

Economic Impacts of National Park Visitor Spending on Gateway Communities: Systemwide Estimates for 2001

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Introduction

In lobbying for the creation of the National Park Service in 1916, Albright and Mather emphasized the economic importance of national parks as “tourist meccas” (Mackintosh, 1999). While regional economic development is not explicitly recognized within the National Park Service’s (NPS) joint missions of resource protection and providing for public use, it has been an important justification for national parks since the establishment of Yellowstone in 1872.

A primary reason for protecting natural and cultural resources within national parks is to ensure the availability of these resources for the enjoyment of future generations. This "enjoyment" is what has and will continue to attract visitors to the national parks. Park visitors, in turn, attract businesses around the park seeking profits by serving visitor needs and wants. Tourism developments, both minor and major, have therefore grown up in gateway communities around National Park units. Many gateway communities and regions depend heavily on tourism and therefore have a considerable interest in park policies that might affect them.

National parks are often seen as “green islands”, somewhat isolated from the surrounding residential and commercial development. However, the NPS has increasingly recognized the need to manage parks within a regional context that more explicitly acknowledges surrounding communities and the ecological, physical and human interactions that cross park boundaries. Many significant "threats" to the parks as well as “opportunities” originate outside the park boundary.

Park Superintendents today are therefore extensively involved with a host of partners and stakeholder groups in surrounding communities (Switzer, 1996). National Parks have become key partners in local and regional planning and development efforts encompassing environmental, cultural, educational and economic dimensions. Economic issues frequently center around the park’s role in regional tourism development.

National parks and surrounding communities have a shared interest in understanding the economic impacts of park visitors/area tourists on the local economy. Cooperative efforts are generally needed in gathering information, managing and serving visitors, and protecting resources that sustain the biological, physical, cultural and human communities inside and outside of national parks.

Economic impact analysis provides one way to quantify the relationships between national parks and local communities. The NPS developed the Money Generation Model (MGM) in 1990 to help parks estimate local economic impacts of visitor spending (USDI, NPS, 1995). The MGM model estimates what park visitors spend in the local area and the impacts of this spending in terms of sales, income, jobs, and local tax receipts.

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While the basic procedures for computing economic impacts are well known, applications to national parks have been quite inconsistent due to limited economic expertise within the NPS, and frequently a lack of the data necessary for economic analysis (Duffield et. al. 1997).

In response to these concerns, an updated version (MGM2) of the Money Generation Model was developed in 2000 (Stynes and Propst, 2000). The MGM2 model provides guidance in selecting visitor spending averages and regional economic multipliers to suit a particular application. For situations where local data is lacking, MGM2 provides recommended default values for spending and multipliers, so that ballpark estimates may be generated at minimal expense.

The MGM2 model has been applied to seventy-four National Park units over the past two years, including eleven parks where recent visitor survey data and other local data were available to take full advantage of the model. Based on the parks that have been studied, systemwide estimates of the local economic impacts of NPS visitor spending can now be made. The MGM2 estimates are based on official park visitation statistics, recent park visitor surveys, local area multipliers derived from the IMPLAN input-output modeling system, and in most cases, some manager and researcher judgement to fill-in missing data and/or to adjust visitation or spending data for known biases.

There are many technical considerations that influence the accuracy of economic impact estimates. These are, however, less important than a number of conceptual issues that dictate the meaning and appropriate interpretation of economic impact figures. Before presenting the results, it is therefore important to distinguish economic impact analysis from related economic techniques and also to clarify what is covered and not covered by our estimates.

What do we mean by economic impacts of a National Park?

Economic impact analysis traces the flow of spending by visitors within the local economy in order to estimate the park's contribution to sales, income and jobs in the area. It does **not** measure the value or benefits of park experiences to visitors or a host of other costs and benefits to local communities. Parks have many educational, environmental and other benefits that are not captured in market transactions or visitor spending. Park visitors also create costs to local communities including congestion, traffic, pollution, and the costs of law enforcement, road repairs, utilities and other public services (fiscal impacts). Impacts of National parks on surrounding property values or the values associated with volunteers in the parks and unpriced programs are also not generally part of a traditional economic impact assessment. Impact studies also don't usually address the economic impacts of park operations or construction activity².

The values that most people associate with National Parks are very different from those captured in an economic impact analysis. From an economic impact standpoint, the most valuable park visitors are likely "windshield tourists", who make a quick tour of the park and head for souvenir shops, restaurants and other commercial attractions, usually in gateway communities outside the park. Park visitors do not spend money while in the backcountry or engaged in activities such as hiking, fishing, observing nature, or learning

² A companion spreadsheet model, MGM2Operate, is available to estimate these impacts.

about history within the park. Spending generally occurs outside the parks, and particularly when visitors stay overnight in the area. Most parks provide very limited spending opportunities inside the park so their economic impacts rest heavily on commercial development surrounding the park.

Economic impact analysis involves a set of tools for evaluating the impacts of particular management alternatives or decisions. These tools are best applied within a clear **with vs without** framework (Gericke and Sullivan, 1996). Applications of economic impact analysis to National Parks frequently do not specify an action to be evaluated, but simply measure spending “associated with” visits to a park. The vagueness of this question allows for many distinct interpretations of what is meant and has led to considerable misinterpretation and abuse of economic impact estimates in recreation and tourism.

A simple example illustrates. To evaluate the economic impacts of adding (or closing) a 100 site campground, one would first estimate the number of visitors to the area with vs without the 100 campsites. This would normally entail estimating the occupancy rate for these campsites and adjusting for substitutions among campgrounds in the region to estimate the net change in campers and their spending. If the 100 new campsites are filled by campers simply shifting from another local campground, the net impact on the region will be minimal. If existing campsites are fully occupied and the new sites attract additional visitors or longer stays, the net impact will be greater.

When estimating spending and impacts of all current park visitors, the implied alternatives are not clear. The without scenario presumably entails closing the park to all visitors. One must then estimate what percentage of park visitors would no longer make trips to the region and also estimate how the length of stay and spending patterns of those who would still come to the area would change in the absence of the park. Spending could increase or decrease depending on how visitors react to the park closing.

Different parks pose significantly different situations. Most visitors to destination parks like Yellowstone or Grand Canyon would not come to the area if the park were unavailable. Hence, all of their spending would be lost to the region. On the other hand, historic sites and monuments are often one of many things to do on a trip. The closure of these sites would result in the loss of only some trips and spending. National seashores like Cape Cod and Cape Hatteras preserve coastal resources and provide access for visitors, but many visitors would come to these areas without the park, taking advantage of other public and private access and opportunities.

Expanding tourism developments around national parks can eventually supercede the park itself as the primary reason for trips to an area. For example, the vast majority of visitors to Colonial NHP are on general vacations involving stops at Colonial Williamsburg and other area attractions (Simmons and Littlejohn, 2001). Although visitors to Great Smoky Mts. NP spent an estimated \$618 million in the area in 2000, Stynes (2001) estimates that as much as half of this spending might still occur in the absence of the park. In many cases the park may be only one of several attractions bringing visitors to an area. This is especially the case for National Parks in urban settings. Isolating the contributions of an individual park can be difficult in these situations. This is, however, what a with vs without analysis entails.

Like most economic impact models, the MGM2 model estimates spending and impacts for a given number of visitors or trips to a region. The determination of which

trips and spending to include depends on the question being asked and is exogenous to the model. We take a conservative approach to the problem, seeking to estimate the loss in local economic activity in the absence of a given national park. These estimates will be much more conservative than estimates that attempt to capture all spending of park visitors in the area³. For some parks, we have produced distinct estimates under different assumptions about which visits or spending should be attributed to the park. In many situations, however, this question is not readily answered, so one should not expect estimates more precise than the question permits.

Our economic analysis is further delimited to the impacts of visitor spending within a 30-100 mile radius of the park. In this report we do not cover impacts of NPS operations or construction activity, both of which can have substantial local economic impacts. The analysis also excludes what park visitors may purchase at home in preparation for trips, such as sporting goods, boats, camping vehicles, etc. En route expenses beyond the 30-100 mile radius are also omitted, so we do not cover all travel expenses on long distance trips, only spending in the vicinity of the park⁴. Unlike the earlier MGM model, our estimates do include spending by local residents. Their inclusion rests on assumptions of whether or not they would otherwise substitute trips outside the region. As the MGM2 model treats locals as a distinct segment, their spending can be included or omitted as desired. In most cases, local spending is a small percentage of the total and will not significantly alter the results. Local residents do, however, account for a significant portion of visits to some national parks, particularly those in urban settings.

Methods

Economic impacts are estimated using the MGM2 model (Stynes et. al. 2001), which combines estimates of park visits, spending patterns of distinct NPS visitor segments, and economic ratios and multipliers for regions surrounding NPS units. Park visit estimates are taken from the National Park Service Statistical Abstract for 2001. Spending profiles are based on recent surveys of visitors at a sample of National Parks. Multipliers are adapted from input-output models of the economy of regions around selected NPS units, using the IMPLAN system (See the MGM2 manual for details).

