

**Estimating National Park Visitor Spending and Economic Impacts;
The MGM2 Model**

May, 2000

Daniel J. Stynes, Dennis B. Propst, Wen-Huei Chang, and YaYen Sun

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

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Chapter 1. The MGM2 Conceptual Framework

Introduction

MGM2 is an update of the National Park Service's (NPS) Money Generation Model (MGM), originally developed by Dr. Ken Hornback over 10 years ago (USDI, NPS, 1995). The purpose of the MGM2 model is to estimate the impacts of NPS visitor spending on the local economy. Economic impacts are summarized in terms of sales, income, employment, and value added.

National Parks impact the local economy in several ways:

- (1) visitor spending in the region
- (2) park operations, including payroll and purchases of goods and services from local suppliers
- (3) construction activities
- (4) economic development in region induced by the presence of the park

The Money Generation Model focuses primarily on the economic impacts of visitor spending. MGM2 uses an Excel workbook to carry out these calculations. A companion workbook to estimate impacts of park operations and construction activities is also available.

This report describes the conceptual framework for the MGM2 model and provides a basic background on economic impact analysis concepts and methods. A more complete treatment of technical assumptions and computations in the model may be found in our technical report (Part 4 of the MGM2 manual). Guidance on using the MGM2 software can be found in the software manual (Part 2) and illustrative applications in the applications manual (Part 3).

The Economic Impact Equation

Although economic impact analysis can be quite complex, the basic components and calculations are summarized in the following simple equation:

$$\text{Economic impacts} = \text{Number of Visitors} * \text{Average spending per visitor} * \text{Economic multipliers} \quad (1)$$

There are three primary inputs to the Money Generation Model:

Visits
Average spending
Multipliers

These inputs typically come from different sources. Visits are derived from park use figures or an estimate of the change in visits due to some management decision to be evaluated. Spending averages are typically estimated in surveys of park visitors. Multipliers are usually derived from input-output models of the region's economy (RIMS II, IMPLAN, etc.). MGM2 model users must provide the estimates of visits. The model includes some suggested spending averages that may be edited or replaced with local data to represent a given set of park visitors. MGM2 offers several sets of multipliers that users may choose from to capture the economy in the region around the park.

Economic impacts are calculated by first estimating what visitors spend in the region. This spending is then applied to a model of the region's economy to translate spending into the resulting income and jobs and to

determine the secondary or "multiplier effects". Tax effects may also be computed by applying local tax rates to the estimated sales and income.

Economic Impact Concepts

Understanding of economic impact analysis requires some familiarity with regional economic concepts and methods. We therefore introduce four important elements of an economic impact analysis: (1) distinctions between direct and secondary or multiplier effects, (2) the most commonly used measures of economic activity and impacts, (3) handling of visitor retail purchases through the margining process, and (4) issues surrounding the definition of the impact region.

MGM2 estimates both the direct effects and secondary effects of visitor spending.

Direct effects are the changes in sales, income and jobs in those businesses or agencies that initially receive the visitor spending (e.g. the park, motels, campgrounds, restaurants, grocery stores, attractions, retail stores). These impacts are most directly associated with the visitor spending and are therefore itemized in greater detail in MGM2. Direct effects are estimated for key tourism-related sectors. Direct effects are estimated by applying simple ratios (jobs to sales, income to sales, etc.) to the direct sales.

Secondary or "multiplier" effects capture what are called indirect and induced effects. These are the changes in economic activity within the region that result from the re-circulation of the money spent by visitors within the local economy. There are two types of secondary effects:

Indirect effects are the changes in sales, income and jobs in "backward linked" industries. These are firms that supply goods and services to those businesses that sell directly to the visitor. For example, motels purchase linen supplies, utilities and other goods and services in the local area in order to provide lodging for the visitor.

Induced effects are the changes in economic activity in the region resulting from household spending of income earned through a direct or indirect effect of the visitor spending. For example, motel and linen supply employees live in the region and spend the income earned on housing, groceries, education, clothing and other goods and services.

Total effects are the sum of direct, indirect and induced effects. Total effects are estimated by applying regional economic multipliers to the estimates of direct sales.

- Direct effects accrue largely to tourism-related businesses in the area.
- Indirect effects accrue to a broader set of economic sectors that serve these tourism firms.
- Induced effects are distributed widely across a variety of economic sectors.

Multipliers capture many "rounds" of re-spending of the initial infusion of visitor spending within the region.

MGM2 reports impacts in terms of four principal measures of economic activity:

1. **Sales** are the sales of firms within the region to park visitors. As explained below under "margining", not all visitor spending accrues to the region as direct sales.
2. **Jobs** are the number of jobs in the region supported by the visitor spending. Job estimates are not full time equivalents, but include part time and seasonal positions.
3. **Personal income** includes wage and salary income, proprietor's income and employee benefits.

4. **Value added** is a commonly used measure of the contribution of an industry or region to gross national or gross state product. Value added is personal income plus rents and profits, plus indirect business taxes. As the name implies, it is the "value added" by the region to the final good or service being produced. It 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.

Each measure of economic activity provides a somewhat different picture of the impacts, so all of the measures can be used in the appropriate context. Although many recreation and tourism impact studies have focused on sales and jobs, personal income and value added are the best and preferred impact measures in most situations.

Both sales and job impacts can be misleading. High sales can be associated with assembling parts bought outside the region or selling items at retail, without contributing extensively to income or jobs in the area. For example, a factory outlet mall that sells goods not made locally at very retail mark-ups will not generate much income or jobs within the region. While employment is an important regional economic development goal, job estimates are confounded somewhat by part time positions and inevitably lead to debates about low-paying or high paying positions. These problems are particularly relevant in tourism-related sectors and regions with seasonal fluctuations in visitors and economic activity.

Income and value added measures are more readily compared across economic sectors and regions as a dollar of income in the hotel sector is the same as a dollar of income in manufacturing. Regional economists prefer value added as it captures all of the value added by the region. In MGM2, we favor personal income, as profits and rents in different industries can fluctuate quite a bit from year to year, making the value added ratios and multipliers somewhat unstable.

For visitor retail purchases, MGM2 includes the retail margin and local production.

Not all visitor spending is counted as direct sales to the region. Retail sales are handled differently than visitor purchases of services (e.g. restaurants and hotels produce services). If a visitor buys a \$100 camera, the retail margin on the item (say \$40) is put in the retail trade sector, the wholesale margin (say \$10) is put in a wholesale trade sector and the remaining amount (\$50) is allocated to the manufacturing sector that produces cameras. Most goods bought by visitors are not made in the local area, so only the retail margin and possibly the wholesale margin accrue to the local economy. Assuming the camera is made elsewhere, \$100 in visitor spending results in only \$50 in direct sales to the local region. This margining process is carried out for all goods purchased by visitors, including fuel, groceries, and all souvenirs and other retail purchases. If retail plus wholesale margins are about 50%, this means that only half of the spending on visitor purchases of goods accrues to the local economy as direct sales. As most visitors purchase more services than goods, roughly eighty percent of visitor spending is typically captured as direct sales.

MGM2 can accommodate different kinds of regions, but focuses mainly on the economic effects in local regions around the park.

An important part of carrying out a regional economic analysis is clearly identifying the region of interest. MGM2 estimates the economic impacts of visitor spending on the region around the park. In most cases, one is interested in the local economic effects on a region of from 30-120 miles around the park. MGM2 is designed primarily to estimate local impacts, although it can also be used to estimate impacts on states, multi-state regions or the entire U.S. economy.

Regions will generally consist of from one to ten counties surrounding a park. Most economic data is available at a county level and input-output models are generally derived using these data. For example the IMPLAN Pro system estimates models and multipliers for regions defined as groupings of counties.

Most of the impacts of visitor spending will be felt in the region immediately surrounding the park. The impact region should include places where visitors may stay overnight while visiting the park and the other

principal attractions they may visit while in the area. The region should capture most of the spending that visitors make while staying in the area. For economic analysis, the region should also represent a viable economic region, including places where local workers live, where tourism employees buy their groceries, and where key supporting businesses are located.

In terms of the economic impact analysis, the region chosen:

- Identifies what visitor spending and businesses are included in the analysis. Visitor spending should include only money spent within the given region. In most cases, spending by local residents of the region should be excluded as this does not represent new money coming into the region. Spending captured by the region represents sales to businesses and agencies within the designated region.
- Affects the size of multipliers. Multipliers capture the amount of re-circulation of visitor spending until it "leaks" out of the region to buy goods and services from elsewhere (imports). Multipliers will be higher for regions that are larger in geographic extent and with more diversified economies.

Key Features Of MGM2

MGM2 introduces three primary improvements over the original Money Generation Model.

- The Excel workbook interface automates many routine calculations and provides a wider array of options. Building MGM2 as an electronic spreadsheet allows us to offer more complex options and customization for advanced analysts while at the same time automating some features for novice users.
- Greater help is provided in choosing appropriate values for the key inputs. Sets of "generic" and "custom" datasets are included from which spending averages and multipliers may be chosen. Primary responsibility for the visitation data still rests with the model user.
- MGM2 disaggregates both the input and output data to better capture differences across parks and to be able to evaluate the impacts of more narrowly defined actions. The additional detail for inputs should yield more accurate estimates, make it easier to apply spending or multiplier estimates from one area to another, and provides more detailed outputs.
 - **Visitors are divided into distinct subgroups** (segments) with different spending patterns. Segments are introduced for three reasons (1) to generate more accurate spending estimates, (2) to compare impacts of distinct subgroups of visitors, and (3) to be able to evaluate management actions that will differentially affect different visitor subgroups.
 - **Visitor spending is itemized in twelve spending categories** and is based on actual surveys of NPS visitors. MGM2 users may choose from spending profiles based on previous studies conducted at similar parks, edit or adjust these to fit their situation, or may enter their own spending data. Spending covers all spending by visitors in the region around the park. The more detailed spending categories allow visitor purchases of goods to be correctly margined to identify impacts on the retail trade sector. The spending detail also allows the model to take into account the different impacts that result from spending in different sectors of the economy.
 - **Sector-specific multipliers** are used to capture the job, income, and value added resulting from visitor spending in each sector. Model users may choose from a set of generic multipliers or import multipliers for a specific area.
 - **MGM2 reports a more complete set of summary outputs**, which allows analysts to a) compare impacts of different visitor segments, b) itemize the direct effects by economic sector, and c) report impacts in terms of sales, income, jobs, value added, or tax effects.

- Consistency of spending categories and multipliers with the IMPLAN I-O modeling system.**
 IMPLAN models for regions around NPS units are used to generate multipliers that are embedded in MGM2. MGM2 uses somewhat more conservative IMPLAN Type SAM multipliers instead of the traditional Type II multipliers (Alward and Lindall 1996). In estimating induced effects, type SAM multipliers do not re-circulate payroll benefits such as social security or contributions to retirement plans. Wages paid to workers commuting from outside the region are also excluded in estimating induced effects. For users with access to IMPLAN, more detailed and customized regional economic analysis may be carried out. A utility is provided for extracting multipliers from any IMPLAN Pro 2.0 model for use with MGM2. (See MIG, Inc. 1999 for background on the IMPLAN model)
- Use of the party night as the unit of analysis.** We recommend that visits and spending be input on the basis of party nights in the area, as visitor spending within the region depends on the amount of time spent in the area, not just the number of entries to the park or time spent in the park. A conversion routine is provided to help parks convert estimates of recreation visits and overnight stays to party nights (see Appendix B).

Comparison of MGM and MGM2: For users familiar with the original MGM model, Table 1 summarizes the major differences in the new version.

Table 1. Comparison of MGM and MGM2

	MGM	MGM2
Visits	From Park Visitor Counts Unit of analysis = person visit Locals excluded via % Non-Local	Estimated by lodging segments from park visit and overnight stay data Unit of analysis = party nights in area or party trip Locals a distinct segment that can be included or omitted as desired
Spending	Runzheimer or AAA per day room and meal rates Only covers motel and meals Aggregate average spending across all visitors	NPS visitor spending surveys. Generic spending figures and spending data for selected parks. Covers all spending in local area within 10-12 spending categories Spending profiles for distinct visitor segments
Multipliers	Aggregate sales, job and income multipliers from published state multipliers or other sources Type II	Sector specific multipliers and ratios for 10-12 economic sectors Sample multipliers for different types of regions and 4 sets of generic multipliers. IMPLAN Type SAM multipliers
Outputs	The MGM Worksheet Total spending by non-local visitors Direct and total sales Total jobs, income and taxes	Spreadsheet tables of results Detailed spending totals by visitor segments and 12 spending categories. Direct effects - sales, income, jobs, and value added by economic sectors Total effects - aggregate impacts - sales, income, jobs and value added. Taxes on direct sales and income

Inputs To MGM2

The three required inputs to estimate the economic impacts of park visitor spending are:

1. Number and types (segments) of visitors, usually expressed as party nights in the area
2. Average spending per unit of visitation for each visitor segment
3. Economic ratios and multipliers for the study region

Visits

Instead of using just overall counts of visitors, MGM2 divides visitors into distinct segments with different spending patterns and possibly different responses to management and marketing decisions. Recommended segments are based on lodging types, as lodging segments are the best general predictors of spending and use patterns, while also being related to a variety of park management and policy decisions. MGM2 will allow analysts to use any visitor segments for which estimates of visits and spending can be derived, but we recommend some variation of the following lodging segments.

- (1) Local: local visitors, who live in the designated region
- (2) NL-Day: non-local day visitors (not staying overnight in the local area) ,
- (3) MOTEL-IN: visitors in motel/cabin/lodge inside the park,
- (4) CAMP-IN: campers staying inside the park,
- (5) Backcountry: visitors staying in backcountry sites,
- (6) MOTEL-OUT: visitors in motel/B&B/cabin/rented condo outside park,
- (7) CAMP-OUT: campers staying outside the park, and
- (8) VFR: visitors staying overnight in the area in an owned seasonal homes, with friends and relatives, or other private home.

Note that the size of segments 3-5 can be estimated from NPS overnight stay data in terms of person nights. Divide person nights by an average party size to convert these to party nights. The number or percentages of park day use visitors is more difficult to estimate by segment. NPS public use statistics focus on entries to and time spent in the park, rather than trips to an area and time and money spent around the park. The latter are more crucial for spending and regional economic impact estimation, as spending opportunities within park units are limited. Visitor surveys, local tourism studies, manager judgment, and other sources can be used to estimate the day user segment shares. A companion spreadsheet (npsconvert.xls) has been developed to assist MGM2 users in estimating segment shares and converting park visits to party nights in the area (see Appendix B).

