measured as the direct and secondary sales, income and jobs in the local area resulting from spending by park visitors. The economic estimates are produced using the Money Generation Model 2 (MGM2) (Stynes and Propst, 2000). Three major inputs to the model are:

1) Number of visits broken down into seven lodging-based segments,
2) Spending averages for each segment, and
3) Economic multipliers for the local region.

Inputs are estimated from the Badlands National Park Visitor Survey, the National Park Public Use Statistics, and MGM2 multipliers. The MGM2 model provides a spreadsheet template for combining park use, spending and regional multipliers to compute changes in sales, personal income, jobs and value added in the region.

Badlands National Park

Located in southwestern South Dakota, Badlands National Park was established as a National Monument in 1939 and re-designated as National Park in 1978 to preserve the scenic and scientific value of the White River Badlands area. The park consists of nearly 244,000 acres of the largest protected mixed grass prairie in the United States. The park is easily accessible from Interstate 90 (Figure 1). Wind Cave National Park, Custer State Park, Jewel Cave National Monument, and Mount Rushmore National Memorial are within 50-miles of the western boundary of Badlands National Park. This cluster of parks and monuments is a highpoint of the scenic route that travelers follow along Interstate 90, which stretches from Boston to Seattle.

Two campgrounds and the Cedar Pass Lodge are located inside the park. The lodge operates from April to mid-October with room rates ranging from $41 to $63 per night. Cedar Pass campground charges $10 per night during the summer and $8 for the winter while Sage Creek campground is free. Accommodations and restaurants outside the park are mainly located along Interstate 90, which passes through Kadoka, Wall and Rapid City, the second largest city in South Dakota (population 59,000). Additional accommodations are found west of the Badlands in Keystone, Custer and Hot Springs.

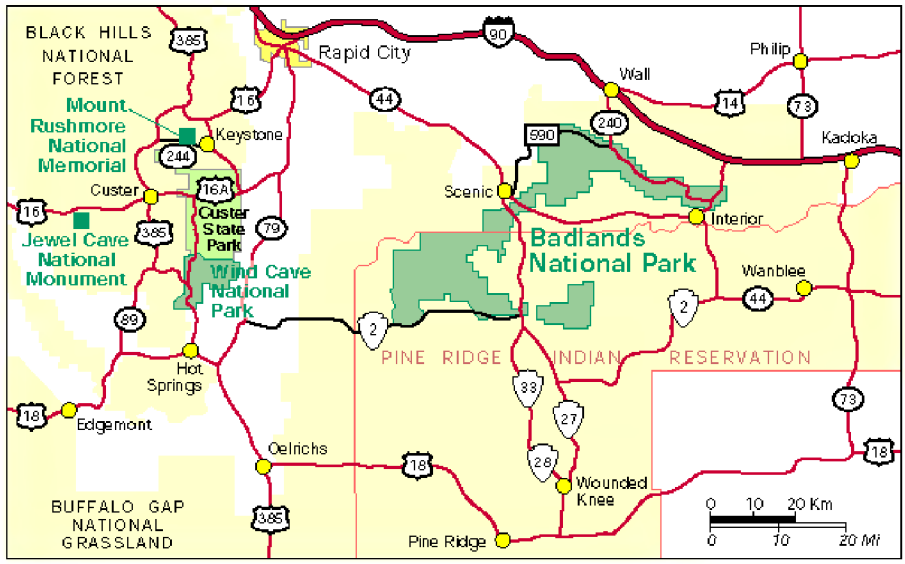

Figure 1. Badlands National Park and the region

Source: Badland National Park, http://www.nps.gov/badl/exp/home.htm

The Local Region

The population of the three county region (Jackson, Pennington and Shannon counties) surrounding the park was 103,534 in 1999. The average per capita income in the region was $23,097. Personal income was $1.77 billion (Table 1), and the number of full-time and part-time jobs was 70,260 (Bureau of Economic Analysis, 2001). The Rapid City SMA is the center of the region's economy and accounts for 92% of total personal income and 93% of total employment in the three-county region. The local region surrounding Badlands NP, excluding Rapid City, is sparsely populated with densities of 1-6 people per square mile (U.S. Census Bureau, 2001). With the exception of Rapid City, economic activity surrounding the park is limited.