Systemwide impact estimates were derived in three ways, each yielding similar results. The simplest approach computes the average visitor spending per recreation visit from some 74 park units that have been studied and applies the average to overall NPS system visits in 2001. Depending on which parks are included, the average spending per recreation visit for the parks studied is between \$35 and \$40 per visit (See Table 5). Applying this figure to total system visits of 280 million yields a total visitor spending estimate of roughly \$10 billion. The systemwide total depends on how some parkways and recreation areas are handled.⁵

³ We speculate that estimates counting all visitor spending would be 2-4 times greater than the figures reported here. Additional spending would include trips where the park visit isn't the primary purpose and spending outside the local area, particularly on long distance trips.

⁴ This avoids double counting of spending for trips involving visits to several national parks in different areas.

⁵ Golden Gate NRA, Gateway NRA, Blue Ridge Parkway, Geo. Washington Memorial Parkway, Natchez Trace Pkwy and John D. Rockefeller Memorial Parkway accounted for 20% of all NPS recreation visits in

A slightly more detailed approach is to compute averages for all MGM2 model parameters from the studied parks and apply these to NPS systemwide visit totals. This approach takes into account visit conversion parameters (average party sizes, length of stay and park re-entries), park visitor segment shares, and spending averages for distinct visitor segments. It also yields greater detail on the impacts of specific visitor segments and which economic sectors benefit from visitor spending. This approach is carried out on pages 7-11 below.

Finally, the most detailed approach derives spending and impact estimates for each of 348 distinct park units⁶ and then adds individual park estimates to get an overall system total. Estimates of the MGM2 model parameters and results from the 74 parks studied are applied to the remaining parks. Parks not directly investigated are classified according to park type, expected spending levels (high, medium or low spending), and the surrounding region's population and economic development. In some cases we used parameters from a similar park that was studied⁷.

All three approaches yield fairly consistent systemwide visitor spending totals, i.e., within roughly 10% of \$10.6 billion. Economic impacts of this spending is then estimated using the MGM2 model with "medium spending" profiles and an intermediate level for local area multipliers and economic ratios⁸.

Methods underlying the MGM2 model are discussed at length in the MGM2 manual (Stynes et. al., 2000). A summary is provided below.

The MGM2 Model

The MGM2 model is based on the following simple equation:

$$\text{Economic Impacts} = \text{Visits} * \text{Spending per Visit} * \text{Regional Economic Multipliers}$$

MGM2 uses a segmented approach to capture differences in spending across distinct types of visitors. Sector-specific economic multipliers capture differences in the impacts of spending within distinct economic sectors, e.g., hotels, restaurants, amusements, retail trade. Visitor spending averages are estimated on a party day basis for day trips and a party night basis for overnight stays. Most park visitors arrive in personal vehicles, so the vehicle is treated as the spending unit or "travel party" for this analysis.

The NPS public use data provides estimates of recreation visits and overnight stays in the parks for 2001. A recreation visit represents the entry of one person to the park. Dividing person visits by an average party/vehicle size converts visits to a travel party basis. Visit figures are adjusted for assumed re-entry rates to avoid double counting of the same visitors. For some parks this is not a problem, while for others considerable

2001. These parks pose special problems for counting visitors, separating out local residents, and attributing spending to the park.

⁶ Estimates are made for all parks reporting use data.

⁷ Impact estimates for some 250 units not explicitly modeled are available from the authors. Many of these are smaller units with low visitation.

⁸ Formally we use the MGM2 "small metro" region generic multipliers at the system level. These represent an "average" between largely rural settings and metropolitan regions. These multipliers are also consistent with the results obtained by summing estimates for individual parks, where local area multipliers were chosen to represent the region around each park.

double counting is likely. Lack of good information about re-entries is one potential source of error in the economic estimates.

Visits are allocated across a number of distinct visitor segments by applying a set of segment shares, i.e., the percentages of visits to the park by each segment. For visitors staying overnight inside the park, the NPS overnight stay figures are divided by an average party size to estimate the number of party nights. Estimating party nights spent in the area for visitors not staying overnight inside the park poses greater problems. Day visitors to the park are frequently overnight visitors to the area. Some are staying overnight in nearby motels, campgrounds, or private homes. Others are on day trips or passing through the area as part of an extended trip. Some park visitors live in the local area. Others stay locally with friends or relatives or at an owned seasonal home.

The MGM2 Shortform uses four segments to separate visitors with distinct spending patterns:

- **Local visitors** live within the local region, as defined by the park (generally a 50-100 radius of the park).
- **Non-Local (NL) Day trips** are visits by parties who do not live in the local area and who did not stay overnight in the local area. For the purpose of estimating spending, visitors staying with friends or relatives in the area or in an owned seasonal home are treated as NL day trips since they do not live in the local region.
- **Motel** segment includes visitor staying in motels, hotels, resorts, lodges, cabins, B&B's or other commercial lodging in the area, either inside or outside the park.
- **Camp** segment includes visitors staying in campgrounds or backcountry sites, inside or outside the park.

For parks with overnight facilities within the park, the final two segments are expanded to separate visitors staying inside the park (labeled "motel-in", "camp-in" or "backcountry") from outside (labeled "motel out", "camp-out"). Park overnight stay data are used to estimate the number of visitors staying overnight inside the park.

Spending patterns vary quite a bit across these segments, so reliable estimates of these segment shares are fairly critical to obtaining good spending and economic impact estimates for a given park. Parks attracting many visitors staying overnight in area motels will generate much larger impacts than parks serving mostly local residents or visitors on day trips. The percentage of visitors staying overnight in the area also depends on the radius around the park chosen to represent the local region.

Most parks do not currently have information to reliably estimate visitor segment shares or re-entry rates. Parks with recent visitor surveys have usually asked questions necessary to estimate segment shares, but most of these surveys cover only a one or two week period during the summer, and segment shares can be expected to vary quite a bit by season. In addition, sampling procedures in some park visitor surveys over-represent visitors with longer stays and those staying overnight inside the park, while under-representing local visitors and day trips.

Spending averages are estimated on a per party day basis or a per party night basis for visitors with overnight stays. For a typical park, spending varies from \$37 per party per day for local visitors to \$53 per party for day trips from outside the local area, to \$70

per party per night for campers and \$175 per night for visitors staying in motels, cabins or lodges. Recreation visits, after adjusting for re-entries, are expanded to party days/nights in the area by multiplying by an average length of stay in the area. Spending averages were estimated from recent visitor surveys at eleven national parks⁹. The spending averages are consistent with other studies of tourists and park visitors in similar settings.

Spending figures generally exclude park admissions¹⁰, but include spending on campground fees and any concession operations inside the park. In estimating economic impacts, we assume park campgrounds and concessions have production functions similar to corresponding commercial enterprises outside the park.

In estimating impacts for individual parks, local area multipliers were chosen to represent the economic characteristics of the surrounding regions. Economic ratios and multipliers in the MGM2 model are based on input-output models developed with the IMPLAN system. MGM2 has distinct multipliers for parks in predominantly rural regions, parks in regions containing smaller cities, and parks in larger metropolitan areas.

In developing systemwide economic impact estimates, it should be understood that we have derived a sum of local impacts as contrasted with impacts on the national economy. We do not apply national multipliers, which would capture impacts beyond the immediate vicinity of the park. This also means that only retail margins on visitor purchases of goods are captured, as with the exception of some agricultural products and local arts and crafts, goods bought by visitors are rarely made in the local area. We also exclude en route expenses made outside of the local area, which can be substantial for long distance trips. No airfares are included.

NPS Systemwide Local Economic Impact Estimates

Systemwide impact estimates are made in the aggregate by entering systemwide visits, MGM2 visit conversion parameters, segment shares, spending averages and intermediate level multipliers into the MGM2 model. The model inputs are reported below in Tables 1 and 2. Results appear in Tables 3 and 4.

The National Park System (NPS) hosted 280 million recreation visits in 2001 across 348 separate NPS units reporting visits. These visitors spent an estimated \$10.6 billion in the local regions¹¹ around the parks. The direct effects of this spending supports 212,000 jobs in local tourism-related businesses and generated \$3.1 billion in personal income¹² to the regions and \$4.6 billion in value added¹³. Including local multiplier effects, the total impact of visitor spending on the economies of gateway regions is 267,000 jobs, \$4.5 billion in personal income and \$7 billion in value added.

⁹ Reports for each of these parks are listed in the references.

¹⁰ Visitor surveys are inconsistent on whether admission fees are included or not.

¹¹ The local region covers a radius of from 30-100 miles around each park. Local regions in most cases cover areas within roughly an hour's drive of the park, capturing where most overnight park visitors might spend the night and where most spending directly associated with the park visit would occur.

¹² Personal income includes wages and salaries plus payroll benefits of employees in tourism-related businesses.

¹³ Value added is the sum of personal income accruing to households in the area, rents and profits of tourism-related businesses and sales and use taxes paid by park visitors. Value added is the preferred measure of the contribution of an industry or activity to national or local gross domestic product.

Based on the Travel Industry Association (TIA, 2001) estimate of all domestic travel expenditures in 1999, NPS visitor spending represents 3.1% of all travel spending, (excluding airfares and other public transportation).