Even rough guesses of the relative shares of park visitors that each of these segments represent will generally yield better spending and economic impact estimates than using a single aggregate spending average for a "typical visitor". In terms of spending, there generally is no "typical visitor", as day visitors to the area, backcountry users, campers, and overnight visitors in motels and cabins will have very distinct spending patterns and impacts. The "average" spending of a typical visitor will depend on the relative mix of these distinct segments. It is therefore virtually impossible to estimate an overall average spending without considering the mix of these segments.

Not all of these segments will apply to all parks. Segments with similar spending patterns may be combined to simplify the analysis. In other cases, one may want to further subdivide a particular segment to better capture differences in spending or different responses to a particular management action being considered.

Visitation Units

We also recommend estimating visits/visitors on a party night basis, that is, party nights in the region around the park, NOT just time spent in the park. The "npsconvert" routine mentioned above converts NPS

visitation data to party nights. The conversion routine uses NPS recreation visit data along with NPS overnight stay data and selected other parameters (e.g. length of stay, party size, park re-entry rates.). The conversion routine is described in Appendix B.

Table 2 shows the form in which visits are entered in the MGM2 model¹. The example shows the distribution of party nights for visitors to Great Smoky Mts. NP (GRSM) in 1996. The 9.262 million recreation visits reported by GRSM in 1996 translates into 3.262 million party nights in the area. Nights spent inside the park are based on 460,000 overnight stays reported in 1996 (159,363 party nights). Visits are reported in party nights in the area and presented as segment shares of the total. This is the format in which visits are entered in MGM2.

Table 2. Sample estimates of visits by segment

SEGMENT	Share	Party-nights
Local-Day	15%	505,375
NL-Day	5%	170,316
Motel-IN	<1%	3,608
Camp-IN	3%	102,194
Backcountry	2%	53,562
Motel-OUT	55%	1,807,448
Camp-OUT	11%	370,696
F&R	8%	248,488
Total	100%	3,262,000

Spending

The MGM2 model covers all visitor spending in the local area. Complete spending profiles are used instead of just spending on lodging and meals, as was the case with MGM. Spending is itemized in 12 categories. A different spending profile is assumed for day visitors to the area compared to visitors staying overnight in motels, campgrounds, or with friends and relatives. The sample spending table for GRSM (Table 3) contains distinct spending patterns for each segment and spending on a party-night basis.

The MGM2 model provides several options for choosing spending profiles. Parks may choose from the existing databases, edit or adjust these, or enter their own data. A built-in price adjustment tool makes it easy to update spending data to a current year. Further details on choosing and adjusting spending data are provided in Appendix D.

- For parks with limited information about what their visitors spend in the area, "generic" spending profiles may be used. Sets of high, medium, and low spending profiles were developed for natural-resource-based parks and for historic sites and monuments.
- Spending profiles estimated from visitor surveys at selected NPS units are provided for users who wish to base their spending averages on a "similar" park (Appendix C).
- MGM2 users may adapt and adjust the above profiles based on judgment and local information.
- The itemized spending categories in MGM2 and segments make it easier to develop spending profiles for narrowly defined segments using a cost or engineering approach (see Appendix D for details).
- Parks that conduct visitor spending studies may enter their own data. A set of spending questions have been developed for use in park visitor surveys². These questions gather the information needed to develop spending profiles by segment and to convert visits to a party

¹ Visits are reported as Table 2 on the Visits page in the MGM2 workbook.

² Spending questions are available from the NPS Visitor Survey Project (VSP) or the MGM2 website.

night basis. As new studies are conducted spending datasets will be added to the MGM2 databases.

Table 3 illustrates the format of the MGM2 spending data³. In this example, spending profiles are reported for eight visitor segments based on visitor surveys at Great Smoky Mt. National Park (GRSM).

Table 3. Visitor Spending by Lodging Segment in Local Area (\$ per party night), 1996

CATEGORY	SEGMENT							
	Local-Day	NL-Day	Motel-IN	Camp-IN	Back-country	Motel-OUT	Camp-OUT	F&R
Motel, hotel cabin or B&B	0.00	0.00	75.32	0.00	3.15	71.68	0.00	0.00
Camping fees	0.00	0.00	0.00	13.59	1.40	0.00	24.00	0.00
Restaurants & bars	6.43	21.00	33.99	11.13	4.06	42.59	17.28	17.85
Groceries, take-out food/drinks	2.15	8.39	5.84	11.14	2.91	6.67	10.03	5.70
Gas & oil	3.89	14.00	14.10	11.46	3.50	10.21	13.88	10.22
Other vehicle expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admissions & fees	0.88	10.00	12.05	5.73	2.10	13.56	12.67	7.44
Clothing	1.44	2.12	9.54	5.30	0.67	8.48	10.60	4.00
Sporting goods	1.08	1.00	1.08	1.08	1.78	1.08	1.08	1.08
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<u>Souvenirs and other expenses</u>	<u>4.12</u>	<u>5.48</u>	<u>12.16</u>	<u>4.09</u>	<u>4.23</u>	<u>22.43</u>	<u>28.12</u>	<u>6.00</u>
Total	20.00	62.00	164.08	63.52	23.80	176.70	117.66	52.30

Spending data here are for Great Smoky Mts, NP- estimated in a 1985 survey and price updated to 1996.

Multipliers

Multipliers are used to convert spending to corresponding jobs and income in the area, as well as to estimate the secondary or multiplier effects of visitor spending. MGM2 multipliers are disaggregated into a dozen sector-specific multipliers that capture the differences in the multiplier effects of spending in different sectors of the economy. For example, a dollar spent in the lodging sector will have a different impact than a dollar spent in retail trade or amusements.

As was the case with spending inputs, MGM2 provides several options for choosing multipliers, from simple "generics" to extracting of custom multipliers from an IMPLAN Pro 2.0 model.

For novice users, four sets of "generic" multipliers are provided to capture the range of possible levels of economic development surrounding a park and different size regions.

Users may select multipliers for:

1. rural areas,
2. smaller metro regions with populations up to 500,000 ,
3. larger metro regions, usually with populations from 500,000 to one million,
4. state level regions and other regions.

The development of these "generic multipliers" is described more fully in a technical report (Part 4 of the MGM2 manual). Guidance on choosing one of the generics is provided in the software manual. Multipliers

³ The average spending table is numbered as Table 1 on Spend page in the MGM2 workbook.

for 114 selected individual regions may also be imported into the model and multiplier data sets for custom regions may be created from IMPLAN Pro models, when available.

Table M is a sample table of multipliers for a generic rural area around a park. The "generic" multipliers are estimated as averages across many different regions of a given type. Our research indicates that the "generic" multipliers are generally within 5% of the actual sales, income, and value added multipliers, if the appropriate generic multiplier is chosen. Job to sales ratios may vary by up to 10%.

We will defer defining what all these multipliers mean for now. Simply note that different multipliers and ratios are used for each major tourism-related sector. The old MGM model only used three multipliers - an aggregate Type II sales multiplier, and aggregate income and job multipliers. The sector-specific multipliers yield more detailed estimates of the direct effects by sector and also better capture differences in economic impacts of different types of spending. MGM2 significantly improves the handling of multipliers, without requiring a complete understanding of them to use the model. Users with input-output modeling skills may adjust and fine-tune the multipliers, as desired. Users with limited experience with multipliers should use the generic ones.

Table M. Multipliers for selected tourism-related sectors - Generic rural area, 1996 IMPLAN Type SAM

Sector	Direct effects			Total effects multipliers ^a				
	Jobs/ MM sales	Personal inc/sales	Value Added /sales	Sales Type II	Jobs II/ MM sales	Income II/ sales	Value Added II/sales	Sales Type I
Hotels And Lodging Places	29.33	0.29	0.43	1.39	36.31	0.42	0.68	1.27
Eating & Drinking	35.52	0.31	0.43	1.32	41.03	0.42	0.62	1.20
Amusement And Recreation	38.51	0.33	0.53	1.34	44.66	0.44	0.74	1.21
Auto dealers/service stations	14.48	0.28	0.44	1.30	19.57	0.38	0.61	1.19
Local transportation	41.60	0.50	0.59	1.32	47.61	0.61	0.78	1.13
Food processing	5.68	0.14	0.27	1.32	10.85	0.25	0.45	1.25
Apparel manf.	15.72	0.15	0.17	1.27	19.57	0.23	0.31	1.21
Petroleum refining	0.63	0.04	0.11	1.35	4.56	0.13	0.33	1.29
Sporting goods	8.22	0.27	0.52	1.29	13.00	0.38	0.69	1.19
Manufacturing	10.64	0.23	0.39	1.32	16.11	0.34	0.58	1.21
Retail Trade ^b	37.02	0.51	0.80	1.28	42.26	0.60	0.97	1.10
Wholesale trade	12.51	0.40	0.68	1.28	17.66	0.50	0.85	1.13

a. Total effect multipliers are total effects across all sectors per dollar (\$MM for jobs) of direct sales in the sector.

b. Retail Trade multipliers are an average across 7 IMPLAN retail trade sectors.

MGM2 Computations And Outputs

1. Total spending is estimated by multiplying the number of visits (in party nights) within each segment (Table 2) by the average spending per visit (Table 3). It is critical that visits and party nights be entered in the same units. Other units may be used as long as they are consistent between visit and spending entries.

Table 4 illustrates a total spending table generated by MGM2⁴. Figures here are based on those in Tables 2 and 3 above.

Table 4. Total spending by Visitors (\$ 000's)

	SEGMENT								Total
	Local- Day	NL- Day	Motel- IN	Camp- IN	Backco untry	Motel- OUT	Camp- OUT	F&R	
Motel, hotel cabin or B&B	0	0	272	0	169	129,558	0	0	129,998
Camping fees	0	0	0	1,389	75	0	8,897	0	10,361
Restaurants & bars	3,250	3,577	123	1,138	217	76,985	6,406	4,435	96,130
Groceries, take-out food/drinks	1,089	1,429	21	1,138	156	12,055	3,719	1,417	21,025
Gas & oil	1,967	2,384	51	1,171	187	18,450	5,146	2,539	31,895
Other vehicle expenses	0	0	0	0	0	0	0	0	0
Local transportation	0	0	0	0	0	0	0	0	0
Admissions & fees	445	1,703	43	586	112	24,513	4,696	1,850	33,949
Clothing	728	361	34	541	36	15,322	3,928	994	21,945
Sporting goods	546	171	4	110	95	1,953	400	268	3,548
Gambling	0	0	0	0	0	0	0	0	0
Souvenirs and other expenses	2,083	933	44	418	226	40,546	10,425	1,491	56,167
Total	10,108	10,559	592	6,492	1,275	319,382	43,618	12,995	405,020

The total spending table is reported as Table 3 on TOTSP page in MGM2 workbook.

2. Estimate the amount of spending in each category that is captured by the local economy. MGM2 assigns the retail and wholesale margins on all retail purchases to the retail and wholesale trade sectors and allocates a portion of the remaining producer price for each good to local production (see technical report for details). The portion of spending captured by the region is the direct sales resulting from the visitor spending. This is usually 70-90% of visitor spending. The captured spending is termed "direct sales" and is reported by sector in the first column of the direct effects table (Table 4).

3. Direct effects are estimated by applying the "direct effect" economic ratios in the multiplier dataset to the estimate of direct sales. Ratios for each sector are applied to a corresponding spending category and then the results are summed across sectors to yield the totals.

Direct jobs = direct sales * jobs to sales ratio

Direct personal income = direct sales * personal income to sales ratio

Direct Value added = direct sales * value added to sales ratio

Table 5 is a sample table produced in the MGM2 workbook, reporting the direct effects in terms of sales, jobs, personal income and value added for each sector. All retail and wholesale margins on goods bought by visitors from local retail stores are accumulated in those two sectors at the bottom of the table. Only the local production of these goods are covered within the manufacturing sectors (identified with an * in the table). Table 5 is obtained by applying the direct effect multipliers in Table M to the total spending in Table 4. In this case \$405 million in spending yields \$328 million in direct sales, 10,667 direct jobs and \$167 million in value added to the region.

⁴ The Total spending table appears as Table 3 on the Totsp page in MGM2 workbook.

Table 5. Sample Direct Effects Table , MGM2 output.

Sector/Spending category	Direct Effects			
	Direct Sales \$000's	Jobs	Personal Income \$000's	Value Added \$000's
Motel, hotel cabin or B&B	129,998	3,754	37,730	57,336
Camping fees	10,361	299	3,007	4,570
Restaurants & bars	96,130	3,388	30,272	42,170
*Groceries, take -out food/drinks	951	5	130	256
*Gas & oil	1,645	1	76	205
Other vehicle expenses	-	-	-	-
Local transportation	-	-	-	-
Admissions & fees	33,949	1,128	11,672	19,098
*Clothing	307	5	44	53
*Sporting goods	69	1	19	36
Gambling	-	-	-	-
*Souvenirs and other expenses	148	2	33	58
Retail Trade	50,862	2,028	25,946	40,526
<u>Wholesale Trade</u>	<u>3,921</u>	<u>55</u>	<u>1,574</u>	<u>2,681</u>
Total	328,342	10,667	110,505	166,988

* indicates a manufacturing sector. For these sectors, the impacts represent local production of goods bought by visitors. Retail and wholesale margins, accumulated across all goods bought at retail, are reported in the retail and wholesale trade sectors.

The direct effects table is reported as Table 1 on Summary Page of MGM2 workbook.

The disaggregation of spending lets the MGM2 model apply distinct ratios for each sector. Inspection of Table M shows that these ratios can vary quite a bit from sector to sector. The sector-specific approach also yields much more detailed estimates of the direct effects than is possible with more aggregate multipliers. For example, estimates of the specific contribution of park visitors to hotels and restaurant sales in the region may be compared with total sales in these sectors to assess the park's relative impacts. Local economic data for hotel, restaurant and amusement sectors may be found in data sources such as County Business Patterns, BEA's Regional Economic Information System (REIS), and the 1997 Economic Census. These data are readily available on the WWW (e.g. the Government Information Sharing Project at Oregon State University - <http://govinfo.kerr.orst.edu>).

Total effects

Total effects are estimated in a similar fashion as the direct effects using the total effects multipliers. The total effects multipliers are shown in the right half of the multiplier table (Table M). They represent the change in total sales (respectively income, jobs and value added) across all sectors for each dollar of additional direct sales in a given sector. The MGM2 model does not break secondary effects down into those sectors receiving them. Total effects are therefore reported in the aggregate as shown in Table 6.