In order to separate the impacts of Badlands NP from those of nearby attractions, we define the impact region to exclude Rapid City and the Black Hills area. Visitor spending was measured within a 60 mile radius of Badlands NP "excluding Rapid City and the Black Hills". Impacts are therefore reported for households, communities, and businesses in the three county region with these exclusions.

Table 1 summarizes economic activity in the three county region in 1999. Bear in mind that the majority of this activity takes place in Rapid City, which is excluded from the impact region. The three primary tourism-related sectors (restaurants, hotels and amusements) account for $87 million in personal income and about 10,000 jobs in the area (5% of all personal income and 14% of all jobs).

Table 1. Income and employment in the three County region, 1999

Sector	Personal income (million's)	Percent of Personal income	Employment (000's)
Farm earnings	13	1%	1.3
Ag. service, forestry, fishing, and other	7	0%	0.5
Mining	3	0%	0.2
Construction	136	8%	4.6
Manufacturing	135	8%	4.8
Transportation and public utilities	84	5%	2.6
Wholesale trade	104	6%	2.8
Retail trade	223	13%	14.4
Eating and drinking places	51		4.3
Finance, insurance, and real estate	114	6%	4.7
Services	516	29%	22.6
Hotels and other lodging places	27		1.6
Amusement and recreation services	9		0.6
Government	432	24%	11.5
Total	1,765	100%	70.3

Source : Personal income is by place of work from the Bureau of Economic Analysis, REIS, 1999. Jobs are "covered" Employment from the Bureau of Labor Statistics. Both series are the sum of county data for Jackson, Pennington and Shannon Counties.

Badlands National Park Visitor Survey, 2000

A park visitor survey was conducted at Badlands National Park during August 2-8, 2000 as part of the National Park Service's Visitor Services Project (VSP). The survey measured visitor demographics, trip characteristics, travel expenditures, and satisfaction with park services and facilities. Questionnaires were distributed at six locations inside the park including two visitor centers, two trailheads, one concession-operated lodge and one park campground[5]. Of 798 questionnaires that were distributed, visitors returned 639 for an 80% response rate (Badlands National Park Visitor Study, 2000).

Analysis of the visitor survey dataset was carried out at Michigan State University to identify visitor segments, estimate spending averages for these segments, and develop parameters for expanding from the sample to all park visitors.

The economic analysis required us to extrapolate from the summer sample of visitors to all park visitors during the year. Several adjustments were made to the VSP survey results to correct for seasonal differences, as well as adjusting for different probabilities of selection due to sampling locations. An indication of the sampling bias is provided by comparing the official park

[5]Questionnaires were distributed proportionally at the following locations: Ben Reifel Visitor Center (41%), Pinnacles Overlook (19%), Door Trailhead (19%), Cedar Pass Lodge (19%), White River Visitor Center (10%), and Sage Creek Campground (10%).

overnight stay figures with corresponding estimates extrapolated from the sample. If the proportions of visitors in the VSP sample reporting overnight stays inside the park is expanded to all park visitors in 2000, park overnight stay estimates are roughly twice those reported in the public use data. This discrepancy is likely explained by a higher percentage of overnight visitors during the summer, a greater likelihood of choosing overnight visitors at the VSP sampling locations and possible length of stay bias.

The results were corrected for seasonal differences by assuming somewhat lower off-season values for selected variables (such as party size and average spending) and taking a weighted average of the summer and off-season estimates based on seasonal distributions of visits. Generally off-season visitors are more likely to be local residents, are less likely to camp, usually involve smaller parties, and often spend less time and money in the area.

MGM2 Visitor Segments

MGM2 divides visitors into segments to help explain differences in spending across distinct user groups. Overnight visitors were distinguished from day visitors based on the lodging type reported in the Badlands visitor study questionnaire. Six lodging segments were established for the Badlands NP visitors:

Day users[6]: Park visitors who do not stay overnight in the local area. This includes all day trips and pass-through travelers.
Motel-In: Visitors staying in lodges or cabins inside the park
Camp-In: Visitors staying in campgrounds inside the park
Backcountry campers: Visitors staying overnight in backcountry sites
Motel-out: visitor staying in motels, cabins, B&B's etc. outside the park within the region
Camp-out: visitors staying locally in private or other public campgrounds outside the park.