Table 1 illustrates the process for converting NPS recreation visits to party nights, breaking visitors into four primary visitor segments and computing total spending. The 280 million visits in 2001 translates to 259 million distinct visitors after adjusting for re-entries and other double counting, and then 126 million party days/nights when party size and length of stay are considered. Local visitors account for 20% of visits, 17% of party days/nights and 7% of spending. The motel segment accounts for 56% of all visitor spending, day trips 30% and campers and locals each contribute 7%.

Table 1. National Park System Visits by Visitor Segment, 2001

	Segment				Total
	Local	Day Trip	Motel	Camp	
Recreation Visits (millions)	56.0	159.6	50.4	14.0	280
Percent	20%	57%	18%	5%	100%
Visit Conversion Factors					
Re-entry factor	1.05	1.05	1.20	1.20	1.08
Party Size	2.5	2.5	2.5	2.6	2.5
Length of stay	1.0	1.0	2.0	2.2	1.2
Park Use measures (millions)					
Adjusted Visits (omit re-entries)	53	152	42	12	259
Party Trips	21	61	17	4	103
Party nights	21.3	60.0	33.6	9.9	125.6
Percent of party nights	17%	48%	27%	8%	100%
Visitor Spending					
Spending per party day/night (\$)	\$ 37	\$ 53	\$ 175	\$ 70	\$ 84
Total Spending (\$millions)	\$ 789	\$ 3,222	\$ 5,880	\$ 691	\$ 10,583
Percent	7%	30%	56%	7%	100%

Table Notes:

- Adjusted visits = Recreation visits/re-entry factor. The re-entry factor is the number of park entries per visitor during a stay in the area.
- Party nights (party days for day trips) = (Recreation visits * Length of stay in area)/(party size* re-entry factor)
- Spending by each segment = party nights * average spending per party night
- Party = a visitor spending unit, normally all persons in the vehicle or all visitors staying in the same room or campsite. This is also the assumed spending unit.
- Party night = number of nights spent in the area on a party basis, represents party days for local visitors and day trips, party nights for overnight stays in the area.
- Segments: Locals live in the local area. Day trips are visitors from outside local area who do not stay overnight in the area (inside or outside park). The "Motel" segment covers overnight stays in motels, cabins, lodges, etc. the "Camp segment" covers overnight stays in campgrounds including backcountry (in the park or in local region). Visitors staying locally in seasonal homes or with friends or relatives are treated as day trips for the purpose of estimating spending.

Table 2 shows the MGM2 average spending profiles by segment. Spending is reported on a party day basis for day trips and a party night basis for overnight stays. Lodging figures are therefore the average room or campsite rate. The spending profiles are based on recent surveys of park visitors, price adjusted to 2001. Spending averages vary somewhat across parks and regions based on local prices and spending opportunities; however, most of the variations across parks are explained by the mix of visitors (segments) attracted. Parks attracting a higher percentage of visitors staying in motels, for example, will have a much higher per visitor spending than parks attracting mostly local visitors or visitors on day trips.

Table 2. NPS Visitor Spending by Lodging Segment in Local Area, 2001 (\$ per party per day/night)

Spending Category	Segment						
	Local	Day Trip	Motel-In	Camp-In	Back-country	Motel-Out	Camp-Out
Motel, hotel cabin or B&B	\$ 0.00	\$ 0.00	\$ 95.56	\$ 0.00	\$ 0.00	\$ 80.47	\$ 0.00
Camping fees	0.00	0.00	0.00	16.09	0.00	0.00	22.13
Restaurants & bars	12.35	16.46	34.99	10.29	6.25	39.10	12.35
Groceries, take-out food/drinks	6.19	6.19	6.19	13.40	4.48	10.31	9.28
Gas & oil	4.82	9.64	8.68	10.61	6.76	8.68	10.61
Other vehicle expenses	0.52	0.78	1.55	0.78	0.47	1.55	0.78
Local transportation	0.00	0.26	0.51	0.26	0.00	0.51	0.26
Admissions & fees	4.21	7.36	11.57	6.31	3.54	12.62	13.67
Clothing	0.98	1.96	3.93	2.95	0.92	5.89	5.89
Sporting goods	1.00	1.00	1.00	1.00	2.47	1.00	1.00
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Souvenirs and other expenses</u>	<u>6.68</u>	<u>9.26</u>	<u>11.31</u>	<u>6.17</u>	<u>6.54</u>	<u>12.34</u>	<u>12.34</u>
Total	36.74	52.90	175.28	67.85	31.43	172.48	88.30

Table 3 summarizes the contribution of the seven segments to visits and spending. Totals are based on 126 million party nights generated by the 280 million park visits in 2001.

Table 3. NPS Visits and Spending by Segment

Segment	Visits in Party-nights, Millions	Avg Spending (\$ per party per day/night)	Total Spending \$Billions	Pct of Spending
Local	21	\$ 36.74	\$ 0.8	7%
Day Trip	61	52.90	3.2	31%
Motel-Inside park	2	175.28	0.3	3%
Camp-Inside park	3	67.85	0.2	2%
Backcountry Campers	1	31.43	0.0	0%
Motel-Outside park	32	172.48	5.5	52%
<u>Camp-Outside park</u>	<u>5</u>	<u>88.30</u>	<u>0.5</u>	<u>4%</u>
TOTAL	126	83.87	\$ 10.6	100%

Table 4 reports the local economic impacts resulting from the \$10.6 billion in visitor spending. This spending yields \$8.6 billion in direct sales after excluding the costs of goods not made locally. The spending directly supports 212,000 local jobs outside the park with a total payroll of \$3 billion. Including local secondary effects, the total impact is \$12.5 billion in sales, 267,000 jobs and \$4.5 billion in personal income.

Table 4. Economic Impacts of NPS Visitor Spending : Direct & Secondary Effects

Sector/Spending category	Sales \$Millions	Jobs Thousands	Personal Income \$Millions	Value Added \$Millions
Direct Effects				
Motel, hotel cabin or B&B	2,723	59	888	1,350
Camping fees	170	4	56	84
Restaurants & bars	2,681	77	913	1,272
Admissions & fees	1,059	31	366	600
Other vehicle expenses	118	1	36	57
Local transportation	35	1	20	23
Retail Trade	1,288	35	657	1,027
Wholesale Trade	225	3	91	155
<u>Local Production of goods</u>	<u>323</u>	<u>1</u>	<u>29</u>	<u>56</u>
Total Direct Effects	8,624	212	3,056	4,624
<u>Secondary Effects</u>	<u>3,892</u>	<u>55</u>	<u>1,408</u>	<u>2,434</u>
Total Effects	\$ 12,515	267	\$ 4,464	\$ 7,057
Multiplier	1.45	1.26	1.46	1.53

Table notes:

- Direct effects are impacts in businesses selling directly to visitors (no multipliers or recirculation of spending here).
- Sales = receipts of businesses. Note that visitor spending on goods gets margined and put into retail trade, wholesale trade and some local manufacturing. Difference between total direct sales (\$8.6 billion) and visitor spending (\$10.6 billion) is roughly \$2 billion from goods (gas, groceries, clothing, souvenirs) bought by visitors that are not made locally. This spending leaks immediately out of the local economy.
- Jobs are not full time equivalents. They represent the number of jobs in each economic sector that would support the given level of sales. Seasonal jobs are counted as annual equivalents, i.e., four jobs for three months = one job on an annual basis.
- Personal income is wages and salaries paid to workers including payroll benefits and income of sole proprietors.
- Value added is personal income plus rents and profits to firms plus sales and use taxes.
- Direct effects are itemized by economic sectors/spending categories. These illustrate the goods and services park visitors purchase and the economic sectors that benefit.
- Secondary effects cover the “multiplier” effects from recirculation of visitor spending in the local economy. Secondary effects include indirect effects on backward linked industries (businesses that tourism firms buy goods and services from) and induced effects from household spending of income earned from visitor spending.
- Multipliers are for an intermediate level of economic development which captures a mix of NPS units in both rural and urban settings. The MGM2 model employs distinct multipliers for each sector. Multipliers reported here are weighted averages, weighted in proportion to the percentage of spending received by each sector. MGM2 multipliers are reported in Appendix A (Table A2).

- Impacts are on local regions around parks. The figures do not cover visitor spending en route to parks (outside of local regions) and do not capture any secondary effects outside of the local region. Impacts should be interpreted as a national sum of local impacts. Figures only include the impacts of visitor spending. This doesn't include admission fees paid to the NPS (does include those to concessionaires), impacts of NPs employees, park operational expenditures, construction, induced development, property value impacts etc.

Visitors staying overnight in area hotels, motels, cabins, B&B's or park lodges have the greatest economic impacts. While representing only 18% of park visitors, the "motel" segment accounts for 27% of the local party nights by park visitors and 55% of the spending. Lodges inside the National Parks account for only 3% of the motel segment spending, as lodging outside the park accounts for 52% (Table 3). Visitors on day trips from outside the local area account for 31% of all spending, local visitors 7% and campers about 6%.

The direct effects of park visitor spending accrues primarily to four sectors : lodging establishments, eating and drinking places (restaurants), amusement and entertainment facilities (admissions and fees), and retail trade (Table 4). Retail trade includes the retail margins on all goods purchased by visitors, i.e., gas and oil, groceries, sporting goods, clothing, souvenirs. Secondary effects accrue to a wide variety of local businesses from banks to utilities to hardware stores.