Total sales = direct sales captured * Type II (SAM) sales multiplier

Total jobs = direct sales captured * total jobs to sales ratio

Total personal income = direct sales captured * total personal income to sales ratio

Total Value added = direct sales captured * total value added to sales ratio

Table 6. Direct and Total Economic Impacts of Visitor Spending

Economic measure	DIRECT EFFECTS	Multiplier	TOTAL EFFECTS
Output/Sales (\$ 000's)	\$ 328,342	1.33	\$ 436,212
Personal Income (\$ 000's)	\$ 110,505	1.33	\$ 146,597
Value Added (\$ 000's)	\$ 166,988	1.40	\$ 233,694
Jobs	10,667	1.17	12,521
Total Visitor Spending (\$ 000's)		\$ 405,020	
Capture rate		81%	
Effective spending multiplier		1.08	

The secondary effects may be computed separately by subtracting the direct effects from the total effects in the above table. That is,

$$\begin{aligned} \text{Total effects} &= \text{Direct effects} + \text{Secondary effects} \\ \text{Secondary effects} &= \text{Total effects} - \text{Direct effects} \end{aligned}$$

Secondary sales in the above example is therefore \$108 million = \$436 - \$328. Secondary sales include both the indirect and induced effects. The aggregate sales multiplier reported in Table 6 is simply the ratio of total sales to direct sales ($1.33 = \$436 / \328). This is the aggregate sales multiplier that would have been entered into the old MGM worksheet. In MGM2 it is computed based upon the sales multipliers for each individual sector and the proportion of visitor spending going to each sector.

Two other figures reported in Table 6 are the capture rate and an "effective spending multiplier". The capture rate is the ratio of direct sales to total spending ($81\% = \$328 / \405) in the above example. The effective spending multiplier is the sales multiplier times the capture rate ($1.08 = 1.33 * 81\%$). The effective spending multiplier may be multiplied by visitor spending to yield total sales effects, as it takes into account the capture rate (e.g., using the figures in Table 6, $1.08 * \$405 = \436 million).

Tax effects

Estimation of tax effects of visitor spending is optional in MGM2. As most taxes accrue to the state and federal governments, they are of limited use in evaluating local impacts. MGM2 computes taxes on the direct effects only. Users must enter the applicable sales and income tax rates for the study area. Sales taxes may be entered for each spending category to reflect taxes on each type of item (Table T1). The tax rates for a given spending category are multiplied by estimates of direct sales in the category to estimate tax receipts accruing to federal state and local governments (see Table 7 for a sample output table). Income tax rates are applied to the estimates of direct personal income in Table 5. It therefore only includes taxes on wage and salary income and the tax rate must be an "effective rate" that adjusts for deductions, tax credits, multiple tax brackets, and untaxed income.

Table T1. Tax Impacts of Direct Sales and Income (\$ 000's)

Spending Category	Spending	Tax rates		
		federal	state	local
Motel, hotel cabin or B&B				
Camping fees				
Restaurants & bars				
Groceries, take-out food/drinks				
Gas & oil				
Other vehicle expenses				
Local transportation				
Admissions & fees				
Clothing				
Sporting goods				
Gambling				
Souvenirs and other expenses				
Total Taxes on Spending				
Taxes on Direct Income				

Table 7. Tax Impacts of Direct Sales and Income (\$ Millions)

	Sales	Income	Total
Federal	5	12	16
State	18	1	19
Local	-	-	-
Total	22	13	35

Errors and Assumptions

There are a number of potential sources of error to be aware of when using MGM2 to carry out an economic impact analysis. A number of assumptions must be made both in assembling the inputs to the MGM2 model and also within the MGM2 procedures themselves. Violations of these assumptions can result in errors in the impact estimates. As part of defining the problem, you should have some idea of the amount of error you can tolerate in the estimates. This will depend on uses to be made of the results. Reducing error will generally involve additional costs in time and data gathering that should be weighed against the benefits of increased accuracy.

As a general rule you should try to balance the errors from different sources and allocate the greatest attention to those elements that will have the largest impact on accuracy. Little is to be gained in fine tuning estimates of spending and multipliers if the visit estimates are subject to errors of 50%. The most important input is the estimates of visits, followed by the average spending figures and distribution of visitors across segments. Multipliers will usually be the least important as they primarily influence the estimates of secondary effects and are generally less variable than either visits or spending. Errors due to multipliers in the past has been due more to misuse than technical errors.

There are two primary sources of error in the MGM2 model:

(1) Errors in inputs. As impact estimates are basically a product of visits times average spending times multipliers, errors in any of the three primary inputs will produce errors in the results.

- **Errors in the visit estimates** may result from faulty counting procedures, double counting or missing certain types of visitors, and errors made in converting from visits to party nights in the area. Handling of park re-entries and other ways in which visitors may be counted more than once during a stay in the area are a potentially significant source of error. In some cases, segment shares will be difficult to estimate. Errors in allocating visits to segments will be less serious than errors in overall visit figures, so we encourage parks to make their best estimates of segment shares. Any consideration of the fact that different visitors have distinct spending patterns and impacts will be better than none. Segment shares are important in generalizing spending data from one park or region to another, as differences in the mix of visitors attracted will help capture an important source of variation.
- **Errors in spending averages** depend on the source of spending data. The usual measurement and sampling errors in any visitor survey will be present to varying degrees in visitor spending surveys. As there is considerable individual variation in spending, sampling errors can be quite large. The segmentation approach helps reduce this variation by grouping visitors with similar spending patterns. Nevertheless, it is quite common for standard deviations for spending to be greater than the average. This means that sample estimates will be subject to sampling errors of 20% or more for sample sizes of 100 (based on a 95% confidence interval). A number of measurement and data processing errors can also affect estimates of spending from visitor surveys. For these reasons, visitor surveys may not always yield more reliable estimates than judgment or other methods. By combining spending averages from many studies, the MGM2 profiles will tend to reduce survey-related errors, but the procedure essentially replaces these errors with potential generalization errors.
- **Generalization errors** . When adapting spending estimates from one park or region to another, errors are introduced if the estimates do not apply well to the intended application. Whenever the generic or custom spending data sets in MGM2 are applied to a particular park, generalization errors are possible. These are controlled by careful choice of an appropriate set of generic profiles and efforts to adapt or adjust them to the particular application. The accuracy/validity of the final estimates rests on the judgment of the analyst, accuracy of any supporting data used to make adjustments (like local room rates), and errors in the original generic profiles.

- **Errors involved in the choice of multipliers** involve similar issues as the spending choices. If using generics, errors will depend on how closely the generic multipliers represent the intended region. Our analysis indicates that errors due to the chosen multipliers will generally be between 5 and 10%, if the appropriate generic set is selected. These errors are not unreasonable given that multipliers can vary by this amount between different regional economic models of the same region. When a custom set of multipliers for the region is available, errors in this same range are likely, due to errors inherent in input-output models (see Technical report -Part 4 for further details).

(2) Errors due to MGM2 and regional economic model assumptions. There are a host of other potential errors resulting from technical assumptions in the MGM2 model and the regional economic models from which multipliers are derived. We briefly mention these here. MGM2 and regional models are basically linear. Doubling of visitors or spending will double all of the impact measures, assuming no change in the mix of visitors or patterns of spending across sectors. Multipliers are based on models that assume linear production functions, so that doubling spending will double jobs. Production functions are national averages that do not fully account for regional variations in technology. Regional models are based on a given sectorization of the economy that assumes that all firms in the sector produce an identical product using the same technology or production function. IMPLAN model sectors will often not line up exactly with visitor spending categories. For example, camping is lumped with hotels in the economic accounts, even though the production function for campgrounds will be quite different than for hotels. The result is that economic ratios for a sector dominated by hotels are applied to campground receipts. While these errors may appear serious, regional economic models are fairly robust. The overall economic impact estimates are generally not very sensitive to these technical assumptions. Violations can, however, yield misleading results if one focuses more narrowly on individual sectors. If one is primarily interested in overall impacts, many of the errors seem to "average out".

In reviewing the earlier MGM model and more generally, applications of economic impact analysis to recreation and tourism, we identified four primary technical sources of error to address in the MGM2 model:

1. Visitation data. We feel the visit data is usually the greatest source of error in estimating economic impacts of visitor spending, whether due to unreliable visitor counts, multiple counting of visitors, optimistic projections of visits, or a unit of analysis not very suitable for economic analysis. As park visit data is gathered for other reasons, it has tended to focus on entries to the park rather than trips to the region. MGM2 recommends visits be measured on the basis of party nights in the area. This captures time spent in the area. The MGM2 model also helps direct more attention to the visit counts by hopefully reducing time and effort necessary to choose spending averages and multipliers.
2. Capturing differences in spending and impacts across distinct subgroups of visitors. Spending varies considerably between different subgroups of visitors. This can lead to significant errors when spending estimates from one park are applied to another with a very different mix of visitors. Subgroup variations will also cause errors in survey-based estimates if the sample is biased toward one subgroup or another. Samples of park visitors frequently over-represent overnight visitors with longer stays in the area, and under-represent locals. The segmentation approach in MGM2 is designed to reduce these kinds of errors.
3. Failure to margin visitor purchases of goods at retail and exclude production-related impacts for goods not made locally. Many recreation and tourism impact studies that employ "off-the-shelf" multipliers often do not handle retail purchases properly. MGM2 itemizes spending in more detailed categories and carries out the margining steps automatically. The model does assume national margins may be applied and requires users to adjust local production coefficients.
4. Misuse of multipliers. Building multiplier calculations into the MGM2 workbook should reduce errors from misapplication of multipliers. Use of IMPLAN Type SAM multipliers reduces a tendency to over-estimate the induced effects of visitor spending. MGM2 also focuses attention more on the direct effects.

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Chapter 2. MGM2 Software Manual

Introduction

This report explains how to use the MGM2 software. The primary purpose of the MGM2 model is to estimate spending and local economic impacts of National Park visitors. This is carried out in an Excel workbook (MGM2.XLS) that applies visitor spending profiles to the number and types of visitors to a particular park or region. Spending is then applied to a set of economic ratios and multipliers to estimate the direct and total impacts on the local economy in terms of sales, jobs, personal income, and value added. The Excel workbook offers a number of options for entering visits, spending averages and multipliers to reflect a particular park, region and application. All of the computations are automated in the workbook and results are presented in a standard set of tables and charts. Procedures for importing spending and multiplier datasets, and price adjusting spending over time make it fairly easy to extend the underlying datasets as new visitor spending studies are completed and prices and regional economic structures change over time.

Some background knowledge of economic impact concepts and methods is necessary to fully understand and properly apply the software. Concepts and computational methods are covered in the MGM2 conceptual framework (Part 1). Tips on applying the MGM2 models to NPS-related problems are included in the applications manual (Part 3). A basic familiarity with spreadsheets and Excel Version 5.0 or greater is also recommended.

While the basic procedures in the Excel workbook are fairly self-explanatory, economic impact analysis is inherently a complex process. Entering information into the MGM2 workbook and pressing the correct buttons to run the macros is only one half of carrying out an economic impact analysis. The other half is defining the problem and interpreting and communicating the results. If you have a limited background in economic impact analysis, we recommend reading through Parts 1 and 3 of the manual as part of learning the software.

The MGM2 workbook has been designed as a flexible tool that can be used for both "quick and dirty" analyses and also as part of more complex and complete regional economic analyses. The model can be used like its predecessor to estimate impacts of all park visitors. It can also be used to evaluate management alternatives in terms of their impacts on the region's economy. These evaluation applications rest quite a bit on structuring the problem in terms of the subgroups of visitors that will be affected. Like any tool, the more you understand how it works and its assumptions and limitations, the easier it will be to adapt it to different situations. We encourage users to experiment with the model and to apply it to different kinds of problems, as a part of mastering and extending its uses.

Outline of the Manual

We first introduce the MGM2 utilities and discuss how to set up the MGM2 system. The overall structure of the MGM2 workbook is presented along with the basic steps for carrying out an impact analysis. MGM2 procedures are then presented on a page by page basis for each worksheet in the MGM2 workbook.

Versions of MGM2 and Supporting Utilities

The MGM2.XLS Excel workbook is the primary tool for estimating visitor spending and economic impacts. There are a number of companion files and utilities that are designed to work with MGM2.

MGM2 Shortform

We have developed a simpler version of MGM2, termed the MGM2 Shortform. This is available in both a paper and pencil version that can be completed by hand, and an electronic version that makes all the computations. The Shortform offers a more limited set of options. It is therefore less flexible, requires fewer inputs, and generates less detailed outputs. The MGM2 Shortform is a more modest update of the original MGM worksheet. The Workbook version of the Shortform is described in Appendix G and the Pencil and Paper version is given in Appendix H.

MGM2 Utilities - these work with the full MGM2.XLS workbook (not the Shortform)

A number of companion files are included with MGM2 to help users in preparing inputs and as a means of storing custom spending and multiplier datasets for use with MGM2.

- **Spending datasets (*.t12.xls)**: These are small Excel files that store spending data in a form that can be readily imported to the MGM2 workbook. These files have a *.t12.xls file extension. See Appendix C.
- **Multiplier datasets (*.m12.xls)**: These are small Excel files that store multipliers for a given region or type of region. These files have a *.m12.xls file extension. See Appendix E.
- **NPS Visit Conversion routine (npconvert.xls)**: This Excel workbook helps convert NPS visit data to the units preferred in MGM2. Based on NPS recreation visit and overnight stay data for a given park, and a set of conversion parameters (party size, length of stay, segment shares, ..), the number of party nights by segment are computed. The conversion routine has been embedded in the MGM2 Shortform, but is handled as a stand-alone routine with the MGM2.XLS workbook. See Appendix B.
- **IMPLAN Multiplier Extractor (mextractor.xls)**: This Excel workbook will extract the set of multipliers used in MGM2 from any IMPLAN Pro 2.0 model. The multipliers are saved in a format that can directly imported to the MGM2.XLS workbook. See Appendix F.

As new spending and multiplier datasets become available, they can be downloaded from the MGM2 website and used in the MGM2 workbook.

Setting Up the MGM2 System

The MGM2 System is a collection of Excel workbooks. You must have a recent version of Microsoft Excel (Version 7.0 or higher) to run the programs. No installation procedures are necessary. Simply put the main MGM2.XLS workbook and all supporting files and utilities in a common folder to simplify finding them. The files may be downloaded from the MGM2 website in a zipped form (as a complete package) or individually.

Downloading files. You may download files from our MGM2 website at

<http://www.msu.edu/~stynes/npsmgm/>.

Set-up: Copy the MGM2 files into a folder of your choice. If you obtain files in zipped form unzip them and then copy them all to the same directory. We recommend setting up an MGM2 folder and copying all the files there.

Load the Excel Program and Open the MGM2.XLS workbook; You must select the "Enable Macros" option when opening the file for the macros to work.

Structure of the Spreadsheet: MGM2.XLS is set up as a multi-page spreadsheet.