Recreation Visits

Badlands NP received 1.1 million recreation visits in 2000 (NPS Public Use Statistics Office, 2001). The concessioner inside the park reported 8,363 person nights in the Cedar Pass Lodge. Park operated campgrounds generated 30,205 person nights of tent camping, 14,869 person nights of RV camping and 859 person nights of backcountry usage (Table 2). Average vehicle party size used in the Public Use Statistics is 3.0 for June to August and 2.4 for September to May. Camper party sizes are 3.8. Seventy percent of recreation visits, 75% of lodging stays, 74% of camping nights and 64% of backcountry stays were generated from June through August in 2000.

A recreation visit is the count of one person entering the park. Spending depends on how long visitors stay in the area rather than how many times they enter the park or how much time they spend in the park. For the purpose of estimating spending, recreation visits are therefore

[6]Excluding Black Hills and Rapid City, a relatively small number of residents live within 50 miles of the park. Thus, no separate "local" segment was created for Badlands NP visitors.

converted to party days/nights in the region. This helps to avoid double counting of spending by visitors who may enter the park multiple times on the same day and also takes into account additional days a visitor may spend in the area outside the park.

Table 2. NPS public use data for Badlands NP, 2000

Month	Recreation visits	Lodge	NPS- Tent	NPS- RV	Back-country	Total
January	7,680	0	87	4	3	94
February	7,216	0	91	4	8	103
March	12,379	0	118	11	30	159
April	19,597	196	418	205	21	840
May	56,457	625	2432	1227	95	4,379
June	241,202	1,864	6665	3534	199	12,262
July	264,707	1,930	8983	4290	71	15,274
August	319,967	2,022	7144	2728	280	12,174
September	113,551	1,313	3181	2402	92	6,988
October	44,591	413	984	426	49	1,872
November	11,928	0	91	38	11	140
December	6,549	0	11	0	0	11
Total	1,105,824	8,363	30,205	14,869	859	54,296

Source: NPS Public Use Statistics Office, On-line at: http://www2.nature.nps.gov/stats/

Recreation visits are converted to party nights[7] as follows:

Person trips to the area = recreation visits / number of park entries per trip
Person nights in the area = person trips * length of stay in area
Party nights in the area = person nights / party size

A distinct re-entry, party size and length of stay average was estimated for each segment using the August 2000 visitor survey data (Table 3). The annual average party size is estimated at 3.1 people per vehicle[8]. Overnight visitors averaged roughly a two night stay[9]. Park re-entries were highest for visitors staying at the Cedar Pass lodge or campgrounds outside the park. Total party nights and spending are sensitive to the length of stay and re-entry factors, as length of stay indicates how many nights of spending will be counted for each visitor group and re-entry factors correct for multiple counting of the same visitors.

[7] A party night is a travel group staying one night in the area. The travel group is usually all individuals in the same vehicle or staying in the same room or campsite. For day trips, estimates are in party days.

[8] This is a weighted average of the summer party size estimate of 3.25 and an assumed off-season party size of 2.4 (2.4 is used in the NPS public use statistics for off-season counts). With 75% of visitation occurring between June and August and 25% of visitation occurring in the off-season (see Table 1), the year-round party size was estimated as (3.25*0.75+ 2.4*0.25) = 3.1.

[9] Stays of more than 10 days and groups of more than 10 people were omitted in computing the party size and length of stay averages.

Table 3. Badlands National Park visit conversion parameters by lodging segment[a]

Segments	Day visitor	Motel-In	Camp-In	Back-country	Motel-Out	Camp- Out	Total
Party size[b]	3.2	3.0	2.8	1.5	2.8	2.7	3.1
Length of stay	1.0	1.9	2.2	2.0	2.1	2.1	1.2
Re-entries	1.0	2.0	1.2	1.0	1.3	1.6	1.1
Number of cases	303	16	48	3	122	79	571

a: Party sizes, lengths of stay and re-entries were computed by weighting cases inversely to their length of stay inside the park.

b: Party size was decreased 7% for all segments from the August 2000 visitor survey figures to reflect a smaller year-round average (see footnote 6).