Economic Impact Estimates for Individual Parks

There is considerable variation in types of National Park units, visitor use and spending patterns at a given park, and also the characteristics of gateway communities. All of these factors influence how visitors and their spending impacts local economies. Each park and regional setting is somewhat unique and must be examined individually to fully assess the impacts of a given national park on the local economy.

The reliability of our estimates for individual parks is quite variable due to the varying quality of local data and the amount of time and resources available to examine each park. Methods used to make economic impact estimates for individual parks fall into three categories that are identified in the "mode" column of Table 5.

Eleven parks with recent park visitor surveys containing spending information received the greatest attention, including extensive additional analysis of the survey data to establish spending profiles unique to the park and to estimate segment shares and other parameters of the MGM2 model. In some cases IMPLAN data were available to develop custom multipliers for a given park. Otherwise, the MGM2 generic multipliers were used. Park visitor activity and spending were compared with area tourism and economic statistics, where available, to assess validity of the impact estimates and the park's share of area economic and tourism activity. The full MGM2 model was used for these parks. Individual reports for these parks are available at the MGM2 website¹⁴.

At the second level are 52 parks that provided estimates of segment shares and other MGM2 parameters, often based on a mix of manager judgement and some local studies. Half of these parks were completed initially in 2001 using year 2000 visit data (Stynes 2001). Estimates for these parks were subsequently updated to 2001 (Stynes and

¹⁴ The MGM2 website URL is <http://www.msu.edu/mgm2/>

Sun, 2002). Staff from twenty-five additional parks helped to complete MGM2 shortforms in 2002 using 2001 visit data. For the 52 parks using the MGM2 shortform, visitor segment shares, visit conversion parameters, spending averages and multipliers were chosen based on information provided by the park. The results for these parks are posted at the MGM2 website with the chosen MGM2 parameters and inputs for each park.

The MGM2 Shortform was also completed for another eleven parks without any direct inputs from the park. In these cases, inputs were chosen based on settings for similar parks that we had examined, inspection of the park's visit counting protocols, local economic data, and any other information about park visitors and nearby tourist attractions and lodging facilities that were readily available on-line. These parks were selected to complete analyses for parks with high levels of visitation or extensive overnight stays in order to develop systemwide estimates.

Visits and Spending

Table 5 provides a summary of the results for 74 NPS units. The parks included reflect those with recent visitor surveys, parks requesting an economic analysis, and others selected based on high visitation and/or extensive overnight facilities. We intentionally excluded some high use parks such as Gateway and Golden Gate NRA's, the Statue of Liberty and parkways, as these pose unique problems for estimating economic impacts.

The 74 parks covered in Table 5 represent 94 reporting units¹⁵ or just over a quarter of all National Parks reporting use figures. These parks cover 44% of all recreation visits to the NPS in 2001 and 71% of the overnight stays. They therefore provide a reasonable basis to extrapolate to the remaining parks.¹⁶

The five parks with the greatest visitor spending are (1) Washington D.C. parks and monuments combined - \$667 million, (2) Great Smoky Mountains NP - \$587 million, (3) Yosemite NP - \$288 million, (4) Lake Mead NRA - \$247 million, and (5) Yellowstone NP - \$238 million. It should be noted that individual park estimates vary in their accuracy depending on what local data was available to estimate the MGM2 parameters. Individual park estimates should therefore be viewed as initial baselines that can be refined over time as better data becomes available.

Different interpretations of what spending should be counted will also influence the park rankings. For example, the spending estimate at Great Smoky Mt. NP might be reduced by as much as 50% if trips and spending that would not occur if the park were closed could be fully sorted out (Stynes, 2002).

We did not have access to concessionaire sales data and other local data that could help to validate estimates for individual parks like Yosemite and Yellowstone. The Washington D.C. park spending estimate represents about 14% of all spending (excluding airfares) by tourists to Washington D.C. (Travel Industry Association, 2000).

Variations in spending across parks are indicated by the last two columns of Table 5, although these must be interpreted with some caution. Spending per party per night

¹⁵ Seventeen Washington D.C. park units are treated as a single unit.

¹⁶ The omission of parkways and large urban recreation areas will bias total spending and impact estimates upward somewhat, as these parks attract more local visitors and day trips, with lower than average spending.

varies from \$167 at Great Smoky Mts. and \$165 at Acadia to less than \$30 at parks attracting mostly local day trips or with limited nearby spending opportunities. The systemwide average of \$84 per party per night is slightly less than the average of the studied parks as we intentionally included more destination parks with overnight accommodations relative to smaller historic sites and monuments.

Table 5. Park Visit and Spending Estimates for Selected Parks, 2001

NPS Unit	Mode ^a	Recreation visits (1,000's)	Overnight Stays (1,000's)	Total party nights (1,000's)	Total spending (\$1,000's)	Spend/party night	Spend/ visit
Acadia NP	1	2,517	153.7	819	\$ 134,846	\$ 165	\$ 53.6
Antietam NB	1	304	0.0	125	12,167	98	40.1
Aztec Ruins NM	1	46	0.0	16	1,219	75	26.3
Badlands NP	3	955	47.6	310	16,860	54	17.6
Bandelier NM	1	314	15.4	139	11,738	85	37.4
Big South Fork NRRRA	1	917	0.0	371	26,687	72	29.1
BigBend NP	1	329	188.1	142	11,525	81	35.0
Biscayne NP	3	489	0.0	222	21,927	99	44.8
BostonNHP	1	1,981	0.0	383	55,155	144	27.8
Cape Cod NS	1	4,391	17.0	1,937	175,996	91	40.1
Cape Hatteras NS	2	2,593	104.5	975	68,994	71	26.6
Capulin Volcano NM	1	61	0.0	26	1,097	42	18.1
Carlsbad Cavems NP	1	456	0.2	217	18,213	84	40.0
Casa Grande Ruins NM	1	133	0.0	53	3,300	62	24.9
Chaco Culture NHP	1	69	19.6	28	1,401	49	20.4
Chesapeake & Ohio Canal NHP	2	4,174	5.1	1,630	77,526	48	18.6
Colonial NHP	3	3,282	0.0	725	39,935	55	12.2
Crater Lake NP	3	457	77.7	231	30,560	132	66.8
Delaware Water Gap NRA	1	4,867	95.7	902	100,149	111	20.6
Eisenhower NHS	3	75	0.0	25	3,827	152	51.1
El Malpais NM	1	118	0.8	49	3,665	74	31.0
El Morro NM	1	69	2.7	29	2,035	71	29.5
Everglades NP	1	1,050	107.8	536	46,909	88	44.7
Fire Island NS	1	662	49.3	279	28,989	104	43.8
Fort Necessity NB	1	89	0.1	38	2,421	64	27.2
Fort Sumter NM	1	919	0.0	372	17,999	48	19.6
Fort Union NM	1	15	0.0	6	287	45	19.0
Gettysburg NMP	3	1,792	26.7	593	90,858	153	50.7
Gila Cliff Dwellings NM	1	49	0.0	20	1,084	54	21.9
Glacier NP	2	1,681	310.8	760	58,093	76	34.6
Glen Canyon NRA	2	2,340	1969.7	1,765	130,920	74	55.9
Grand Canyon NP	1	4,105	1152.1	1,575	151,238	96	36.8
Grand Portage NM	1	81	0.1	48	3,770	79	46.3
Grand Teton NP	1	2,535	527.3	1,018	100,227	98	39.5
Great Smoky Mountains NP	3	9,198	380.8	3,523	586,766	167	63.8

Table 5. Park Visit and Spending Estimates for Selected Parks, 2001 (Continued)