Welcome : an opening screen with links, contact information and basic steps

Spend : Import, enter or edit spending data here

Visits : Enter the number and types of visitors

Totsp : Computes total visitor spending by segment and spending category

Multipliers : Choose multipliers and compute secondary effects

Tax : Computes tax effects (optional)

Summary : Results are presented here

Print-Charts : printing tables and creating and printing charts

Steps for a typical analysis: The Workbook opens at the **Welcome** page, where basic steps are listed. Each set of inputs and outputs are covered on separate pages. You may move from page to page by clicking (left mouse button) the page tabs at bottom of the workbook. In a standard analysis you would proceed from left to right:

1. First choose spending data on the **Spend Page**.
2. Enter visit data on the **Visits page**.
3. Inspect total spending estimates on **Totsp page**
4. Choose Multipliers on the **Multipliers Page**.
5. Enter tax rates on **Tax Page** (optional).
6. Inspect/print results on **Summary Page**.
7. Other printing and charting options are on **the Print-Chart page**.

Options and features: Each page has buttons to automate particular procedures for you. Cells where entries are requested have a yellow background. Sections where you may choose from a set of options (presented as radio buttons) are in green. Other buttons carry out particular functions using Excel macros. These commands automatically paste information into the spreadsheet based on the choices you make. Users knowledgeable with Excel may use any Excel procedure, for example to copy and paste information into cells or print particular pages or tables.

Protections: Pages are protected to avoid accidentally overwriting important formulas or information. Cells where entries are requested are in yellow and are not protected. Users who wish to customize the workbook may unprotect a page to alter formats or add information (Always save a back-up before attempting any changes and DO NOT make any changes that will alter the location of key input or output cells, as these changes could produce errors in the built-in macros). Re-protect pages after any changes. If you want to make notes or set up a scratch area on the workbook, we suggest adding a worksheet and labeling it "SCRATCH" or "NOTES".

The MGM2.XLS WORKBOOK

The MGM2 model is set up as a multi-page Excel workbook. When you first open it you will see eight pages as follows:

Welcome: An opening page that includes credits, links to places where you can get help, and the basic steps for completing an analysis. The basic steps are to 1) choose or edit spending data, 2) enter visits, and 3) select multipliers, 4) enter tax rates (optional) and 5) inspect and print results.

Spend: On the Spending page you choose or edit a set of spending profiles from those provided or your own spending data. A spending profile gives the average amount spent (usually on a per party/per day basis) for a particular visitor segment. The spending data are organized in sets of up to 12 visitor segments that can be used in a given application. Spending data sets are divided into a set of "generic" profiles and illustrative profiles from previous studies at individual parks. MGM2 users may import any of these spending datasets, edit or adjust them to fit the application, or enter spending data from local surveys. There are buttons on the SPENDING page to import the spending datasets and to price adjust spending data to any year between 1990 and 1999. You may also edit the spending data directly on this page or create and save your own spending datasets.

Visits: On the VISITS page, you enter the number of visits, usually in party nights. Users must also indicate the breakdown of these visits by segment. We recommend some variation or subset of the 8 lodging-based segments, although the model can accommodate any segments for which visits and spending are available. The segments for the analysis are implicitly chosen when you select a spending dataset. Segment names from the spending columns are transferred to the VISITS page. You needn't use all segments in the dataset. Enter 0 visits for segments not included in your application. Be sure to enter visits in the same units for which spending is reported. Most of the spending datasets we provide are in party nights, as these are the easiest to subjectively evaluate and they force consideration of length of stay in the area - crucial for spending estimation.

Totsp : Total visitor spending is computed on the TOTSP page by multiplying the number of visits (in each segment) entered on the VISITS page by the spending averages on the SPEND page. Spending is summed across segments to estimate total spending.

Multipliers: Economic impacts are calculated using a set of economic multipliers and ratios for the designated region. Four sets of "generic" multipliers represent different kinds of regions around parks. A button is provided to import multipliers for other custom regions. Impact calculations are carried out in Tables M1 and M2 on this page. Most users will not need to wade into the multiplier details, they can simply select a set generic multipliers that best fit their region and proceed to the results.

Taxes: Taxes accruing to federal, state or local governments are computed based on the estimated sales and income effects. You must enter or edit local tax rates and have the option of including any combination of federal, state, or local taxes. Taxes are only computed for the direct effects. Since most taxes accrue to federal and state governments, taxes are generally not that useful for assessing local impacts.

Summary: Economic impact results are summarized in a single page report. Table 1 reports the direct effects in some detail. Table 2 summarizes direct and total effects including aggregate multipliers. Table 3 reports selected impact measures on a per dollar of visitor spending basis. Table 4 summarizes tax effects.

Print-Charts: A set of buttons are provided for saving the workbook, printing out key tables, and creating charts. The charts may require some editing to clean up overlapping labels or delete unwanted spending categories or segments.

SPEND Page

On the SPEND page you select spending profiles and at the same time a set of segments that will be used in the analysis. This page contains buttons to import generic or custom spending datasets and to price adjust, edit, or save a set of spending data.

Table 1 contains the spending profiles. Spending is itemized in 12 standard categories. There are twelve columns to include separate profiles for up to 12 segments. The default segments are eight lodging-based segments:

- (1) L-Day: local visitors, who live in the designated region
- (2) NL-Day: non-local day visitors (not staying overnight in the local area) ,
- (3) MOTEL-IN: visitors in motel/cabin/lodge inside the park,
- (4) CAMP-IN: campers staying inside the park,
- (5) Backcountry: visitors staying in backcountry sites,
- (6) MOTEL-OUT: visitors in motel/B&B/cabin/rented condo outside park,
- (7) CAMP-OUT: campers staying outside the park, and
- (8) VFR: visitors staying overnight in the area in an owned seasonal homes, with friends and relatives, or other private home

The first row of the table contains important identifying information:

- the unit of analysis in Cell G1,
- the name of the dataset in Cell I1, and
- the year of the spending data in Cell L1.

The segment labels in row three of Table 1 define the segment names. These names appear again on the VISITS page where the number of visits for each segment must be entered. Note that the naming and ordering of segments on VISITS page is the same as on SPEND page.

Table 1. Visitor Spending by Lodging Segment in Local Area

CATEGORY	Natural Resource-based parks		1998		\$ per party per night			
	L-Day User	NL-Day User	Motel-IN	Camp-IN	Motel-OUT	Camp-OUT	Back-country	VFR
Motel, hotel cabin or B&B	0.00	0.00	90.84	0.00	80.26	0.00	4.50	0.00
Camping fees	0.00	0.00	0.00	15.08	0.00	19.53	2.00	0.00
Restaurants & bars	11.28	14.98	32.59	9.27	36.11	11.35	5.80	11.00
Groceries, take-out food/drinks	8.34	5.69	5.52	12.04	6.01	8.31	4.16	11.24
Gas & oil	6.37	7.97	10.19	13.74	12.75	10.65	5.00	8.54
Other vehicle expenses	0.60	0.82	1.80	1.07	1.14	1.17	0.00	0.20
Local transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58
Admissions & fees	3.00	6.00	9.50	4.99	9.12	12.08	3.00	3.39
Clothing	1.25	2.00	4.50	2.90	5.49	6.73	0.96	3.05
Sporting goods	1.12	1.05	1.08	1.13	1.54	0.61	2.54	2.00
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Souvenirs and other expenses	6.15	6.57	9.92	5.47	10.31	12.06	6.04	10.00
Total	38.11	45.08	165.94	65.69	162.73	82.49	34.00	50.00

The spending figures in each column of Table 1 represent the average spending of the given subgroup of visitors, usually on a party night basis. The default table (Table 1 above) is the generic set of medium spending profiles for natural resource-based parks (labeled "parks").

Note that both the total spending and the distribution across spending categories varies by segment. Also note that since the figures are on a party night basis and reported by lodging segment, users can easily replace some values to reflect local conditions, (e.g., local room and campsite rates may be substituted). Similarly, spending in other categories may be adjusted to reflect local prices, spending opportunities, and known visitor use patterns.

Choosing spending data

Several options are provided for selecting the spending averages to be used in a given application. These options may be used individually or in combination:

- Choose one of the six generic spending data sets
- Choose a custom spending data set for individual parks
- Price adjust a spending data set to a different year
- Edit or adjust any of the spending data
- Enter your own spending data

Note that segments are chosen implicitly when you select a spending dataset.

To choose one of the generic spending datasets, simply select one of the buttons in part A at the bottom of page. The corresponding spending data will be copied into Table 1. Three sets of generic spending datasets are provided for natural resource-based parks (labeled "parks" for brevity) and three for historic sites. The "low" and "high" profiles adjust the medium profiles up or down by 30%. These generic spending profiles were estimated from a number of NPS visitor studies conducted over the past ten years. See Appendix C for details about these spending data sets

Import Spending Data

A. Generic Spending Profiles
choose one of the following

Parks	Historic Sites
<input type="radio"/> Low	<input type="radio"/> Low
<input type="radio"/> Medium	<input type="radio"/> Medium
<input type="radio"/> High	<input type="radio"/> High

Select Park Type and Low, Medium, or High Spending

B. Import Custom Spending Profiles

Import Custom Spending profiles

The natural resource-based or "Parks" spending profiles include average spending estimates for the eight lodging segments, while historic site profiles include only four segments (L-Day, NL-Day, Motel and VFR). You may only choose one of these options at a time.

To choose a custom spending dataset, select the "Import custom spending profiles" option in Part B. This will yield a list of available files to choose from. All files with a "*.t12.xls" extension in the MGM2 folder will be listed. (If no files are listed, navigate to the folder where you have placed these files). To import one of the listed files, simply select it and press OK. For example, to use spending data profiles from Mammoth Cave NP, choose the "Mammoth Cave 1998.t12.xls" file. This will replace the spending data in Table 1 with the MACA spending figures (Table 1A). (If you are using Microsoft Excel 2000, you will be given the option of updating the spending file. Answer Yes).

Table 1A. Spending by Segment of MACA Visitors (\$ per party per night, 1998)

CATEGORY	Lodging Segment				
	LOCAL DAY-NL	MOTEL-OUT	MOTEL-IN	CAMP-OUT	
Motel, hotel cabin or B&B	0.00	0.00	77.21	57.81	0.00
Camping fees	0.00	0.00	0.00	0.00	24.30
Restaurants & bars	20.40	22.50	35.54	37.71	11.76
Groceries, take-out food/drinks	7.79	3.59	5.45	6.38	8.37
Gas & oil	6.53	6.43	4.00	8.87	10.24
Other vehicle expenses	1.72	0.49	0.00	0.66	2.28
Local transportation	0.00	0.00	0.00	0.00	0.00
Admissions & fees	14.65	15.34	20.88	20.23	20.32
Clothing	0.58	11.06	5.63	9.96	8.69
Sporting goods	1.11	0.30	0.00	1.20	0.00
Gambling	0.00	0.00	0.00	0.00	0.00
Souvenirs and other expenses	9.03	5.56	9.34	9.85	3.82
Total	61.81	65.27	158.05	152.67	89.79

Locals are visitors from the three county region around the park

Day-NL are visitors from outside the local area, who do not stay overnight in the local region.

Buttons on Spending page let you:

- **Price adjust spending data** to different years : built in price indices will adjust the spending data from one year to another. The year of current spending data is given in cell L1. To price adjust the data, push (left click) the price adjust button, and select the year you want to adjust to. Click OK and the spending data in Table 1 will be adjusted. Cell L1 should now reflect the new year. Distinct price adjustments are made to each spending category using Bureau of Labor Statistics (BLS) price indices. Current indices cover years between 1990 and 1999.
- **Edit spending data** : to edit the spending data in Table 1, press the EDIT button. This will unprotect the yellow cells so you may change any value. Totals at the bottom of columns will adjust automatically. Remember to press the "Press when finished editing" button to re-protect the cells when finished.
- **Save a spending dataset**: if you have price adjusted or edited a spending data set or entered your own data, you may save the file for future use. This procedure saves only the spending data (Table 1) in a form that may be imported back into MGM2. Replace the *name* in the Save as dialog box (*name.t12.xls*) with a name that describes the data, but keep the ".t12.xls" file extension and save the file to the same directory where you have put the MGM2.xls file. This will guarantee that the file will appear in the file list the next time you choose to "import custom spending profile". MGM2 will look for files with a "t12.xls" extension. The MGM2 spending datasets are small spreadsheets with the spending data stored in the format of Table 1, so that they may be readily imported to MGM2.
- **Proceed to Visits page** - once you are satisfied with spending profiles, the next step is to enter visits.

VISITS PAGE

Once you have a suitable set of spending profiles for your application, proceed to the VISITS page to enter the number of visits in Table 2.

Two options are provided to enter the visitation data: Choose the option you prefer in the green cells (row 5). Entering visits as percentages or segment shares is the default. You may switch between the two options at any time. Cells are adjusted based on your selection to unprotect and display the appropriate entry cells in yellow.

Enter as percentages of the total. This option is convenient if you know total visits and are estimating visits for each segment as a percentage of this total. Enter total visits in cell E3 and then enter the percentages (or shares) of this total for each segment in Column C (yellow cells). Be sure to enter percentages using a decimal or % sign, e.g. to enter 50%, you must enter .50 or 50%. If you enter 50 it will show as 5000%. Simply correct it if you make this mistake. Shares should sum to 100% at the bottom of the column. You may use the "Balance Visitor Shares" button to adjust percents to 100%. Be sure to reset total visits in cell E3 after balancing to the desired number of visits.

Enter as number of visits by segment (in party nights). This option may be preferred if you have visit counts for each segment. In this case, enter the number of visits (in party nights) for each segment in Column E. Visits for each segment will be summed to yield the total at the bottom and this total will be entered in cell E3 for you.

Units or Thousands buttons: For applications with more than a million visits, we recommend entering visits in thousands so the results will be more readable and fit within the standard column widths. Select the thousands button if you wish to enter visits in thousands (the units designation at the bottom of table will then show "thousands"). Example: to enter 10 million visits, choose the thousands button and enter 10,000 visits. Select the "Units" button if visits are entered in units. (Note that selecting these buttons does not change the numbers entered, it only labels the units that you have entered.)

It is imperative that the units for spending and visits match. Be sure that visits are entered in party nights if using spending data that is on a party-night basis!! For example, do not enter the number of recreation visits on the Visits page if the spending page has spending on a party night basis.

See the NPSCONVERT.XLS routine for help in converting NPS recreation visit and overnight stay data to party nights (Appendix B). Segments presented on the VISITS page correspond exactly to those on the SPEND page. If you wish to change segments, you must do so first on the SPEND page. Table 2 below is a sample Visits table corresponding to the default segments in the spending table above (Table 1).

Table 2. Visits by Segment

SEGMENT	SHARE	Party-nights
L-Day User	10.0%	10,000
NL-Day User	25.0%	25,000
Motel-In	1.0%	1,000
Camp-In	12.0%	12,000
Backcountry Campers	1.0%	1,000
Motel-Out	35.0%	35,000
Camp-Out	8.0%	8,000
VFR	8.0%	8,000
Total	100%	100,000

TOTSP: Total Spending Page

The total spending page computes spending by spending category and segment by multiplying the number of visits reported on **Visits** page by the average spending per visit from **Spending** page. Spending is computed for each segment and spending category and then summed across segments to yield totals in each spending category and down columns to yield total spent by each segment. The total spending column is the one used in computing impacts. Impacts are not estimated separately for each segment. If you wish to estimate impacts of a single segment, set visits for all but that segment to zero on the Visits page.