Using the conversion parameters in Table 3, 1.1 million recreation visits equates to 334,000 party trips and 378,000 party-days/nights in the area (Table 4). Day visitors account for 86 percent of the recreation visits (Figure 2) and 78% of party days/nights in the area. Visitors staying in motels outside the park accounted for 11% of party nights with an additional 1% staying at Cedar Pass lodge. Eleven percent of party nights are campers, with about two thirds of campers staying outside the park. Park visitors accounted for about 40,000 room nights in area motels and about 25,000 campsite nights outside the park in 2000. Overnight stays inside the park are consistent with NPS overnight stay figures for 2000.

Table 4. Visit measures for Badlands NP by segment, 2000

Segment	Day visitor	Motel-In	Camp-In	Back-country	Motel-Out	Camp-Out	Total
Visit Measures in 000's							
Recreation visits (person-entries)	948.7	8.7	25.5	0.4	72.2	50.3	1,105.8
Person-nights[a]	948.7	8.4	45.1	0.9	113.3	66.7	1,183.0
Party trips[b]	293.7	1.5	7.4	0.3	19.5	11.7	334.0
Party-nights[c]	293.7	2.8	16.0	0.6	40.1	24.8	378.0
Percents by segment							
Pct of recreation visits	86%	1%	2%	0.0%	7%	5%	100%
Pct of person-nights	80%	1%	4%	0.1%	10%	6%	100%
Pct of party trips	88%	0%	2%	0.1%	6%	3%	100%
Pct of party-nights	78%	1%	4%	0.2%	11%	7%	100%

a: Person-nights = recreation visits * length of stay / re-entry rate

b: Party trips = recreation visits/ (re-entry rate * party size)

c: Party-night = recreation visits * length of stay / (party size * re-entry rate)

Visitor spending

Spending averages were estimated from the Badlands NP visitor survey data. After removing eight outliers[10], spending averages were computed on a party trip basis for each segment and then converted to a party night basis by dividing by the average length of stay. The survey asked visitors to report expenditures that occurred within a one-hour driving distance of the park boundaries, but excluding expenditures in Rapid City or the Black Hills. Spending averages were reduced by 3% across all segments to account for typically lower off-season prices and spending patterns[11].

Day visitors spent $28 per party per day in the local area (Table 5). Overnight visitors staying outside the park in lodges or cabins spent $195 per party per night, about $77 dollars more per night than those staying in the lodge inside the park. These spending figures include nightly room expenditures of $43 inside the park and $83 outside. Campers staying inside the park spent $36 per night, while campers staying outside the park were estimated to spend $92 per night. Backcountry campers spent around $21 dollars per party per night, or about $42 for a two-day stay.

Table 5. Visitor spending in the local area by lodging segment [a] ($ per party per night)

	Visitor Segment					
Spending Category	Day visitor	Motel-In	Camp-In	Back-country[b]	Motel-Out	Camp- Out
Motel, hotel cabin or B&B	0.00	43.23	0.00	3.15	83.33	0.00
Camping fees	0.00	0.00	5.58	1.40	0.00	20.71
Restaurants & bars	7.55	24.29	5.84	4.06	40.00	13.61
Groceries, take-out food/drinks	1.77	3.43	3.62	2.91	7.72	8.74
Gas & oil	4.20	10.32	6.22	3.50	22.75	13.51
Local transportation	0.45	6.61	0.41	0.00	0.69	0.51
Admissions & fees	4.08	5.66	5.39	2.10	10.86	10.08
Souvenirs and other expenses	9.67	24.53	8.50	4.23	29.91	24.35
Total	27.74	118.06	35.55	21.35	195.26	91.51

a: Cases were weighted inversely to the length of stay inside the park to adjust for a potential length of stay bias.
b: As only three backcountry visitors were sampled in the VSP study, the default MGM2 spending profile for backcountry visitors (rural areas) is used.

Total visitor spending is calculated by multiplying the number of party-nights in Table 4 by the spending averages in Table 5. The calculations are carried out segment by segment, summing across the seven segments to obtain the total. Visitors to Badlands NP in 2000 spent $19 million in the local area (Table 6). Visitors spent $3.5 million on motel/hotel rooms, $4.3 million on restaurant meals, and $4.8 million on souvenirs. Day visitors contributed 43% of total spending to the region, followed by visitors staying outside the park in motels (41%), and groups staying outside the park in campgrounds (12%).

[10] Spending outliers are defined as those parties who spent more than $1000 per day, or $3000 per trip.
[11] We assumed that off-season visitors would spend 10% less than summer visitors (i.e., 90% of what summer visitors spend). As about 25% of Badlands NP visitors visited the park between September and May, the annual averages were reduced by 3%.