NPS Unit	Mode ^a	Recreation visits (1,000's)	Overnight Stays (1,000's)	Total party nights (1,000's)	Total spending (\$1,000's)	Spend/party night	Spend/ visit
Gulf Islands NS	2	4,550	0.0	1,947	\$ 50,581	\$ 26	\$ 11.1
Hagerman Fossil Beds NM	1	12	0.0	5	290	61	23.5
Indiana Dunes NL	1	1,735	28.0	743	40,438	54	23.3
Isle Royale NP	1	19	67.0	40	805	20	41.4
Jefferson NEM	1	3,533	0.0	1,295	114,184	88	32.3
Joshua Tree NP	1	1,281	234.4	599	46,282	77	36.1
Lake Mead NRA	1	8,466	887.6	2,583	247,458	96	29.2
Lassen Volcanic NP	1	377	94.9	170	11,807	70	31.3
Maggie Walker NHS	1	10	0.0	3	177	52	17.4
Mammoth Cave NP	1	1,884	84.1	798	94,396	118	50.1
Manassas NBP	1	823	0.0	232	11,706	50	14.2
Martin Van Buren NHS	1	16	0.0	8	239	30	15.0
Mount Rainier NP	3	1,301	205.7	402	29,301	73	22.5
Mount Rushmore NM	2	1,904	0.0	818	55,072	67	28.9
Natchez Trace Parkway	2	5,552	0.0	2,163	66,102	31	11.9
Olympic NP	3	3,416	393.8	973	93,407	96	27.3
Pecos NHP	1	33	0.0	11	587	52	18.0
Petroglyph NM	1	61	0.0	25	2,194	86	36.2
Pictured Rocks NL	3	421	30.5	142	14,763	104	35.0
Pinnacles NM	1	178	0.0	42	3,168	76	17.8
Pipestone NM	1	89	0.0	48	4,489	94	50.7
Point Reyes NS	1	2,223	33.6	878	83,568	95	37.6
Prince William FP	1	218	65.0	110	6,012	55	27.6
Redwood NP	1	388	34.5	201	12,734	63	32.8
Richmond NBP	1	108	0.0	58	5,706	99	52.7
Rocky Mountain NP	1	3,318	210.1	1,550	198,136	128	59.7
Roosevelt-Vanderbilt NHS	1	524	0.0	187	12,550	67	23.9
Salinas Pueblo Missions NM	1	35	0.0	14	1,070	74	31.0
Santa Monica Mountains NRA	1	572	0.0	210	10,696	51	18.7
Scotts Bluff NM	1	113	0.0	36	2,431	68	21.5
Shenandoah NP	1	1,499	295.1	795	53,278	67	35.6
Sleeping Bear Dunes NL	1	1,127	83.0	343	25,759	75	22.9
Valley Forge NHP	3	1,230	2.5	469	33,281	71	27.1
Washington DC Parks	1	14,938	0.0	4,780	667,945	140	44.7
White Sands NM	1	519	2.2	208	13,703	66	26.4
Womens Right NHP	1	24	0.0	11	609	54	25.6
Yellowstone NP	1	2,759	1244.4	1,766	238,248	135	86.4
Yosemite NP	2	3,369	1632.7	2,463	287,976	117	85.5
<u>Zion NP</u>	<u>2</u>	<u>2,535</u>	<u>258.3</u>	<u>877</u>	<u>66,760</u>	<u>76</u>	<u>26.3</u>
Totals of Studied Parks	74	124,272	11,140	47,892	4,646,293	97	37.4
Systemwide Total	348	279,874	15,593	125,600	10,583,000	84	37.8
Percent of System	26%	44%	71%	38%	44%		

a. The mode of analysis is coded as 1 for parks helping to complete the MGM2 shortform, 2 for shortforms completed without park input and 3 for the full MGM2 model including analysis of park visitor survey data.

The spending per visit averages in Table 5 have the advantage of being directly applicable to park visit figures. Systemwide, we estimate spending of \$37.8 per NPS visit. The per visit figures, however, are more difficult to interpret than the per party night averages. Variations in per visit spending averages across parks depend on differences in re-entry rates and lengths of stay in the area. Across parks, the per visit spending averages range from \$11 at Gulf Islands and Colonial NHP to \$85-\$86 at Yellowstone and Yosemite. The low figure at Colonial reflects treatment of most visits as side trips rather than primary destinations. Higher per visit spending estimates at Yosemite and Yellowstone reflect a high percentage of overnight stays, longer stays and fewer re-entries.

Differences in spending across parks is also related to the mix of visitors. Parks attracting high percentages of local visitors and day trips have lower spending averages, while parks attracting many overnight stays, particularly in motels and lodges, will have higher spending averages. While reliable data to estimate visitor segment shares was not available for many parks, rough estimates were made based on some judgement and evaluation of park settings relative to population centers and overnight accommodations. Park overnight stay data provided fairly reliable estimates for visitors staying inside the park, although in most cases the park does not provide the majority of visitor accommodations. Segment shares for the 74 studied parks are reported in the Appendix (Table A1).

Economic impacts

Economic impacts of visitor spending for individual parks are estimated by applying the spending at each park to a model of the local area economy. Distinct multipliers and economic ratios are used for each park depending on the characteristics of the local economy. Table 6 reports the direct and total impacts of park visitor spending in terms of personal income (wages and salaries) and jobs. For example, the \$135 million spent by park visitors to Acadia NP in 2001 directly supported about 2,300 jobs in the local region and another 1,100 jobs through secondary effects for a total local employment impact of 3,400 jobs¹⁷.

¹⁷ The precision to which jobs are reported should not be interpreted as implying accuracy to the nearest job. If job estimates are greater than 1,000, we recommend reporting jobs to the nearest 100 jobs. For job estimates below 500 report figures to the nearest 10 jobs.

Table 6. Economic Impacts of Selected Parks on the Local Economy

NPS Unit	Direct effects ^a		Total effects	
	Personal Income (\$millions)	Jobs	Personal Income (\$millions)	Jobs
Acadia NP	\$ 38.6	2,326	\$ 56.7	3,381
Antietam NB	3.5	210	5.1	305
Aztec Ruins NM	0.3	21	0.5	31
Badlands NP	4.9	272	8.0	373
Bandelier NM	3.4	202	4.9	294
Big South Fork NRRRA	7.1	543	9.4	721
Big Bend NP	3.1	230	4.1	305
Biscayne NP	6.8	291	10.4	400
BostonNHP	17.6	761	28.9	1,244
Cape Cod NS	46.6	3,578	61.9	4,755
Cape Hatteras NS	18.3	1,375	24.3	1,827
Capulin Volcano NM	0.3	22	0.4	29
Carlsbad Caverns NP	4.8	363	6.4	482
Casa Grande Ruins NM	0.9	67	1.1	79
Chaco Culture NHP	0.4	28	0.5	37
Chesapeake & Ohio Canal NHP	20.5	1,545	27.3	2,053
Colonial NHP	12.4	912	17.7	1,115
Crater Lake NP	8.6	730	11.4	860
Delaware Water Gap NRA	26.5	1,996	35.2	2,652
Eisenhower NHS	1.1	83	1.6	104
El Malpais NM	1.0	73	1.3	97
El Morro NM	0.5	41	0.7	54
Everglades NP	12.4	935	16.5	1,242
Fire Island NS	8.3	500	12.2	727
Fort Necessity NB	0.6	48	0.9	64
Fort Sumter NM	5.5	285	8.6	443
Fort Union NM	0.1	5	0.1	7
Gettysburg NMP	26.7	2,370	35.7	2,790
Gila Cliff Dwellings NM	0.3	22	0.4	29
Glacier NP	15.4	1,158	20.4	1,538
Glen Canyon NRA	34.7	2,609	46.1	3,466
Grand Canyon NP	40.0	3,013	53.2	4,004
Grand Portage NM	1.0	75	1.3	100
Grand Teton NP	26.5	1,997	35.3	2,654
Great Smoky Mountains NP	167.0	12,687	244.0	15,926
Gulf Islands NS	13.4	1,008	17.8	1,339
Hagerman Fossil Beds NM	0.1	6	0.1	8
Indiana Dunes NL	10.7	806	14.2	1,071
Isle Royale NP	0.2	16	0.3	22
Jefferson NEM	34.9	1,774	54.7	2,752

Table 6. Economic Impacts of Selected Parks on the Local Economy

NPS Unit	Direct effects ^a		Total effects	
	Personal Income (\$millions)	Jobs	Personal Income (\$millions)	Jobs
Joshua Tree NP	\$ 12.2	922	\$ 16.3	1,225
Lake Mead NRA	70.8	4,356	104.1	6,330
Lassen Volcanic NP	3.1	235	4.2	313
Maggie Walker NHS	0.1	3	0.1	4
Mammoth Cave NP	25.0	1,881	33.2	2,499
Manassas NBP	3.1	233	4.1	310
Martin Van Buren NHS	0.1	5	0.1	6
Mount Rainier NP	9.0	614	12.9	770
Mount Rushmore NM	14.6	1,097	19.4	1,458
Natchez Trace Parkway	17.5	1,317	23.3	1,750
Olympic NP	27.8	1,929	40.7	2,441
Pecos NHP	0.2	10	0.2	15
Petroglyph NM	0.7	34	1.1	53
Pictured Rocks NL	4.6	426	5.6	470
Pinnacles NM	0.8	63	1.1	84
Pipestone NM	1.3	77	1.9	113
Point Reyes NS	26.7	1,130	43.8	1,848
Prince William FP	1.7	104	2.5	151
Redwood NP	3.4	254	4.5	337
Richmond NBP	1.6	98	2.4	143
Rocky Mountain NP	52.4	4,029	69.7	5,353
Roosevelt -Vanderbilt NHS	4.0	173	6.6	283
Salinas Pueblo Missions NM	0.3	18	0.5	27
Santa Monica Mountains NRA	3.3	166	5.1	258
Scotts Bluff NM	0.6	48	0.9	64
Shenandoah NP	14.1	1,062	18.8	1,411
Sleeping Bear Dunes NL	6.8	524	9.1	696
Valley Forge NHP	10.4	713	15.3	902
Washington DC Parks	204.3	10,378	320.2	16,098
White Sands NM	3.6	279	4.8	370
Womens Right NHP	0.2	12	0.2	16
Yellowstone NP	63.1	4,747	83.9	6,308
Yosemite NP	76.2	5,738	101.4	7,625
<u>Zion NP</u>	<u>17.7</u>	<u>1,330</u>	<u>23.5</u>	<u>1,768</u>
Total Studied Parks	1,267	86,662	1,804	117,498
Systemwide Total	3,056	212,000	4,464	267,000
Percent of System	41%	41%	40%	44%

a. Direct effects include jobs and income in businesses selling directly to park visitors. Total effects include both direct and secondary effects. Secondary effects include both indirect and induced effects, estimated using IMPLAN Type SAM multipliers for local regions around the park. See the MGM2 manual for details.