Table 3 reports the total spending computed from Tables 1 and 2 above . The 100,000 visitors distributed as in Table 2 with the generic medium park spending patterns spend \$9.2 million dollars distributed across segments and spending categories as shown. Since average spending figures were in 1998 dollars, these totals are in 1998 dollars. This table includes spending by locals. To omit locals, one would set the local segment visits to zero on Visits page.

Table 3. Total spending by Visitors (\$000's)

	SEGMENT						Total
	L-Day User	NL-Day User	Motel-In	Camp-In	Backcountry Campers	Motel-Out	
Motel, hotel cabin or B&B	0	0	91	0	5	2,809	2,904
Camping fees	0	0	0	181	2	0	339
Restaurants & bars	113	375	33	111	6	1,264	2,079
Groceries, take-out food/drinks	83	142	6	144	4	210	747
Gas & oil	64	199	10	165	5	446	1,043
Other vehicle expenses	6	21	2	13	0	40	92
Local transportation	0	0	0	0	0	0	5
Admissions & fees	30	150	10	60	3	319	695
Clothing	13	50	5	35	1	192	373
Sporting goods	11	26	1	14	3	54	129
Gambling	0	0	0	0	0	0	0
<u>Souvenirs and other expenses</u>	<u>62</u>	<u>164</u>	<u>10</u>	<u>66</u>	<u>6</u>	<u>361</u>	<u>845</u>
Total	381	1,127	166	788	34	5,696	9,252

MULTIPLIERS Page

On the multiplier page, you choose a set of multipliers that will represent the given study region. Multipliers (and related ratios) are used to determine the portion of visitor spending that is captured by the local economy (margin of goods bought at retail), to convert direct sales to income, jobs and value added, and to estimate secondary effects. Keep in mind that the multipliers reflect the economy of the region surrounding the park, rather than the characteristics of the park or its visitors.

MGM2 provides several options for selecting multipliers. Users with limiting understanding of multipliers, may select one of the sets of generic multipliers that are provided and can proceed directly to the results. Other options are provided for users who would like to customize or adjust the multipliers. These require a greater understanding of multipliers and how they are used in the MGM2 model. All of the formulas and multipliers are provided on the multiplier page for those who may want to examine multipliers in more detail or further customize the multipliers and calculations. Users with limited experience with multipliers should use the generics or import already prepared multiplier datasets.

1. **Choose a set of generic multipliers.** Four sets of "generic" multipliers are provided. These represent regions of increasing economic diversity and independence ranging from small rural economies to large metropolitan regions. Tables 4 and 5 provide further guidance in choosing generic multipliers to best fit a given application. All multipliers for the four generic regions are reported in Appendix E.

Rural: smaller regions (1-5 counties) with limited economic development

Smaller metro: regions that are mostly rural but include one or more moderate size cities.

Larger metro: regions with populations up to a million.

State: larger SMA's and state or multi-state regions.

2. **Import a set of Custom multipliers:** Choose the "import custom multipliers" button to pick from a list of regions for which multipliers have been estimated. Multipliers have been estimated using IMPLAN for over 100 regions. You may find a region with similar economic characteristics and use the multipliers for that region. See Appendix E for the set of regions for which multipliers are available.
3. **Extract multipliers from an IMPLAN model.** For advanced users with access to IMPLAN Pro 2.0, the MEXTRACTOR.XLS workbook will extract the multipliers used by MGM2 from any IMPLAN Pro 2.0 model. To use this utility you must have access to the IMPLAN Pro 2.0 program and the county data files for the region of interest. See Appendix F for details on how to create custom multiplier files for use with MGM2 from an IMPLAN model.
4. **Manually enter or edit multipliers.** Advanced users may manually edit the multipliers in Table M by unprotecting the sheet and changing any of the values. This procedure is not recommended for users with limited knowledge of multipliers or Excel. Keep a backup copy of the MGM2 workbook before attempting this procedure. You may also adjust the retail and wholesale margins in Table M1 or the local production coefficients (LPC's). Margins are the national averages in all multiplier datasets. The LPC settings increase from rural to small metro to large metro to state models. The LPC settings in the custom multiplier datasets are IMPLAN's Regional Purchase Coefficients (RPC) for the given region.

Some very large metro regions and rural areas with extensive year-round tourism activity experience job to sales ratios somewhat lower than the generic averages. The "Adjust job multipliers" button in row 26 can be used to reduce all job multipliers in Table M by 10%. Changes in job to sales ratios should, however, be based on observed values for the region. Importing multipliers again will restore the original values. Note that job to sales ratios in MGM2 are automatically adjusted to reflect price changes between the year of the spending data and the year of the multipliers (1996). See MGM2 Technical report (Part 4) for further details.

Brief explanation of multipliers

The chosen multipliers are stored in Table M in the MGM2 workbook. Table M below shows the multipliers for a generic rural region. There are eight distinct types of multipliers for 12 economic sectors.

Direct effect multipliers convert direct sales (spending) to the income, value added, and jobs associated with visitor spending in tourism sectors.

Total effect multipliers include the direct effects as well as the secondary effects (indirect and induced) throughout the local economy. Total effect multipliers are expressed as a ratio of total impact relative to direct sales.

Table M. Generic Multipliers for a Rural Region by Sector , 1996^a

Sector	Direct effects			Total effects multipliers				
	Jobs/ MM sales	Personal inc/sales	Value Added /sales	Sales II	JobsII/ MMsales	Income II/ sales	VA II/ sales	Sales I
Hotels And Lodging Places	29.33	0.29	0.43	1.39	36.31	0.42	0.68	1.27
Eating & Drinking	35.52	0.31	0.43	1.32	41.03	0.42	0.62	1.20
Amusement And Recreation	38.51	0.33	0.53	1.34	44.66	0.44	0.74	1.21
Auto dealers and service stations	14.48	0.28	0.44	1.30	19.57	0.38	0.61	1.19
Local transportation	41.60	0.50	0.59	1.32	47.61	0.61	0.78	1.13
Food processing	5.68	0.14	0.27	1.32	10.85	0.25	0.45	1.25
Apparel from purch mate	15.72	0.15	0.17	1.27	19.57	0.23	0.31	1.21
Petroleum refining	0.63	0.04	0.11	1.35	4.56	0.13	0.33	1.29
Sporting goods	8.22	0.27	0.52	1.29	13.00	0.38	0.69	1.19
Manufacturing	10.64	0.23	0.39	1.32	16.11	0.34	0.58	1.21
Retail Trade	37.02	0.51	0.80	1.28	42.26	0.60	0.97	1.10
Wholesale trade	12.51	0.40	0.68	1.28	17.66	0.50	0.85	1.13

a. All Type II multipliers are IMPLAN Pro Type SAM Multipliers

Interpreting multipliers

The entries in the hotel sector row of Table M above are interpreted as follows: In this region, there are 29.33 hotel jobs for every million dollars of direct sales in hotels. Each dollar of spending in hotels yields \$.29 in personal income (wages and salaries in hotels and sole proprietor's income) and a total of \$.43 value added (VA includes personal income plus rents and profits, plus indirect business taxes). For every dollar of direct sales in hotels there is \$1.39 in total sales made up of \$1 direct sales, \$.27 in indirect sales (based on the type I sales multiplier) and another \$.12 in induced sales (total sales effect per dollar of hotel spending = \$ 1.39 = \$1 + \$.27 + \$.12). There are 36.31 total jobs supported by each million dollars in hotel spending (29 direct jobs in hotels and about 7 secondary jobs through indirect and induced effects).

Variation in Multipliers for Different Regions

Table 4. Characteristics of the generic regions

Rural

- Rural regions with low population (below 30,000) and limited economic development.
- Low sales multipliers and higher than average job to sales ratios.
- Representative regions: Pictured Rock NL, Dinosaur NP, Bents NM

Small metro

- Larger rural regions or small metro areas with population up to 500,000. Also some regions with smaller populations that serve as the economic center of the surrounding area.
- Low to medium sales multipliers and medium to high job to sales ratios.
- Representative regions: Redwood NP, Mesa Verde NP, Gainesville MSA (FL)

Large metro

- Medium to larger metro areas with population up to 1,000,000. Also regions with smaller populations that serve as the economic center of the surrounding area.
- Medium to high sales multipliers and medium to low job to sales ratios.
- Representative regions: Rocky Mt. NP, Lassen Volcanic NP, Springfield MSA (MA), Santa Barbara MSA (CA)

State

- State level regions or regions including larger metro areas (populations of 1 million and more).
- High sales multipliers and low job to sales ratios.
- Representative regions: States, Everglades NP, San Diego MSA (CA), Denver MSA (CO)

Table 5 . Multipliers for the hotel sector by generic region

Multipliers	Rural	Small Metro	Large Metro	State
Direct effects				
Jobs/ MM sales	28.88	24.57	20.93	18.02
Personal inc/sales	0.29	0.33	0.35	0.37
Value Added /sales	0.44	0.50	0.54	0.57
Total effects				
Sales I	1.25	1.32	1.36	1.38
Sales II (SAM)	1.37	1.52	1.62	1.70
Total jobs/ \$ MM direct sales	35.24	33.04	30.26	27.41
Total income/ direct sales	0.42	0.52	0.59	0.64
Total value added / direct sales	0.67	0.83	0.93	1.01

Note how income, value added and sales multipliers increase as the region grows in size and economic development. The job multipliers tend to be larger in less developed regions due to a variety of reasons (wage rates, scale economies, and the number of part time jobs). See Appendix E for a complete listing of all generic multipliers used in MGM2.

TAX PAGE

Tax computations are optional. The tax page is included since taxes were a part of the original MGM model.

MGM2 only computes taxes on the direct sales and income associated with visitor spending.

Taxes are computed in Table T1 by applying applicable tax rates to the sales and income estimated in the model. Enter the applicable federal, state, or local tax rates you wish to include in the shaded area. Sales taxes should be entered per dollar of sales. Income tax rates must be an adjusted rate that reflects typical deductions, tax credits, and distributions across tax brackets. The sales and income tax rates should yield tax collections when multiplied by total sales and income in the model.

Table T1. Tax impacts of Direct Sales and Income (\$000's)

Taxes on Spending	Spending	Tax rates			Tax Collections			Sales Tax
		federal	state	local	fed	state	local	Total
Motel, hotel cabin or B&B	3,385		6%	2%	-	203	68	271
Camping fees	-				-	-	-	-
Restaurants & bars	2,381		6%	2%	-	143	48	190
Groceries, take-out food/drinks	526				-	-	-	-
Gas & oil	931		12%		-	112	-	112
Other vehicle expenses	-				-	-	-	-
Local transportation	-				-	-	-	-
Admissions & fees	958		6%		-	57	-	57
Clothing	516		6%		-	31	-	31
Sporting goods	153		6%		-	9	-	9
Gambling	-				-	-	-	-
<u>Souvenirs and other expenses</u>	<u>1,197</u>		<u>6%</u>		<u>-</u>	<u>72</u>	<u>-</u>	<u>72</u>
Total Taxes on Spending	10,048				-	627	115	742
Taxes on Direct Income	2,685		3.4%		-	91	-	91
Total Direct Taxes					-	718	115	834

Table T1 above shows a sample tax calculation based on about \$10 million dollars of visitor spending. This scenario does not compute any federal taxes. The state has a 6% sales tax that covers most goods and

services. The gas tax reflects both a flat per gallon tax plus a 6% sales tax. Note that the per gallon fuel tax must be converted to a percent of sales using an average fuel price.

Most sales and income taxes are levied by state and federal governments. These do not accrue directly to a local region and therefore are not particularly relevant to a local impact analysis. Very few taxes related to visitor spending accrue to local governments. Some areas may have a local sales tax or a local room or restaurant tax. Otherwise, the tax computations are of limited use in assessing local economic impacts.

There are a number of complications in estimating tax effects, that preclude fully automating tax effects in MGM2. Users must judge whether the tax computations are worth the additional effort to identify the appropriate rates to enter in MGM2. For example, different sales tax rates often apply to different items, and fuel taxes are on a per gallon vs. per dollar of sales basis (these must be converted to a per dollar basis using the current fuel price for use in MGM2. If the region surrounding a park encompasses multiple taxing authorities with different rates, rates for different areas must be averaged (weight by an estimate of the share of visitor spending each area receives).

Income taxes pose additional complexity due to multiple tax brackets and a variety of deductions. MGM2 requires an "effective income tax rate", which adjusts for deductions and averages across tax brackets. The "effective income tax rate" should yield actual tax collections when multiplied by total income. The effective income tax rate will be 20-40 percent less than the reported rate. For example, Michigan has a flat 5% income tax rate. The effective rate after adjusting for various deductions and tax credits is about 3.4%.

For these reasons, the MGM2 tax page is optional and may be skipped without affecting the other computations. Users who wish to develop tax rates for a particular area may find up-to-date state and federal tax rates at the following web sites:

Fuel taxes by state from the American Petroleum Institute: <http://www.api.org/consumer/fueltax99.htm>

Fuel taxes from Federation of Tax Administrators: http://www.taxadmin.org/fta/rate/motor_fl.html

Federal Tax Administrators home: <http://www.taxadmin.org/>

State tax rates and collections from the American Tax Foundation :

<http://www.taxfoundation.org/statefinance.html>

Census Bureau tax data for 50 states: <http://www.census.gov/ftp/pub/govs/www/sttax98.html>

Consult local units of government for any taxes that may apply to visitor spending in an area.

SUMMARY Page

Results of the economic impact analysis are summarized in a series of tables that may be conveniently printed or copied into a report or presentation. Tables 1-3 below illustrate the summary output tables. Figures are for the generic medium park example above with 100,000 party nights. (i.e., Spending averages in Table 1 , visits from Table 2 and the rural region multipliers in Table 4.)

Direct effects

Direct effects are reported by sector/spending category in terms of sales, jobs, personal income, and value added.

Sales are the direct sales in businesses receiving the visitor spending. Note that MGM2 computes retail and wholesale margins on goods bought by visitors and applies a local production coefficient to estimate the portion made locally. Direct sales is therefore less than visitor spending, as only the margins for most goods that visitors buy at retail are attributed to the local economy

Jobs are an estimate of the number of jobs supported by these sales. Jobs are not full time equivalents.

Direct jobs in each sector are computed by multiplying the direct jobs to sales ratio (expressed in jobs per million sales) times direct sales.

Personal income is the income resulting from the direct sales. Personal income includes wages, salaries, proprietor's income, and employee benefits. Direct income is computed by multiplying the direct income to sales ratio times direct sales.