Table 6. Total spending by Badlands NP visitors in 2000 ($000's)

	Visitor Segment							
Spending Category	Day visitor	Motel-In	Camp-In	Back-country	Motel-Out	Camp-Out	Total	Percent
Motel, hotel cabin or B&B	0	122	0	2	3,342	0	3,466	18%
Camping fees	0	0	89	1	0	513	603	3%
Restaurants & bars	2,218	69	94	2	1,604	337	4,324	23%
Groceries, take-out food/drinks	521	10	58	2	310	216	1,116	6%
Gas & oil	1,234	29	100	2	912	335	2,612	14%
Local transportation	133	19	7	0	28	13	199	1%
Admissions & fees	1,199	16	86	1	435	250	1,988	10%
Souvenirs and other expenses	2,842	69	136	2	1,199	603	4,852	25%
Total	8,147	334	570	12	7,831	2,267	19,161	100%
Percent	43%	2%	3%	0%	41%	12%	100%	

Economic Impacts of Visitor Spending

Economic impacts of this spending are computed by applying the visitor spending to the MGM2 economic ratios and multipliers for rural areas[12]. The $19 million spent by Badlands NP visitors had a direct economic impact on the region of $14.5 million in direct sales, $5.2 million in personal income (wages and salaries), $7.9 million in direct value added[13], and supported 438 jobs (Table 7). The restaurant sector received the largest amount of direct sales ($4.3 million), followed by lodging ($3.5 million) and retail trade ($3.3 million).

Direct effects are less than total spending, as only the retail and wholesale margins on visitor purchases of goods accrue to the local economy. The local region surrounding Badlands NP, excluding Rapid City and the Black Hills, captured 75% of visitor spending. Twenty-five percent of visitor spending leaked out of the local economy to cover the costs of imported goods bought by visitors[14].

The generic rural sales multiplier is 1.31, meaning that an additional $0.31 in sales is generated through secondary effects for every dollar of direct sales. This is likely optimistic for the more narrowly defined region, as most secondary effects would likely accrue to the Rapid City economy. Secondary effects of Badlands visitor spending are estimated at 72 secondary jobs, $1.5 million in secondary income and $2.8 million in value added.

[12] The MGM2 "Rural " generic multipliers are applicable to regions with populations below 50,000.

[13] Value added includes personal income (wages, salaries and payroll benefits) plus rents and profits to businesses and indirect business taxes.

[14] For example, if a visitor buys $50 dollars worth of clothing at a local store, the store receives the retail margin (assume $20 dollars), the wholesaler or shipper (if local) may receive $5 dollars, and the remaining producer price of the clothing ($25 dollars) leaks immediately outside the local economy, unless the clothing is manufactured in the local region.

Table 7. Economic Impacts of Badlands NP visitor spending, 2000

Sector/Spending category	Direct Sales ($000's)	Jobs	Personal Income ($000's)	Value Added ($000's)
Direct Effects				
Motel, hotel cabin or B&B	3,466	91	1,006	1,529
Camping fees	603	16	175	266
Restaurants & bars	4,324	139	1,362	1,897
Admissions & fees	1,988	60	683	1,118
Local transportation	199	7	105	123
Retail Trade	3,291	120	1,679	2,622
Wholesale Trade	429	6	172	293
Local Production of goods	198	0	7	14
Total Direct Effects	**14,498**	**438**	**5,189**	**7,862**
Secondary Effects	4,587	72	1,540	2,849
Total Effects	**19,085**	**511**	**6,729**	**10,711**
Multiplier	1.32	1.16	1.30	1.36

Sales data for hotels in the area provides a rough check on the MGM2 estimates. The gross sales of hotels/motels in Wall, Kadoka, and Hot Springs was $7.3 million in 2000 (Department of Revenue, South Dakota, 2001). Comparing these sales figures with MGM2 visitor spending suggests that visitors staying outside the park account for about half of total hotel/motel sales in the area.

Study Limitations and Error

The accuracy of the MGM2 estimates rests on the three primary inputs: visits, spending averages, and multipliers. The number of visitors is usually the largest potential source of error. As the party night is the basic unit for spending, errors in party sizes, lengths of stay or re-entries will affect the spending and impact estimates. Sampling errors for these parameters in the VSP survey are small, but biases may be introduced by the sampling procedures, nonresponse, or misinterpretation of survey questions.