Study Limitations

As noted above, estimates for individual parks should be interpreted with some caution and with a clear understanding of the difference between a with vs without analysis and a simple measure of all spending by park visitors while in an area. In most cases, our estimates will be conservative compared to park visitor spending and impact estimates that may not a) adjust for re-entries, b) take into account differences in spending across visitor segments, or c) adjust for non-primary purpose trips.

MGM2 multipliers, although more realistic, are generally lower than what many parks have used in the past. Compared to earlier park impact estimates made with the original MGM model in 1996, we estimate higher visitor spending but lower total impacts for some parks. Higher spending in MGM2 estimates often results from capturing spending associated with longer stays outside the park and particularly stays in motels¹⁸, while lower total effects are usually caused by the lower MGM2 multipliers.

Economic impact estimates rest largely on accurate estimates of the number and kinds of visitors and their spending patterns. Multipliers must also be selected to capture the structure of the local economy, although if done properly, multipliers are the least important of the three general MGM2 inputs. Accuracy of the MGM2 impact estimates therefore rests largely on the accuracy of the model inputs and interpretations of which visits and spending should be included.

Visits vs visitors : The NPS has a reasonably accurate system of counting entries to park units (recreation visits), but recreation visits are not exactly the same as the number of visitors to an area generated by a national park. Park visitors may be counted multiple times during a trip to a region where one or more National Parks are located. This may be due to re-entries to a single park or counting of visitors at several nearby attractions, such as those along the Boston Freedom Trail or the numerous monuments and parks in Washington D.C. If these sources of multiple counting are not taken into account, spending estimates will be inflated.

NPS use estimates also do not measure how much time park visitors are spending in the local region, and especially if they are staying overnight in nearby gateway communities. Clearly visitor staying in nearby motels and resorts will spend differently than those staying in campgrounds or on day trips/passing through the area. Spending and economic impacts require better information about what park visitors do outside the park, as this is where the majority of spending occurs. Few parks have much information about visitor use and spending patterns outside the park. Local tourism organizations sometimes have data about visits and spending, but these can be quite unreliable and may not adequately represent park visitors. Park visitor and general tourist surveys rarely ask questions in ways that facilitate direct comparisons.

The unit of visitation in the MGM2 model is the person or party day/night in the region, as spending is largely determined by the time spent in the local area. Time spent in gateway communities is more important for estimating spending than time in the park itself. The MGM2 model contains a system for converting recreation visits to person or

¹⁸ The original MGM spending estimates were based on RVD's inside the park and used Runzhiemer average spending on meals and lodging as the source of spending figures.

party days/nights in the area, but most parks lack good information to reliably estimate the conversion parameters (a re-entry factor, party size and length of stay in the region).

Spending: Several National Park visitor surveys over the past three years provide information on visitor spending. Spending estimates from visitor reports are, however, prone to a number of errors, especially from problems in obtaining representative samples, getting complete spending information, and handling outliers and missing data when computing averages. Many differences in spending across parks are explained by the mix of visitors a park attracts and their length of stay in the area. The MGM2 model handles these two factors by requiring that visits be broken down by segment and expressing spending on a per day/night basis. There can still be significant differences across parks/regions in the per day spending of particular segments. For example, parks near prominent tourist destinations or in large metropolitan areas generate higher per visitor spending than parks in more remote areas.

Many high spending areas also pose difficulties in isolating how much of the visitor spending should be attributed to the park visit. For example, consider a businessman on a three night trip to New York City (NYC), who takes one afternoon to visit the Statue of Liberty. Our estimates would only count the equivalent of a half day of spending for the NPS visit, not three full nights of spending including lodging. If, on the other hand, the trip to NYC would not have been made in the absence of the statue, we would count all three night's of spending as attributable to the NPS visit. Many trips involving one or more NPS visits have multiple purposes and the NPS share is therefore not readily sorted out in these situations.

Some park visitor surveys have asked visitors if the park visit was the primary reason for the trip. This question is sometimes difficult to answer and there are no established protocols for how to handle multi-purpose trips in economic assessments. The guiding principle is to include only trips and spending that would not occur in the absence of the park, but applying this principle poses problems in practice.

Sampling errors for spending estimates are easier to estimate, but these do not cover measurement errors, sampling biases, seasonal bias, or nonresponse bias. The variances and sampling errors also depend on how outliers are handled. Visitor survey project (VSP) studies generally obtain samples of between 300 and 600 visitors at each park. These sample sizes yield sampling errors of 5 to 6% (95% confidence interval) on the overall park visitor spending averages. However, sample sizes are much smaller at the segment level, where sampling errors generally range from 10-25%. None of the parks surveyed contains an adequate sample of backcountry campers to estimate a spending average. In applying spending averages from surveyed parks to non-surveyed parks, the issue becomes more one of generalization errors than sampling errors. Nevertheless, considerable consistency in the spending patterns of a given visitor segment, makes errors in spending estimates considerably less important than errors in visit figures and segment shares. In effect, the MGM2 model shifts the problem of explaining spending differences across parks to explaining differences in segment shares.

Multipliers: MGM2 multipliers are derived using IMPLAN models¹⁹ for local regions around National Parks. The MGM2 “generic” multipliers were estimated based on 1996 IMPLAN data. The MGM2 model adjusts employment to sales ratios to 2001 based upon consumer price indices. Otherwise, we assume little change in regional economic structures between 1996 and 2001. In cases where more recent IMPLAN data files were acquired, custom IMPLAN multipliers for the area were within 10% of the corresponding MGM2 generic figures. The MGM2 generic multipliers are reported in the Appendix (Table A2).

Multipliers are, however, in our opinion the least important source of error in the MGM2 models for several reasons. First, we recommend that parks focus first on the direct effects of visitor spending. Direct effects do not include multiplier effects, although there are some regional variations in employment to sales figures that influence the estimates of direct jobs. Secondly, local area multipliers for tourism-related spending do not vary as much as the estimates for spending and visits. The aggregate generic MGM2 sales multipliers range from 1.3 for rural areas to 1.6 for large metropolitan regions. Variations within classes of rural regions or distinct metropolitan regions are much smaller, so as long as the appropriate generic multiplier is chosen, errors from multipliers should be less than 10%. Finally, one can expect variations of a similar magnitude in multipliers for the same region across different I-O modeling systems, so the use of an MGM2 generic will usually introduce errors no larger than, for example, choosing between IMPLAN or RIMS II or IMPLAN’s Type II or Type SAM multipliers.

In making impact estimates for individual parks, the greatest source of potential errors are:

1. Errors in estimates of visits. Re-entries and multiple counting of visitors depends on the individual visit estimation protocols for each park. Additional errors are introduced in converting recreation visits to party days/nights in the area. For example, average party sizes estimated in Visitor Survey Project studies are often different from those used in park use estimation protocols. These differences are sometimes due to seasonal differences, unrepresentative samples, different definitions of the “party”, or in some cases, use measurement protocols that haven’t been updated recently.

2. Segment shares. In most cases, segment shares had to be estimated from judgement (park managers and/or our own) or in a few cases visitor surveys that may not accurately represent visitors throughout the year. Most parks have limited information to estimate the percentage of visitors who are local or the percentage staying overnight outside the park. Manager and researcher judgement were used extensively to estimate these shares. The size of the errors introduced by faulty segment shares depends on the differences in spending among segments. The motel segment is the most critical as these visitors spend at least twice that of the other segments on a per day/night basis. Pinning down the

¹⁹ In most cases we use MGM2 “generic” multipliers rather than multipliers from individual IMPLAN models for particular regions. See Appendix E of the MGM2 manual (Stynes, Propst, Chang and Sun, 2000) for a detailed discussion of the MGM2 multipliers

number of room nights in the area sold to park visitors should be a high priority to refine the spending and impact estimates.

3. Attribution decisions. For many parks, decisions had to be made about which visits and spending should be counted to capture changes in spending with vs without the park. Many parks with high levels of visitation pose significant problems in sorting this out, e.g. Gateway and Golden Gate NRA's, parkways, national seashores, and historical sites and monuments in metropolitan or tourist destination areas. For parks lacking visitor surveys to assess primary trip purposes, attribution decisions were based on the setting and perceived significance of the park as a trip generator. For many historic sites and monuments with visits often lasting 2 hours or less, only a half-day's spending was attributed to the park visit.

4. Spending averages. Spending averages vary from region to region and also depend on the activities of park visitors. This makes it difficult to generalize from spending studies at one park to another. Spending averages for individual parks are often based on small samples, particularly when visitors are divided into distinct segments. On the other hand, the spending averages for national park visitors fall within the range of estimates from other park and tourist spending studies and in many cases, decisions about which visits and spending to count likely supercede concerns over errors in the spending averages.

Economic impact estimates involve a product of visits, spending and multipliers. If the errors in each component fall in the same direction, the errors will be multiplied in the totals. If the errors are in different directions they may cancel each other. The systemwide estimates are likely more reliable than the estimates for individual parks, as random errors for individual parks should tend to "average out". While statistical error estimates are possible for some components (e.g., spending averages for visitors to individual parks), most of the potential errors in the MGM2 model are inherently not quantifiable as they involve measurement errors, sampling biases, nonresponse biases, seasonal biases, and errors in judgement. Triangulation and consistency with other sources of information may be a better approach to validating the estimates.