Value added includes personal income plus rents, profits and indirect business taxes. Direct value added is computed by multiplying direct sales times the direct value added to sales ratio.

Table 1. Economic Impacts of Visitor Spending : Direct Effects

Sector/Spending category	Direct Effects			
	Direct Sales \$000's	Jobs	Personal Income \$000's	Value Added \$000's
Motel, hotel cabin or B&B	2,904	81	843	1,281
Camping fees	339	9	98	150
Restaurants & bars	2,079	70	655	912
Groceries, take-out food/drinks	34	0	5	9
Gas & oil	54	0	2	7
Other vehicle expenses	92	1	26	40
Local transportation	5	0	2	3
Admissions & fees	695	22	239	391
Clothing	5	0	1	1
Sporting goods	3	0	1	1
Gambling	-	-	-	-
Souvenirs and other expenses	2	0	1	1
Retail Trade	1,043	40	532	831
Wholesale Trade	-	-	-	-
Total	7,256	224	2,405	3,628

Total Effects

Total effects are reported in a more aggregate form, as shown in Table 2 below.

Table 2. Direct and Total Economic Impacts of Visitor Spending

Economic measure	DIRECT EFFECTS	Multiplier	TOTAL EFFECTS
Output/Sales (\$ 000's)	\$ 7,256	1.33	\$ 9,655
Personal Income (\$ 000's)	\$ 2,405	1.33	\$ 3,207
Value Added (\$ 000's)	\$ 3,628	1.41	\$ 5,112
Jobs	224	1.18	264
Total Visitor Spending (\$ 000's)		\$ 9,252	
Capture rate		78%	
Effective spending multiplier		1.04	

The Direct effects column of Table 2 is the total across all sectors from Table 1. The "Total effect" column is the sum of direct effects plus indirect and induced effects. The aggregate multipliers reported in Table 2 are the ratios of total effects to direct effects.

The \$ 9.252 million in visitor spending yields \$7.256 million in direct sales (capture rate of 78% is the ratio of direct sales to visitor spending) and \$9.655 million total sales. The ratio 9,655/ 7,256 is the sales multiplier (1.33). The effective spending multiplier is the sales multiplier times the capture rate. This number may be multiplied by visitor spending to obtain the total sales effect.

Marginal Effects

Since regional economic impacts are estimated with linear models, it is quite easy to estimate impacts associated with different scales of activity. Doubling of visits will double the spending and all impact measures, as long as the mix of visitors and average spending per visit are unchanged. Table 3 on the Summary page reports the impact measures per thousand dollars of visitor spending and per 1,000 party nights. These figures may be applied to marginal changes in spending or party nights to quickly estimate impacts.

Table 3. Marginal Impacts per \$1,000 of spending or pe 1,000 party nights

	Change per \$1,000 of visitor spending	Change per 1,000 party nights
Direct personal income	\$ 260	\$ 24,048
Direct value added	\$ 392	\$ 36,276
Direct jobs	0.024	2.24
Total personal income	\$ 347	\$ 32,067
Total value added	\$ 552	\$ 51,117
Total jobs	0.029	2.64

Tax Effects

Tax effects are summarized in Table 4 if applicable tax rates are entered on the Tax Page.

Print-Charts Page

This page has buttons that automate saving, printing and charting features of Excel.

1. **SAVING THE WORKBOOK** : Use this button to save the MGM2.XLS workbook itself with whatever data entries, choices or customization you have added. A new file name - YOURNAME.xls is presented to guard against saving over the original MGM2.XLS workbook. You may change "YOURNAME" to any valid file name other than MGM2. Keep a back-up of the original MGM2.XLS in the event you accidentally overwrite it.

2. **PRINTING RESULTS**: The more useful MGM2 tables may be printed using buttons on this page.

- Spending: Table 1 (averages) and Table 3 (Totals)
- Visits : Table 2
- Multipliers: Table M
- Summary : Direct effects, Total effects, Marginal Impacts, and Tax Impacts (Tables 1-4 on Summary page)

3. CREATE OR PRINT CHARTS:

Several charts summarizing the spending and visit information may be created and printed here. Charts may require some editing for overlapping labels or to delete unwanted spending categories and segments.

References

Alward, G. and Lindall, S. 1996. Deriving SAM multiplier models using IMPLAN. Paper presented at 1996 IMPLAN user conference.

MIG, Inc. 1999. IMPLAN Professional, Version 2.0. Users Guide.

Sullivan, J; Hite, M. Gericke, K., and Grow, Y. 1993. Assessing economic contributions from National Park Service units; A handbook. Blacksburg, VA: College of Forestry and Wildlife Sciences, Virginia Polytechnic Institute and State University.

USDI, National Park Service. 1995. The Money Generation Model. Denver, CO: Office of Social Science, Socio-economic Studies Division.

Chapter 3. MGM2 Applications Manual

Before opening the MGM2 workbook and entering spending and visit data, one should first clarify the nature of the problem being addressed. This will include identifying the intended uses and users of the results. In the first part of the applications manual, we review the basic steps for defining problems for regional economic impact analysis. The first question to raise is whether an economic impact analysis or some other type of analysis is needed. We briefly discuss differences in using MGM2 to estimate impacts of all park visitors vs. to evaluate a particular management action. We then present ten basic steps for carrying out the analysis with the MGM2 workbooks.

In the second part of the applications manual, we provide examples to illustrate how typical problems or types of applications are handled using the MGM2 workbook.

The examples include:

1. A typical analysis of the impacts of all visitors to a natural resource-based park.
2. A typical application to a historic site.
3. Use of MGM2 to evaluate management alternatives.
4. Handling situations involving multiple parks and trips with multiple purposes

Do I Need an Economic Impact Analysis?

An economic impact assessment will trace changes in economic activity resulting from some action. Be certain that changes in economic activity within a given region are an important element of your problem before considering an economic impact analysis. NPS programs are designed to protect natural and cultural resources as well as to provide for their use and enjoyment. Only programs that will result in significant changes in the number and kinds of park visitors and/or their spending should be evaluated in terms of their local or regional economic impacts. Benefit cost analysis and other economic analysis tools are more suitable for evaluating the direct benefits to visitors (consumer surplus) or the non-use values associated with resource protection (See Sullivan et. al. 1993).

Before launching an economic impact analysis (EIA), determine if you really want/need an economic impact assessment or something else? An EIA by itself will not predict changes in recreation use and will not measure benefits (willingness to pay) to visitors. Economic impact assessment procedures do not assess efficiency and also do not generally produce estimates of the fiscal costs of an action, for example, the additional costs to local government (police, fire, highways) to serve a given number of visitors. For many problems economic impact analysis will be part of a broader analysis. Environmental, social, and fiscal impacts are often equally important concerns in a balanced assessment of impacts. These issues are NOT covered by a standard economic impact analysis.

An economic impact analysis provides a snapshot of the regional economy at one point in time. It reveals the interrelationships among economic sectors and provides estimates of the changes that will take place in an economy due to some action. For recreation and tourism, an economic impact assessment generally estimates the changes in sales, income and employment that will result from changes in recreation and tourism activity in an area. Make sure that this kind of assessment will be useful to you in making a decision, preparing a plan, evaluating a program, or understanding your problem better.

Defining The Problem -- Two basic uses of MGM2

Once you have determined that an assessment of economic impacts is an important element of your problem, you may proceed with a more complete definition of the problem. There are two basic kinds of problems that the MGM2 model is designed to handle.

1. Estimating economic impacts of all park visitors in a given year. The most common use of the MGM model to date has been to estimate overall impacts of visitors to a particular park in a given year. Visitors from the local region are usually excluded in this analysis as they often do not represent "new dollars" to the local area.

2. Evaluating the economic impacts of a proposed action or management alternative. Evaluation of alternatives is what economic impact analysis is designed to do. In this case, one must define the action or alternative to be evaluated and estimate the change in visitors and spending due to the action. Changes in use and spending should be estimated **with vs. without** the action (alternative) to obtain impacts that are clearly attributed to the action (alternative).

Many of the refinements to the MGM model are designed to make it more applicable to evaluation problems. Estimates of overall visitor spending or impacts for a particular park contribute to an understanding of the overall role and significance of the park in the region's economy. The results of such studies have been used more for public relations than to evaluate any particular decision.

It is instructive to ask what action or decision an overall park economic impact analysis may be evaluating. Such analyses could be applicable to decisions of whether to establish a National Park, or to assess the impacts of opening or closing the park to visitors. In these cases, one would want to identify how many visits to the region would be lost or gained due to the presence or absence of the park. In many cases, not all visitors would stop coming to the area, but in the absence of the park many visits would not be made or the spending and behavior patterns of visitors to the area would be altered.

Two kinds of economic impact analysis may be distinguished. In previous papers we have termed these "significance" and "impact" analysis (Stynes and Propst, 1992).

Significance analysis identifies the overall contribution of visitor spending to the region. How much of the sales, income and jobs in the area are associated with visitor spending? No attempt is made here to use a with vs without framework. All spending of park visitors associated with their visit to the park, including spending by both local residents and tourists can be included.

Impact analysis identifies the changes in economic activity within the region that results from some action. The spending and related economic activity included in an impact analysis rests on a clear **with vs without** framework. Only spending that would not otherwise have occurred in the region should be counted.

The typical applications of the Money Generation Model to date fall in between these two types of analysis. Many are not a full "significance" analysis as visitors from the local area were usually excluded. Spending by visitors from outside the region has usually been included, although the methods employed may not have captured all of their spending in the region. Recommended MGM spending figures only included food and lodging expenses and the focus on park visits and time spent in the park would tend to exclude spending on extra days in the area.

Significance and Impact analyses provide clearer criteria for deciding which spending should be included or not in an analysis:

Significance analysis: include all spending by all visitors that can be associated with the park visit. One would still exclude a stop off by a local resident on the way home from the park to buy groceries for the week. Also, not all spending by tourists who visit the park, may be "associated with" the park visit. For example, if a traveler in the area on business or to visit friends or relatives takes a few hours to visit the park, only the spending for this visit should likely be associated with the park.

Impact analysis : here the criteria for inclusion are even more clear. The rule is whether or not the spending would have been made without the action or management alternative being evaluated. If the action is closing the park to visitors, then one must assess changes that would result. Would local residents still spend the money associated with visits to the park in the local area (on visits to other local parks, or going to a movie) or would they instead take trips to visit parks outside the region? The latter would represent a loss to the region. Visitors from outside the region fall into two groups. Some would not travel to the region at all if the park were unavailable, in which case all of the money they spend on such trips would be lost to the region. Others may still come to the area, but might visit the area less often, alter their length of stay or change their spending patterns in the region. In an impact analysis one would count the marginal changes in spending of these visitors attributable to the closing of the park.

General Steps in Applying the MGM2 Model to a Problem

There are ten steps that will be common to most applications. These are listed below and then discussed briefly.

1. Define the problem and identify uses and users of the results.
2. Identify a set of visitor segments based on following considerations:
 - a. Segments explain differences in spending
 - b. Segments respond differently to management/policy actions
 - c. You can estimate average spending for each segment (step 3)
 - d. You can estimate visits by each segment (step 5)
3. Define the study region.
4. Estimate spending averages for each segment (on a party night basis)
5. Decide which segments and spending to include in the analysis
 - a. Local visitors ?
 - b. Attribute the visit and spending to the park or action being evaluated.
6. Estimate visits in party nights
 - a. Impacts of existing visits – convert Public use reports using npsconvert.xls
 - b. Evaluate an action – estimate change in visits by subgroup due to the action (with vs without).
7. Choose multipliers based on the characteristics of the region's economy
8. Enter visits, spending and multiplier selections on the MGM2 Workbook
9. Inspect results on Summary Page
10. Interpret and communicate the results

Step1. Define the problem. Are you estimating impacts of all park visitors or evaluating a particular action or management alternative? Conducting a significance or impact analysis? Who will use the results and how? What are the interests of local partners and stakeholders in the study? Answers to these questions can help define and structure the problem,

If conducting an evaluation, begin by clarifying the action or management alternatives to be evaluated. MGM2 can be used to evaluate the economic impacts of virtually any action that can be translated into changes in economic activity brought about by changes in recreation and tourism activity. Typical actions for which recreation/tourism impacts are estimated include:

- a. Opening or closing a park, road, campground, recreation area, hotel, visitor center or tourist attraction.
- b. Changing the size or quality of any of the above in a way that would affect visitation and economic activity in the area.

- c. Any change in policy that would affect the number or types of visitors, for example, a change in products and services offered, changes in pricing or promotional strategies, restrictions on types of recreation uses, or expansion/restriction of off-season uses.
- d. Any other action that would affect the amount or types of recreation/tourism activity in an area.

When evaluating a particular management alternative, the action must be defined precisely enough to be able to estimate the changes in the number and types of visitors to the area and/or their spending patterns. Whether the analysis should include all visitors, only non-residents, or only a particular activity subgroup depends largely on which changes in visitors or their spending can be attributed to the action being evaluated.

Step 2. Identify a set of visitor segments. Segments play a very central role in the MGM2 model, so careful consideration should go into choosing a set of subgroups of visitors for the analysis. Segments will be used to help explain differences in spending and to assess which subgroups of visitors will be affected by a particular action. To carry out a segmented analysis in MGM2 you must be able to a) estimate a spending profile for each segment, and b) estimate the number of visits or the change in the number of visits (party nights) by each segment.

There are many ways to divide visitors into subgroups, but some will be more useful for conducting an economic impact assessment than others. If visitors who camp inside the park spend the same as those who camp outside the park, then you may not need to identify two distinct camping segments. This separation may, however, still be helpful in estimating visits, as the park overnight stay figures only cover those camping inside the park.

Visitors could be divided by activity, origin regions, length of stay, trip purpose, transportation mode and a host of other factors. We have generally found lodging types to be the most useful for economic analysis as spending is closely related to lodging type and many parks or local tourist organizations have some visitor count information broken down by lodging. Local room and campsite inventories provide a basis for estimating overnight stays in the area, even when visitation statistics are limited (e.g., apply an assumed occupancy rate to lodging inventories to estimate party nights).

After some experience with the MGM2 model, you will find many ways that the choice of visitor segments can help to facilitate the analysis.

Step 3. Identify the study region. Perhaps the most important, yet often neglected part of a recreation and tourism impact assessment is the definition of a study region. You must identify the region or regions of concern before you can carry out an economic impact assessment. The region defines the area for which impacts are desired, as well as the portions of visitor spending that are relevant. An impact assessment evaluates the impacts on households, businesses, and organizations within the given region. Spending that visitors make outside of a study region either at home or along the way are not included in assessing impacts of spending on the designated region. Similarly, businesses that directly or indirectly benefit from visitor spending within the region are included only if they lie within the region. The definition of the region influences what direct visitor spending should be included in the analysis, as well as what secondary effects will be counted.