Given considerable variation in spending across visitor segments, the proportions of each type of visitor also affects the total spending estimates. The fact that the VSP segment proportions overestimate overnight stays in the park by a factor of two, suggests that some errors may be present in segment shares. Our analysis has, however, made adjustments and corrections based on available information and the economic results will be less sensitive to errors in segments shares than in overall visits.

The sampling errors on the average spending figures are 6% overall and range from 7-34% for individual segments[15] (95% confidence interval). Spending averages also vary by about 10% based on our decisions to treat missing spending data as zeros or not, and the number of outliers to delete.[16]

Multipliers for this application depend on whether the Rapid City area is included or excluded from the region. Secondary effects will be minimal outside the Rapid City area as Rapid City is the central place for most goods and services in the region. We recommend ignoring secondary effects when estimating impacts for the local area excluding Rapid City. The default MGM2 rural multipliers provide a reasonable approximation to the secondary effects, much of which will accrue to Rapid City.

Depending on the direction and magnitude of errors in visits, spending, and multipliers, the different errors may compound or cancel each other. The most important potential errors are in the estimates of visits, length of stay in the area, and re-entries. As the model is linear, doubling visitors will double spending and impacts. Errors in re-entry estimates or lengths of stay directly translate into errors in party nights, which is multiplied by the spending averages to derive total spending.

In addition to these statistical issues, there are also conceptual issues regarding how much and which spending may be claimed by the park. Badlands NP is rarely the sole destination for these trips. Ninety-one percent of the visitors indicated that Badlands NP was one of many destinations on their trips (Badlands National Park Visitor Study, 2000).[17] For many, the park is is a side-trip/stop while traveling along Interstate 90 or one of a cluster of attractions in the region. Therefore, it is difficult to identify the precise portion of visitor spending solely due to Badlands National Park.

Future studies might take a broader regional tourism approach, treating parks and other attractions in the area as a group and studying in more detail visitor use patterns within the region. As the cluster of parks is the primary attraction for tourists, the economic analysis might begin with the overall economic impacts of tourists to the area and then assess the relative contributions of individual attractions.

Summary and Discussion

Visitors to Badlands NP spent $19 million within an hour's driving distance to the park (not including Rapid City and Black Hills) in 2000. The direct economic effects of visitor spending were $14.5 million in sales, $5.2 million in personal income, $7.8 million in direct value added and 438 jobs. With multiplier effects created by the re-circulation of the money spent by tourists, visitor spending generated a total (direct + secondary) of $19 million in local sales, and an associated $6.7 million in personal income, $10.7 million in value added and 511 jobs. Sectors receiving the greatest benefit from park visitors were restaurants ($4.3 million in direct sales), lodging ($3.5 million), and retail trade ($3.3 million).

---

[15] Sampling errors depend on sample sizes and variances within each segment.
[16] We treated missing values for spending variables as zeros for day visitors and eliminated a few large outliers.
[17] Three percent of visitors indicated Badlands NP as the primary destination and 6% indicated it was not a planned destination.

If increased economic impact is a goal, management strategies that motivate park visitors to stay overnight in the area or to extend lengths of stay should be encouraged as overnight visitors inject the most money into the local economy, particularly visitor staying in lodges and motels.

Total economic impacts (Table 7) are useful for accountability purposes, garnering park support, and capturing the role of the park in the region's economy. The MGM2 model can also be used to evaluate alternative management, development and marketing decisions. The marginal economic impacts of particular visitor segments can be used to evaluate particular actions. Table 8 shows the changes in sales, jobs, income and valued added associated with an increase or decrease of one thousand additional party-nights by each segment.

To evaluate the regional economic impacts of adding 10 rooms to a park lodge, for example, first compute the change in party nights – 10 rooms occupied 100 nights per year yields 1,000 extra party nights. Then apply the marginal impacts for the "Motel- in" segment in Table 8. Each additional 10 rooms occupied 100 nights generates an additional $237,000 dollars in direct sales in the region, $86,000 in personal income, $126,000 in value added and 6 direct jobs in the area. Using Table 8, the impact of this alternative could be compared to others such as expanding campsites, a marketing campaign to increase day trips, etc.