Recommendations

As there is no "typical" national park, refinements to systemwide economic impact estimates, at least for the visitor spending component, must come from improvements to the estimates for individual parks. Attention should focus first on higher use destination-type parks, where economic impacts will be most significant and where attribution issues are more clearcut. We recommend that parks using the MGM2 shortform migrate to the full MGM2 model where spending patterns and segments may be customized to capture the unique features of park visitors and the regional settings. The full MGM2 model can also directly incorporate IMPLAN-based multipliers for the specific region.

Perhaps the most important need is to obtain better information on the number and types of visitors to each park. For some parks, corrections of vehicle entries for re-entries on the same day are needed to identify the number of distinct park visitors. For

other parks this may not be a problem. All parks, however, should examine ways to estimate visitor segment shares, and especially the percentage of visitors staying overnight in the local region. Visitor surveys are one approach²⁰. Estimates might also be derived from an inventory of overnight accommodations around each national park and examination of local room taxes, hotel sales, room and campsite occupancy rates and related statistics. The number of local visitors and day trips to each park might be estimated via demand models and an examination of population distributions within a given radius of each park. Such models could also help project changes in use and associated economic impacts in the future.

It should be noted that the suggested MGM2 segments based on local-nonlocal, day trip vs overnight, motel vs camping, and inside vs outside the park are not only useful for economic analysis. These segments have applications beyond their use in the MGM2 model. Local visitors are a significantly different market than visitors from outside the area, with quite different use and spending patterns, as well as different responses to management and development alternatives. Differences can also be expected between overnight visitors staying inside or outside the park and in campgrounds, backcountry sites, or hotels, cabins and lodges. Park visitors who own seasonal homes in the area are another important segment for some parks. For many decisions these segments are more useful than traditional demographic or activity-based visitor segments.

NPS visitor spending patterns can be updated over time as additional visitor surveys are conducted at different parks. It is important that visitor surveys continue to apply a consistent approach to estimating spending and segment shares. There are a few unique visitor segments that likely deserve special attention to estimate spending profiles. School groups, bus tours, and backcountry campers, for example, do not show up in large enough numbers in general park visitor surveys to make reliable spending estimates and their spending patterns will be different from other visitors.

Multipliers for individual parks can be updated in the future by purchasing appropriate IMPLAN data or RIMS II multipliers. The generic multipliers in the MGM2 model appear adequate for most current uses, particularly if the focus remains on the direct effects. Current multipliers are based on 1996 IMPLAN data/models. At some point it would be worthwhile to re-estimate the MGM2 generic multipliers using a similar approach to what is described in Appendix E of the MGM2 manual. Parks with significant economic impacts should consider purchasing IMPLAN county data files for the surrounding region, having an IMPLAN model estimated and then embedding the multipliers in a custom version of the MGM2 model.

Additional research should be conducted to validate the visitor spending impact estimates for individual parks. The preferred approach is to use triangulation to compare results with independent data sources and alternative methods. For example, MGM2 model estimates of room nights in motels may be compared with occupancy rates or room taxes in the area. For parks with significant concession operations, visitor spending may be compared with concessionaire receipts to make sure spending estimates are at least as large as what concessions are taking in. MGM2 employment impact estimates may be compared with local employment data. For parks that are the primary tourist

²⁰ Segment shares can be estimated with a very short survey asking zipcode of residence, if the visitor is on a day or overnight trip, and lodging type in the local area. Party size, length of stay and re-entry factors could also be estimated in such surveys.

attraction in an area, MGM2 model estimates for lodging, restaurants, and amusements may be compared with official local estimates of tourism impacts.

In most cases a single validating source is unlikely, but one can assess whether some simple ratios of MGM2 estimates to other sources are at least reasonable, for example: (1) for parks with major concession operations, the ratio of concession receipts to total visitor spending or spending in particular categories, (2) the ratio of camping overnight stays or campground capacity inside the park vs outside, (3) room nights in motels estimated by MGM2 compared with regional room capacity, motel occupancy or sales data, (4) park visitor spending as a percentage of all tourist spending in an area, or (5) park visitor spending, income or jobs in hotels, restaurants, and amusements as a percentage of total sales, income or jobs in these sectors from government sources. Some of these computations also give the park a better sense of its relative contribution to tourism and the local economy in an area.

We also recommend moving beyond simply generating overall estimates of the impacts of all visitor spending. These figures are primarily of use for public relations, be it at the NPS system level or an individual park. The MGM2 model can be used to evaluate specific management alternatives. Some of the difficulties in estimating segment shares and attributing which spending should be counted or not at a particular park are more easily addressed within the narrower context of evaluating a particular action, where the “with vs without” scenarios become more clearly defined.

To round out the analysis of NPS economic impacts, the economic impacts of NPS employees and operations should be estimated. This is a much easier task than the visitor spending analysis and for some parks the impacts of park operations will exceed those of visitor spending. A companion spreadsheet model (MGMOperate) is available for estimating impacts of park operations, but only a few parks have used the model to date.

The primary uses of MGM2 and economic impact analysis within the National Park Service has been for public relations and strengthening of local partnerships. Similar uses of the model have been made by local communities and various NPS partners. Economic impact analysis helps to direct attention to relationships between the park and surrounding communities. Improving economic estimates requires a better understanding of these relationships and more coordinated efforts between the park, gateway communities and local tourism organizations and businesses. Cooperative efforts help to achieve the NPS’s joint goals of resource protection and providing for the enjoyment of visitors, while at the same time contributing to community goals of economic development and quality of life.

Park visitor surveys frequently focus mostly on what happens inside the park and area tourist studies frequently focus on what happens outside the park. Collaboration with and among NPS partners in gathering information about visitor behaviors and spending can significantly improve economic impact estimates, while also reducing the costs of marketing research and encouraging collaborative decisionmaking to the benefit of the NPS, visitors and local communities.

Viewing park visitors as tourists to an area rather than just visitors to a particular facility has some quite practical implications. First, the NPS should better understand the full range of visitor behaviors both inside and outside the park. Estimating re-entry factors requires a clearer sense of the circulation patterns of visitors during a stay in the

area. Segment shares will depend on the provision of lodging facilities inside and outside the park. Increasing economic activity associated with park visitors generally means providing additional opportunities to spend money. Important management and policy questions are whether these opportunities should be provided inside the park or in gateway communities and how associated costs and revenues should be apportioned among the NPS, non-profit groups, concessionaires, the private sector, and local government units.

The development and applications of the MGM2 model has provided baseline estimates of visitor spending, local area multipliers, and economic impacts for National Park units. More importantly, the model provides a tool for evaluating management, marketing and policy decisions related to national parks and gateway communities. The MGM2 framework provides specific guidance on the variables that must be measured and monitored in order to refine the estimates and update them over time.

Assuming some stability in spending patterns and segment shares, the 2001 estimates can be readily updated to 2002 and beyond using price indices built into the MGM2 model and updates of park visit figures. Periodic visitor surveys should be conducted to update and extend the visitor spending profiles and most parks should consider instituting methods for tracking basic visitor information on a more regular basis – e.g., party sizes, lengths of stay in the area, zipcodes of origin, overnight stays outside the park and lodging types.

Finally, we recommend that the NPS establish at least one economist position within the agency. Limited in-house expertise in regional economics²¹ poses problems in interpreting, maintaining and applying tools like the MGM2 model. More importantly, the lack of economic expertise limits the agency's ability to incorporate economic considerations in decisions.

²¹ Similar arguments may be made for managerial and resource economist positions within the NPS.

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These reports are available at MGM2 website: <http://www.prr.msu.edu/mgm2>.

Table A1. Visitor Segment Shares by Park

NPS Unit	Local	Day Trips	Motel	Camp
Acadia NP	5%	25%	60%	10%
Antietam NB	25%	25%	40%	10%
Aztec Ruins NM	7%	64%	17%	12%
Badlands NP	0%	86%	7%	7%
Bandelier NM	8%	55%	17%	20%
Big South Fork NRRRA	30%	33%	20%	17%
BigBend NP	15%	15%	35%	35%
Biscayne NP	7%	69%	8%	16%
BostonNHP	12%	40%	45%	3%
Cape Cod NS	30%	40%	30%	5%
Cape Hatteras NS	10%	50%	20%	20%
Capulin Volcano NM	8%	81%	8%	3%
Carlsbad Caverns NP	7%	56%	17%	20%
Casa Grande Ruins NM	10%	80%	10%	0%
Chaco Culture NHP	7%	64%	14%	15%
Chesapeake & Ohio Canal NHP	77%	20%	2%	1%
Colonial NHP	6%	25%	63%	6%
Crater Lake NP	11%	34%	37%	18%
Delaware Water Gap NRA	10%	75%	10%	5%
Eisenhower NHS	4%	32%	53%	11%
El Malpais NM	7%	64%	17%	12%
El Morro NM	7%	64%	14%	15%
Everglades NP	10%	50%	20%	20%
Fire Island NS	30%	40%	25%	5%
Fort Necessity NB	20%	60%	10%	10%
Fort Sumter NM	13%	87%	0%	0%
Fort Union NM	7%	76%	10%	7%
Gettysburg NMP	3%	28%	58%	12%
Gila Cliff Dwellings NM	7%	56%	17%	20%
Glacier NP	10%	56%	16%	18%
Glen Canyon NRA	10%	35%	15%	40%
Grand Canyon NP	5%	60%	15%	20%
Grand Portage NM	5%	10%	70%	15%
Grand Teton NP	10%	50%	20%	20%
Great Smoky Mountains NP	14%	25%	53%	11%
Gulf Islands NS	60%	30%	5%	5%
Hagerman Fossil Beds NM	49%	24%	11%	16%
Indiana Dunes NL	45%	45%	5%	5%
Isle Royale NP	5%	10%	10%	75%
Jefferson NEM	25%	63%	10%	2%
Joshua Tree NP	20%	50%	15%	15%
Lake Mead NRA	30%	30%	10%	30%