The choice of the region is not explicit in MGM2, but enters in several subtle ways.

- a) The region defines which visitors are considered local or not. Local visitors live within the study region.
- b) The region defines which visitor spending should be included in the spending profiles.
- c) The region determines the multipliers to be used to compute secondary effects. You select a set of multipliers based on the size and characteristics of the region.

The multipliers we provide in MGM2 are derived from IMPLAN (MIG, Inc. 1999), which defines regions by combining counties. The smallest region you can examine is therefore a single county. Counties may be

combined within or across states up to and including the entire U.S. Key factors to consider in forming a suitable region for a recreation/tourism impact analysis are:

- (1) Origins of visitors (i.e., consumer residences)
- (2) Residential location of the labor force
- (3) Travel corridors
- (4) Locations of recreation/tourism facilities & businesses
- (5) Locations of supporting and service industries

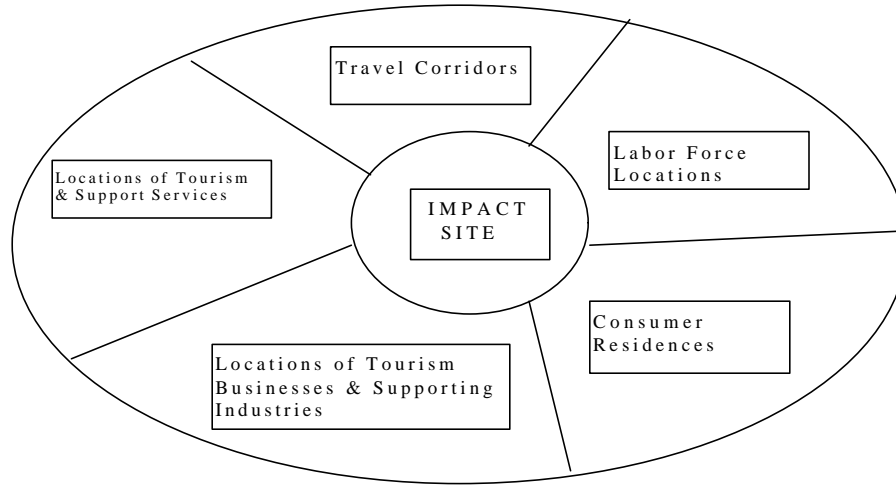


Figure 1. Functional Economic Regions for Recreation & Tourism Analysis

In assessing impacts of tourism it is often useful to separate visitor origins from the destination when defining the region. This helps to distinguish "new" dollars coming into the region (tourist spending) from local resident spending. Secondly, define a viable destination region that includes groups of facilities and sites that a visitor might include as part of a given trip to an area. Thirdly, aim for "functional economic areas" that have a sufficient variety of businesses to be reasonably self-contained. The area should include the primary labor markets and local shopping areas as defined usually by a reasonable commuting distance (Figure 1).

The study area should be centered around the location of the activities whose impacts you are estimating. Thus, an initial definition of the region might be obtained by considering counties falling within a given radius of the site or sites in question. Using a map, identify these counties and then adjust the region based on the five considerations listed above. The larger the region, the more economic activity that will be captured within the model. Thus, the absolute impacts of parks grow as one expands the size of the region. However, as the region grows and includes large metropolitan areas, the relative contribution of a particular park declines significantly, as the impacts are diluted by other economic activity.

4. Estimate the spending patterns of each visitor segment. You must estimate what a typical visitor from each segment spends on a trip to the region. In most cases, we recommend estimating spending on a party day or night basis. Within MGM2 you have the option of selecting from sets of generic spending patterns, importing custom spending data sets, entering data from your own park visitor survey, or adjusting any of the above. Inspect the spending averages you intend to use to make sure they seem reasonable and that they apply to your visitors. See Appendix D for tips on estimating spending profiles.

5. Decide which segments and spending to include in the analysis. You may restrict the spending that will be included in the impact analysis by either omitting or discounting certain visits (party nights) or by modifying the spending profile to reflect expenses to be included. If conducting an impact analysis, local visitors and their spending may be excluded by entering zero visits for locals. The MGM2 Short Form and

the npsconvert.xls routine include entries to identify the portion of visits by each segment to be included in the analysis. If using the MGM2 workbook, these choices are made when you enter the number of visits in party nights on the VISITS page. If you estimate that half of the visits by local residents would otherwise involve trips outside the region, enter 50% for locals to capture half of their visits and spending.

You may adjust the spending profiles in the MGM2 workbook to reflect the spending you wish to include. For example, to avoid double counting when you are also estimating impacts of park operations, you may exclude the visitor spending that accrues to the park in the spending profiles. You may also want to exclude spending not attributable to the park visit for segments who are visiting the region for some other purpose. For example, historic sites are often an attraction for tourists in an area, rather than the primary reason for the trip to the area. Historic site visitors who happen to be staying overnight in the area for other reasons may be treated as day users for the purpose of estimating park spending impacts or they may be defined as a unique segment and only the actual costs of visiting the site may be included in their spending profile (see Example 2).

6. Estimate visits by each segment (in party nights).

If estimating impacts of all visitors to the park in a given year, use the npsconvert.xls routine to help convert recreation visit and overnight stay data to party nights by segment (Appendix B). If evaluating a management alternative or action, you must estimate the anticipated change in visits by segment (see Example 3).

7. Choose multipliers based on the characteristics of the region's economy.

Examine the characteristics of the region around the park, as defined in step 3. Based on the geographic size of the region, its population, degree of economic development, and its economic importance and role in the broader region, choose a set of multipliers. Table 4 in Part 2 of the MGM2 manual provides guidance for selecting from the generic multipliers. If using custom multipliers, find multipliers for the region as defined above or choose those from a region with similar levels of economic development.

8. Enter visits, spending and multiplier selections on the MGM2 Workbook

Enter the visit, spending and multiplier selections on the corresponding pages of the MGM2 workbook by following the procedures described in the software manual. Be sure that visits and spending are in the same units. Enter spending profiles first, as these define the segments for which visits must be entered.

9. Inspect results on Summary Page

Always inspect the results to make sure they are reasonable and all inputs have been correctly entered. Check the spending totals on the **Totsp** Page to verify spending estimates. You may want to compare estimates of sales and jobs attributed to park visitors with the total economic activity in the region. If evaluating an existing condition, jobs attributable to visitor spending should not exceed the number of jobs that exist in the area. The lodging, restaurant and amusement sectors are good ones to check.

10. Interpret and communicate the results

Once you are satisfied with the results, you will want to communicate them to the intended audiences. The format and detail you may want to include will vary with the audience. Tables on the Summary Page of MGM2 workbook present the direct and total economic impacts. In communicating impacts you should begin with the number and types of visits and, if applicable, a description of the alternative being evaluated. The natural sequence of findings is visits, spending, direct effects and finally total effects.

Illustrative Applications of MGM2⁵

EXAMPLE 1: Estimating the economic impacts on the local economy of all visitor spending to a single park in a given year.

We will use Great Smoky Mountains NP (GRSM) to illustrate, using 1998 park visitation data. First, let's assume we have no visitor spending information for the park. The generic high spending profiles are used first, as is, and then with adjustments. We will then show how to import a custom spending dataset for GRSM and explore several additional variations on the problem to illustrate some of the MGM2 features. To become familiar with MGM2 we suggest carrying out the steps below in Excel yourself.

There are four steps:

1. **Choose spending profiles on SPEND Page– choose the generic park high selection**
2. **Enter Visits and segment shares for GRSM in 1998 on the VISIT Page**
3. **Choose Multipliers for the local region around GRSM on MULTIPLIERS – rural generics**
4. **Go to SUMMARY page for the results**

Step 1. On the SPEND Page, choose the generic “high” park spending profile. Due to the high level of tourism activity in surrounding communities, the **high** spending profile is probably the most appropriate for GRSM visitors.

Table 1. Visitor Spending in Party Nights, 1998, National Parks Profile: Generic, High

CATEGORY	L-Day User	NL- Day User	Motel-In	Camp- In	SEGMENT			
					Backcountry Campers	Motel- Out	Camp-Out	VFR
Motel, hotel cabin or B&B	0.00	0.00	118.09	0.00	5.85	104.34	0.00	0.00
Camping fees	0.00	0.00	0.00	19.61	2.60	0.00	25.39	0.00
Restaurants & bars	14.66	19.47	42.36	12.05	7.54	46.94	14.76	14.30
Groceries, take- out food/drinks	10.84	7.40	7.17	15.65	5.41	7.81	10.81	14.61
Gas & oil	8.28	10.36	13.25	17.86	6.50	16.57	13.84	11.10
Other vehicle expenses	0.78	1.07	2.34	1.39	0.00	1.48	1.52	0.26
Local transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76
Admissions & fees	3.90	7.80	12.35	6.49	3.90	11.86	15.70	4.41
Clothing	1.63	2.60	5.85	3.77	1.25	7.14	8.75	3.97
Sporting goods	1.46	1.37	1.40	1.48	3.30	2.00	0.80	2.60
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Souvenirs and other expenses	8.00	8.54	12.90	7.11	7.85	13.41	15.67	13.00
Total	49.54	58.60	215.72	85.40	44.20	211.55	107.24	65.00

⁵ Tables from MGM2 are numbered to be consistent with MGM2 workbook, rather than consecutively.

Step 2: Go to VISITS page. Based on the 1998 NPS Public Use Statistics, GRSM visitation was **9,989,395 recreation visits**. Using the visitation converter (Appendix B), these recreation visits translate into **5,726,264 party nights** spent within 50 miles the park. Based on 1985 and 1996 visitor surveys and park overnight stay data, segment shares were 15% local day users, 5% non-local day users, 1% backcountry users, 55% motel-out, <1% motel in, 11% camp out, 3% camp-in and 8% friends and relatives. Enter these segment shares as percentages, and enter 5,726,264 party nights in cell E3 on the VISITS page. After making these entries the VISITS page should look like this:

Table 2. USER INPUTS: ENTER THE FOLLOWING NUMBERS

1. NUMBER OF VISITS IN PARTY NIGHTS 5,726 ,264
2. VISITOR TYPES : Enter the distribution of visits by segment
3. Space is provided for up to 12 segments. Click on "Balance Shares" if percents do not sum to 100%.

SEGMENT	SHARE	Party-nights
L-Day User	15%	887,243
NL-Day User	5%	299,010
Motel-In	0%	6,334
Camp-In	3%	179,413
Backcountry Campers	2%	94,033
Motel-Out	55%	3,173,182
Camp-Out	11%	650,799
VFR	8%	436,250
CHECK SUM	100.0%	5,726,264

Step 3. Goto MULTIPLIERS Page: For this example choose the generic multipliers for a rural region (these are the defaults - select the "rural" button to choose these). You may now examine the results on the SUMMARY page.

Step 4. See SUMMARY Page for results. Based on these selections, GRSM visitors spent \$852 million in 1998 in the local counties surrounding the park. Furthermore, this \$852 million spending is associated with \$368 million in household income, and 24,000 jobs (full and part-time).

Example 1, Variation 1: Adjusting generic data to fit the park (GRSM)

Upon examining some of the generic data, you conclude that most of the figures look reasonable, but that several changes are needed to improve the accuracy of the generic high spending profile for GRSM. You feel that spending for local day users (\$49.54 per party per day) and motel users inside the park (\$215.72 per party per night) are too high. You feel that the low generic profile for local day users is much more representative of what this user group spends and that the average motel expenditure inside the park needs to be adjusted downward to reflect the amount charged at the park lodge on a per night basis. Furthermore you feel that the remaining "Motel-IN" expenses are too high and that the camping fees need to be adjusted to reflect the actual fees for campgrounds and backcountry users. There are five steps required to make these changes:

Step 1. Begin with the generic high park spending profiles as above..

Step 2. Edit the spending profiles.

- Click the "Edit Spending Profiles" button. This unprotects the spending table and allows you to edit the entries.
- Manually replace the values in the "Local Day User" column with the corresponding low generic profile (in Table C5, Appendix C).
- Replace the per night lodging average of \$118.09 for the "Motel-IN" segment with the actual room rate of \$ 75.00 per night.
- Adjust the remaining "Motel-IN" expenses downward by 10%.
- Change the camping fees for Camp-IN and Backcountry Campers to \$15 and \$10 per party night, respectively.
- When you are satisfied with these adjustments, click the "Press when finished editing" button to re-protect the worksheet.

Step 3: You may save the changes by clicking the "Save spending profiles" button and entering a file name, say GRSMnew.t12.xls. The new table now looks like --

Table 1. Great Smoky Mountains Visitor Spending in Party Nights, 1998, National Parks Profile: Generic, High with Adjustments

CATEGORY	L-Day User	NL- Day User	Motel- IN	Camp- IN	Backcountry Campers	SEGMENT		VFR
						Motel- OUT	Camp-OUT	
Motel, hotel cabin or B&B	0.00	0.00	75.00	0.00	5.85	104.34	0.00	0.00
Camping fees	0.00	0.00	0.00	15.00	10.00	0.00	25.39	0.00
Restaurants & bars	7.90	19.47	38.13	12.05	7.54	46.94	14.76	14.30
Groceries, take- out food/drinks	5.84	7.40	6.46	15.65	5.41	7.81	10.81	14.61
Gas & oil	4.46	10.36	11.92	17.86	6.5	16.57	13.84	11.10
Other vehicle expenses	0.42	1.07	2.11	1.39	0	1.48	1.52	0.26
Local transportation	0.00	0.00	0.00	0.00	0	0.00	0.00	0.76
Admissions & fees	2.10	7.80	11.12	6.49	3.9	11.86	15.70	4.41
Clothing	0.88	2.60	5.27	3.77	1.25	7.14	8.75	3.97
Sporting goods	0.78	1.37	1.26	1.48	3.3	2.00	0.80	2.60
Gambling	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00
Souvenirs and other expenses	4.31	8.54	11.61	7.11	7.85	13.41	15.67	13.00
Total	26.68	58.60	146.58	80.79	51.6	211.55	107.24	65.00

Step 4. On the VISITS Page, enter 5,726,264 party-nights as before and the same segment share percentages.

Step 5. See SUMMARY Page for results. With this scenario, GRSM visitors spent \$831 million in 1998 in the local counties surrounding the park. Furthermore, this \$831 million spending is associated with \$361 million in household income, and 23,000 jobs (full and part-time).

Example 1, Variation #2. Importing a custom set of spending data for the park.

Spending surveys were conducted of GRSM visitors in 1985 and 1996. We will use the spending profiles generated from the 1996 VSP study. This is one of the custom spending datasets included with MGM2.