Table 8. Direct impacts of an additional 1,000 party nights by lodging segment, Badlands NP, 2000

Segments	Direct Sales ($000's)	Personal Income ($000's)	Value Added ($000's)	Jobs
	(Marginal Impacts per 1,000 party-nights)			
Local day user	22.2	7.9	12.0	0.6
Non-local day user	31.7	12.7	18.8	0.9
Motel-In	237.4	86.3	126.1	6.1
Camp-In	34.6	12.3	18.4	0.8
Back-country	20.4	7.2	11.1	0.5
Motel-Out	149.6	53.4	78.6	3.8
Camp-Out	57.0	20.3	31.0	1.4

The economic impacts presented in the report document the economic significance of 1.1 million recreation visits to Badlands NP in 2000 on the surrounding region. These impacts will vary from year to year with changes in prices, visitor volumes, the mix of visitors attracted, and other changes in the park and surrounding communities. The MGM2 model has built-in procedures to price adjust spending averages over time, so updated figures may be obtained fairly easily, if there are not significant changes in visitor use and spending patterns. In the absence of significant structural changes in the local economy, multipliers will be quite stable. The primary input for updating the estimates is visitation, which must take into account any changes in the mix of visitors or their length of stay in the area

Suggested research to further refine the spending and impact estimates would include (1) a survey of off-season park visitors to refine the segment shares, party sizes and re-entry rates, (2) general surveys of visitors to the region in cooperation with local tourism organizations to estimate the percentage of area tourists stopping at Badlands NP and to better understand the interrationships among local attractions, and (3) further comparisons of park visitor characteristics, spending and impacts with other secondary sources of tourism activity in the region, such as local room taxes and occupancy rates, and other local economic statistics.

References

Bureau of Economic Analysis. (2001). REIS data for Jackson, Pennington and Shannon counties, 1999. http://fisher.lib.virginia.edu/reis/county.html. Data retrieved on October 18, 2001.

Department of Revenue, South Dakota. (2001) South Dakota Sales and Use Report: City Recap for Selected Cities for Standard Industrial Classification (SIC) Industries (4 digits). http://www.state.sd.us/revenue/stats.htm. Data retrieved on January 1, 2002.

NPS Public Use Statistic Office. (2001). 1979-2000 Visitation DataBase. http://www2.nature.nps.gov/stats/. Data retrieved on October 18, 2001.

Stynes, D. J., Propst, D.B., Chang, W. and Sun, Y. (2000). Estimating national park visitor spending and economic impacts: The MGM2 model. May, 2000. Final report to National Park Service. East Lansing, Michigan: Department of Park, Recreation and Tourism Resources, Michigan State University.

U.S. Census Bureau. (2001). American FactFinder. http://factfinder.census.gov/servlet/BasicFactsServlet. Data retrieved on October 18, 2001.

Visitor Services Project. (2000). Badlands National Park Visitor Study. Summer, 2000. Visitor Services Project Report #124. Moscow, ID: National Park Service and University of Idaho, Cooperative Park Studies Unit.

Appendix A: Definition of Terms

Term	Definition
Sales	Sales of firms within the region to park visitors.
Jobs	The number of jobs in the region supported by visitor spending. Job estimates are not full time equivalents, but include part time and seasonal positions.
Personal income	Wage and salary income, proprietor's income and employee benefits.
Value added	Personal income plus rents and profits and indirect business taxes. As the name implies, it is the value added by the region to the final good or service being produced. Value added can also be defined as the final price of the good or service minus the costs of all of the non-labor inputs to production.
Direct effects	Direct effects are the changes in sales, income and jobs in those business or agencies that directly sell goods or services to visitors.
Secondary effects	Secondary effects are the changes in economic activity in the region resulting from the recirculation of money spent by visitors. Secondary effects include both indirect and induced effects.
Indirect effects	Changes in sales, income and jobs within industries that supply goods and services to businesses that sell directly to visitors. For example, linen suppliers benefit from visitor spending at lodging establishments.
Induced effects	Changes in economic activity in the region resulting from household spending of income earned through direct or indirect effects. For example, motel and linen supply employees who live in the region spend their income on housing, groceries, education, clothing and other goods and services creating sales and jobs in these sectors.
Total effects	Sum of direct, indirect and induced effects.
Marginal impacts	Economic impacts per additional visitor or dollar spent.