Table A1. Visitor Segment Shares by Park (Continued)

NPS Unit	Local	Day Trips	Motel	Camp
Lassen Volcanic NP	20%	40%	10%	30%
Maggie Walker NHS	80%	10%	9%	1%
Mammoth Cave NP	20%	20%	40%	20%
Manassas NBP	5%	85%	5%	5%
Martin Van Buren NHS	16%	84%	0%	0%
Mount Rainier NP	10%	67%	12%	11%
Mount Rushmore NM	10%	70%	10%	10%
Natchez Trace Parkway	77%	20%	2%	1%
Olympic NP	27%	40%	23%	10%
Pecos NHP	7%	63%	17%	12%
Petroglyph NM	40%	25%	30%	5%
Pictured Rocks NL	7%	28%	37%	28%
Pinnacles NM	25%	35%	5%	35%
Pipestone NM	10%	30%	25%	35%
Point Reyes NS	19%	42%	23%	16%
Prince William FP	67%	10%	5%	18%
Redwood NP	25%	50%	10%	15%
Richmond NBP	50%	20%	25%	5%
Rocky Mountain NP	10%	45%	35%	10%
Roosevelt-Vanderbilt NHS	21%	69%	9%	1%
Salinas Pueblo Missions NM	7%	64%	17%	12%
Santa Monica Mountains NRA	70%	20%	10%	0%
Scotts Bluff NM	40%	15%	25%	20%
Shenandoah NP	29%	35%	18%	18%
Sleeping Bear Dunes NL	25%	45%	15%	15%
Valley Forge NHP	67%	14%	17%	1%
Washington DC Parks	20%	40%	40%	0%
White Sands NM	40%	30%	15%	15%
Womens Right NHP	7%	81%	10%	2%
Yellowstone NP	18%	37%	21%	24%
Yosemite NP	10%	30%	30%	20%
<u>Zion NP</u>	<u>10%</u>	<u>60%</u>	<u>10%</u>	<u>10%</u>
Studied Parks	24%	40%	24%	11%
System Totals	20%	57%	18%	5%

Table A2. MGM2 Generic Multipliers for selected tourism-related sectors, 2001

Economic Sector	Direct effects				Total effects multipliers				
	Jobs/ MM sales	Personal inc/sales	Property Inc/sales	Value Added /sales	sales II	JobsII/ MMsales	IncII/ sales	VA II/sales	Sales I
LARGER METRO REGIONS									
Hotels And Lodging Places	18.54	0.35	0.12	0.54	1.62	26.81	0.59	0.93	1.36
Eating & Drinking	27.02	0.36	0.07	0.49	1.54	33.55	0.54	0.82	1.29
Amusement And Recreation	27.28	0.35	0.18	0.58	1.56	34.62	0.56	0.93	1.30
Auto repair and service	10.79	0.31	0.14	0.49	1.48	16.66	0.48	0.78	1.26
Local transportation	24.65	0.58	0.09	0.68	1.53	31.47	0.78	1.01	1.18
Food processing	4.92	0.14	0.13	0.28	1.48	10.62	0.31	0.56	1.34
Petroleum refining	0.54	0.05	0.06	0.13	1.40	3.31	0.15	0.38	1.33
Sporting goods	9.67	0.23	0.17	0.44	1.52	15.68	0.42	0.74	1.33
Manufacturing	9.43	0.22	0.15	0.39	1.49	15.25	0.41	0.68	1.31
Retail Trade	24.52	0.51	0.13	0.80	1.46	30.50	0.68	1.09	1.16
Wholesale trade	9.80	0.40	0.13	0.69	1.48	16.01	0.59	0.99	1.21
SMALLER METRO AREAS									
Hotels And Lodging Places	21.77	0.33	0.11	0.50	1.52	29.27	0.52	0.83	1.32
Eating & Drinking	28.60	0.34	0.07	0.47	1.44	34.37	0.49	0.74	1.24
Amusement And Recreation	29.53	0.35	0.18	0.57	1.45	35.98	0.51	0.85	1.25
Auto repair and service	11.30	0.31	0.14	0.48	1.41	16.72	0.45	0.72	1.23
Local transportation	27.23	0.57	0.09	0.67	1.43	33.40	0.73	0.94	1.15
Food processing	4.96	0.12	0.11	0.23	1.33	9.93	0.25	0.45	1.23
Petroleum refining	0.45	0.04	0.05	0.11	1.05	2.45	0.10	0.24	1.01
Sporting goods	11.13	0.21	0.15	0.39	1.42	16.37	0.36	0.64	1.27
Manufacturing	9.23	0.21	0.14	0.36	1.33	14.03	0.35	0.58	1.19
Retail Trade	27.36	0.51	0.13	0.80	1.38	32.78	0.65	1.04	1.13
Wholesale trade	11.29	0.40	0.13	0.69	1.38	16.77	0.55	0.92	1.17
RURAL REGIONS									
Hotels And Lodging Places	25.58	0.29	0.10	0.44	1.37	31.22	0.42	0.67	1.25
Eating & Drinking	31.23	0.31	0.07	0.44	1.30	35.80	0.42	0.62	1.19
Amusement And Recreation	29.45	0.34	0.17	0.56	1.32	34.42	0.45	0.76	1.19
Auto repair and service	12.95	0.28	0.12	0.44	1.26	17.04	0.37	0.60	1.16
Local transportation	33.29	0.53	0.08	0.62	1.28	38.04	0.63	0.79	1.11
Food processing	5.03	0.14	0.13	0.27	1.32	9.61	0.25	0.45	1.25
Petroleum refining	0.55	0.05	0.05	0.12	1.51	3.76	0.16	0.44	1.45
Sporting goods	7.37	0.27	0.20	0.51	1.25	11.07	0.36	0.66	1.16
Manufacturing	9.42	0.23	0.16	0.39	1.32	14.28	0.34	0.58	1.21
Retail Trade	35.33	0.51	0.13	0.80	1.26	39.58	0.60	0.96	1.10
Wholesale trade	12.50	0.40	0.13	0.68	1.26	16.69	0.49	0.84	1.12

a. Multipliers estimated from 1996 IMPLAN models, Jobs/sales ratios are updated to 2001 by dividing by an overall price index of 1.13. Type II multipliers are IMPLAN Type SAM multipliers.

Interpretation of Multipliers. Using the hotel sector and larger metro region figures in first row: Every million dollars in sales in hotels supports 18.54 jobs, 35% of hotel sales goes to wages, salaries and payroll benefits, 12% to profits and rents and total value added is 54% of hotel sales. The other 46% of hotel revenue goes to buy goods and services. For every \$1.00 of direct sales in hotels, another \$.62 in secondary sales is generated within a metropolitan region. Total effect multipliers capture secondary effects and are expressed per dollar (or million dollars) of direct sales. Every million dollars of hotel sales results in 26.81 total jobs in the region, 18.54 jobs in the hotel from direct effect and another 8.27 jobs through secondary effects (26.81-18.54). Total income from each dollar of hotel sales is \$.59, \$.35 from direct income within hotels and \$.24 from secondary effects. The type I sales multiplier only captures indirect effects. The sales impact of each dollar of hotel sales equals \$1.00 of direct sales, \$.36 from indirect effects and \$.26 from induced effects for a total sales effect of \$1.62.

Sales multipliers increase as one moves from rural to small metro to larger metro regions, capturing the increased circulation of money within more developed economies and greater leakage from rural economies. Job to sales ratios tend to go in the other direction due to generally larger firms and associated economies of scale in more developed regions, and also higher wages and fewer part time and seasonal jobs. One million dollars in hotel sales supports 26 direct jobs in a rural area, 22 jobs in smaller metro regions and about 19 jobs in larger metro areas. Service sectors are more labor intensive than manufacturing sectors, creating more jobs and greater personal income per dollar of sales. For tourist purchases of goods, the retail trade sector ratios are applied to retail margins and wholesale and manufacturing ratios are applied to wholesaling and manufacturing activity that remains in the local area. Most goods purchased by tourists are, however, not usually made locally, so only the retail margins contribute to local economic activity.

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The role and function of the NPS Social Science Program are to:

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- provide technical support to parks, park clusters, support offices and regional offices, and
- support a program of applied social science research related to national research needs of the NPS.

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