There are four steps:

1. **Import custom spending data for GRSM on SPEND Page**
2. **Enter Visits for GRSM in 1998 on the VISIT Page**
3. **Choose Multipliers for the local region around GRSM on MULTIPLIERS page**
4. **Go to SUMMARY page for the results**

Step 1: GOTO SPEND Page and Import the GRSM spending data by selecting the "import custom spending profiles" button and choosing the Great Smoky Mountain 1998.t12.xls file. This spending data set has already been price adjusted from 1996 to 1998 dollars. If the spending data files do not appear in the file list when you choose the import button, make sure you have put all the files in a common directory.

Table 1. Great Smoky Mountains Visitor Spending in Party-Nights, 1998

CATEGORY	SEGMENT							
	L-Day User	NL-Day User	Motel-In	Camp-In	Backcountry Campers	Motel-Out	Camp-Out	VFR
Motel, hotel cabin or B&B	0.00	0.00	87.38	0.00	3.65	83.16	0.00	0.00
Camping fees	0.00	0.00	0.00	15.77	1.62	0.00	27.84	0.00
Restaurants & bars	6.98	22.79	36.88	12.08	4.41	46.22	18.75	19.37
Groceries, take-out food/drinks	2.39	9.30	6.47	12.35	3.23	7.39	11.12	6.32
Gas & oil	4.16	14.98	15.08	12.26	3.74	10.92	14.85	10.93
Other vehicle expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Local transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Admissions & fees	1.03	11.68	14.07	6.70	2.45	15.84	14.80	8.70
Clothing	1.44	2.12	9.53	5.29	0.67	8.47	10.58	4.00
Sporting goods	1.11	1.03	1.11	1.11	1.83	1.11	1.11	1.11
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Souvenirs and other expenses	4.61	6.13	13.60	4.57	4.72	25.08	31.44	6.71
Total	21.71	68.02	184.12	70.12	26.33	198.18	130.49	57.13

Step 2-3 : Enter visits and segment shares and choose rural generic multipliers, as above. Note that you must re-enter the visit data as the entries are cleared when a new spending data set is imported.

Step 4. Go to SUMMARY page for the results. Visitors to GRSM spent \$795 million in 1998 in the local counties surrounding the park. Furthermore, this \$795 million in spending is associated with \$342 million in household income, and 22,000 jobs (full and part-time).

You can also try importing a custom set of multipliers. Back on MULTIPLIERS page, choose the "Import Custom multipliers" button. As a custom multiplier file is not available for GRSM, you would need to select one for a similar region (see Appendix E for a list of available multiplier files). If you wish you may choose one of the available files and see how this changes the results. To return to the rural generic multipliers, select them again on the Multiplier page.

Additional custom multiplier files are posted on the MGM2 web site.

More Variations on Example 1

Continuing with the GRSM example, we illustrate some of the other features of the program. These features will begin to illustrate the flexibility and potential of the model. Mastery of the program will take some practice with a range of problems.

Variation 3: Excluding Local Visitors. The old MGM model normally excludes spending by local residents as this spending doesn't represent "new dollars" to the local economy. Locals can be easily excluded by entering zero visits for Locals on the VISITS page. Note that locals accounted for 15% or 887,000 party nights.

Step 1. Goto Visits Page

Step 2. Choose the option at the top to enter visits "as the number of visits by segment (party nights)" Cells in column E should now be highlighted in yellow.

Step 3: Change entry for Locals from 887,000 to 0. (Select cell E8, type in 0 and press ENTER key). Total visits drops to 4,839,021 and shares adjust to this new total excluding Locals.

Step 4: Summary page will now reflect impacts of non-local visitors.

To count some portion of Locals in the analysis, enter some percentage of 887,000 in Cell E8. For example, entering 443,000 would include half of the spending by local visitors.

Variation 4: Estimating impacts of a particular segment. You can also estimate impacts of a single segment by changing the entries on the Visits page. Let's say you only want impacts of visitors staying outside the park in motels. Follow the same steps as in Variation 3 above, but this time enter zero in all cells of Column E except the Motel-OUT segment. Results now are economic impacts of just this one segment. Inspect TOTSP and SUMMARY pages to see the results. Repeat for other segments, if you wish.

Variation 5: Changing the mix of visitors: More generally one can estimate impacts for any mix of visitors defined by the given segments -- simply change the shares or number of visits on the VISITS page, to reflect a given number and mix of visitors. Remember that visits and shares are on a party-night basis here. This feature allows you to estimate impacts of management or marketing actions that may affect only some visitor segments, e.g. adding campground or motel capacity or putting lodging facilities inside or outside the park. Note that segment shares should always add to 100%. The balancing button can be used to adjust for minor rounding errors. Always verify the shares and number of visits are correct before proceeding.

Variation 6: Updating economic impact estimates over time. To update these estimates from 1998 to 1999, one could conduct a new visitor survey, or simply price update the spending data and enter estimates of the number and mix of visitors in 1999. The GRSM visitor spending profile in 1998 dollars may be updated on the SPEND page by selecting the "Price Adjust" button. Choose 1999 from the list and the spending profiles are updated from 1998 to 1999. National price indices for each spending category are built into the spreadsheet to make these adjustments.

New VISIT information for 1999 would be entered on VISITS page. One could assume shares remain the same and only adjust overall visits or change the segment mix, too. Remember visit data must be entered in party nights if the spending profiles are on a party night basis. Multipliers do not change much over time, unless there has been significant change in the structure of the local economy. The MGM2 model adjusts job to sales ratios to match the year for which spending data are reported. Multipliers in this initial version are based on 1996 IMPLAN models.

Variation 7: Estimating impacts on different regions. In some cases one may want impacts on a larger region. Multiplier effects will be greater as the size of the region increases. To estimate impacts of GRSM visitor spending on the state economy, one would replace the local area multipliers with state multipliers. On the MULTIPLIER page you may import the generic state level multipliers or, if available, import

multipliers for the state of North Carolina or Tennessee. One can also test the sensitivity of results to assumptions about multipliers by examining results when different multipliers are used. Note that changing multipliers does not change the direct spending, although it may change direct income and job estimates as income and job to sales ratios vary somewhat from one region to another. Note, however, that the spending profiles generally cover spending in the local area around the park. Changing the multipliers to state ones estimates the impacts of the local spending on the larger region. One could also adjust spending profiles to capture spending in the state that takes place outside the local area around the park (if size of this added spending is known).

Variation 8: Adjusting spending data from one park to another. As not all parks will have conducted visitor spending surveys, MGM2 is designed to assist users in adapting spending information from one park to another. A number of spending profiles are provided from the best data available. A park that has conducted a visitor spending study may enter spending averages for designated segments onto the SPEND page. Appendix D provides illustrations of all of these methods for creating spending profiles.

EXAMPLE 2: Estimating economic impacts of historic sites, The Case of Women's Rights NHP, 1999.

Historic sites and smaller parks pose some unique problems for economic impact analysis. Like many historic sites, Women's Rights NHP attracts primarily day visitors and also visitors who may be in the area for a variety of activities. We recently carried out an economic impact analysis for Women's Rights NHP as part of testing the MGM2 model (Stynes 2000).

The application illustrates:

- 1. How to handle visitors whose primary trip purpose may not be to visit the park.**
- 2. How a more detailed segmentation can help compensate for a lack of spending data.**
- 3. How to avoid double counting when impacts of park operations and visitor spending are estimated simultaneously.**

Background

Women's Rights NHP (WORI) was established by Congress in 1980 to commemorate the 1848 Women's Rights Convention in Seneca Falls, New York. The park preserves the homes of Elizabeth Cady Stanton and other participants as well as the remains of the Wesleyan Chapel, site of the convention. The park is located in Seneca Falls, a historic village in the Finger Lakes region of central New York State. The area includes the Finger Lakes and connecting waterways as well as a variety of historical and cultural attractions within the Seneca Falls Heritage Area. Seneca County has a population of about 30,000. It is within an hour's drive of Rochester and Syracuse and readily accessible from the New York State Thruway. A large factory outlet mall recently opened near the Seneca Falls thruway exit. The park has not conducted a visitor spending survey, but has some estimates of the types of visitors from a prior study.

Step 1: Develop a set of spending profiles for WORI visitors. No local spending studies were available and spending data for historic sites in general were rather thin. We decided to use a combination of previous studies, judgment and an engineering approach (See Appendix D). Spending profiles from other historic sites were examined. As the park gets a significant number of visits from pass through travelers and tourists who are in the area for other purposes, we wanted to attribute only part of their trip spending to the park. Most visitors would be treated as day users to the park, even if staying overnight in the area. The solution was to design some custom segments that helped in identifying which spending would be counted.

Nine different segments were identified ranging from school children on group tours to general tourists to visitors making a short stop off the thruway. These are detailed in Table 1A, where estimates of party size, length of stay and spending per day are also reported. Spending attributed to each segment was based on the characteristics and expected local use patterns of each group.

Distinct spending profiles were developed for each segment using a combination of the generic spending profiles (medium, historic sites) and considerable judgment. Spending averages varied: \$6 per person for school groups, \$24 per party per day for local day users, \$50 per party for day visitors from outside the area, \$40 per party for pass through travelers and general visitors to the Finger Lakes region (spending associated with the visit to WORI), \$133 per party per night for overnight visitors whose primary purpose was to visit the park.

The spending averages count one day's spending for most segments and we assigned a higher spending value for day users coming specifically to visit the park versus those in the area for other purposes or making a quick stop from thruway. General tourists in the area for other purposes were treated as if they were day visitors to park, even if staying overnight in the area (i.e., no lodging expenses were attributed to the park). One night's spending was counted for visitors staying in motels or campgrounds, if the park visit was an important component of the trip. Only visitors coming for special events at the park were assigned a length of stay of more than one night. One important thing to notice in this case is how the length of stay choices combined with spending averages determines the amount of spending attributed to the park. This approach is probably easier and more accurate than estimating all spending in the area for visitors and then deciding a percentage of this to count.

A custom spending dataset was developed and then imported into MGM2.

Step 2 : Estimate visit and shares. The percentage of visitors from each segment was estimated from a previous study at WORI and some of the details in the park Public Use Reports (school groups were counted separately). Estimating overall use was more difficult. The park reports 38,016 recreation visits for calendar year 1999 in its Public Use Report. This figure includes some double counting of visitors at different sites within the park. We therefore used the Visitor Center count of 30,917⁶ visitors, assuming most visitors would stop at the Visitor Center and be counted once there.

Table 1A. Visits and Spending by Segment, Women's Rights NHP, 1999

Segment	Pct of visits	Person Visits	Party size	Days /Nights	Party days	Avg spend per day	Total Spending
Local Day User	6%	1,855	2	1	927	\$24	\$21,973
Nonlocal Day User	18%	5,564	2	1	2,782	\$50	\$139,102
Thruway Visitors	21%	6,624	2	1	3,312	\$40	\$133,309
Gen'l Tourist	25%	7,684	2	1	3,842	\$40	\$153,676
Motel Users	11%	3,444	2	1	1,722	\$133	\$229,191
Friends/Relatives	2%	530	2	1	265	\$48	\$12,663
Campers	2%	583	2	1	291	\$60	\$17,605
Events (overnight visitors)	0.7%	216	1.5	2	289	\$133	\$38,401
<u>School Groups</u>	<u>14%</u>	<u>4,421</u>	<u>1</u>	<u>1</u>	<u>4,421</u>	<u>\$6</u>	<u>\$26,527</u>
Total	100%	30,917			17,852	\$43	\$772,445

⁶ After the study was nearly completed, we determined that there was some additional double counting due to the way figures were entered into the use reporting system. The revised visitation figures for 1999 are 25,167. This reduces all visitor spending and impact totals to 81% of the values reported here.

The estimates of party size and length of stay were applied to recreation visits to estimate party days/nights included in the analysis for each segment. Recreation visits of 30,917 translated into 17,852 party days/nights. Multiplying the visits in party days by average spending per day gave a total visitor spending in the local area (defined as Seneca county) of \$772,000.

Step 3 : Seneca county is a small region with a population of only 30,000 so the generic rural region multipliers were chosen.

Step 4: Inspect Results The \$ 772,000 that park visitors spend in the area has a direct economic impact on the county of about \$600,000 in direct sales, \$211,000 in direct personal income, and \$322,000 in direct value added. Including secondary effects, visitor spending generates total local sales of \$786,000, \$274,000 in personal income for the county, and \$438,000 in value added by the local economy. Visitor spending supports about 19 direct jobs in the local area and 22 jobs with multiplier effects

Spending profiles included an average of \$4.35 per party in purchases at the park gift shop, which is operated by a nonprofit group. When expanded to total visitors, MGM2 estimated sales of \$78,000 in the gift shop, slightly less than the \$94,000 reported by WOR1 for 1999. An advantage of the greater detail in spending categories in MGM2 is that baseline figures like gift shop sales can be used to partially validate the spending estimates. In this case, the gift shop sales figure suggests that visitors are spending about a dollar more per party in the gift shop than we estimated (or the visitation estimates could also be too low).

Avoiding double counting when impacts of park operations are also estimated.

The park was also interested in the impacts of park operations. The direct impact of park operations on the local economy in 1999 includes 11 full time equivalent NPS positions, associated payroll of \$803,028 and \$24,242 in sales to local businesses. We employed a model similar to MGM2 for estimating the impacts of park operations. Total impacts with multiplier effects of park operations in 1999 were 18 jobs, \$364,000 in local sales and \$911,619 in personal income to the region (Stynes, 2000).

If visitor and park operation impacts are added together there will be some double counting. To avoid this, visitor spending that accrues to the park should be excluded when estimating the impacts of visitor spending, as these receipts will be part of park operations. Roughly \$60,000 in visitor spending for park admission fees were therefore omitted before adding in the impacts of park operations.

Combining the regional economic impacts of visitor spending and park operations, the total local economic impact for 1999 of the park (no construction impacts are included) was roughly one million dollars in local sales, \$1.2 million in personal income and \$ 1.4 million in value added. In terms of value added to the local economy, park operations account for 70% of the impact, while visitor spending contributes 30%. Overall, the park supports about 37 jobs in the area, 11 positions in the park, and another 26 in the local community. The latter accrue from direct and secondary effects of visitor spending in the area, the induced effects of park employees who live in the area, and park purchases from local businesses (see Stynes, 2000 for details).

Discussion

There are many cases where not all spending by visitors to a park while in the area should be counted. An economic impact analysis usually attempts to determine what the loss in spending and economic activity would be if the park were closed or otherwise not available. For this reason local visitors are usually excluded, if they would otherwise spend their money in the region on something else. For visitors who come to the area for some other purpose, only the additional spending associated with the park visit should be included. This can be handled in many cases by treating these visitors as day visitors (or even half-day visitors) and only including the portion of their spending in the area attributable to the park visit.

This example also illustrates that park operations can, in some cases, have a larger local economic impact than visitor spending. Most park budgets go mainly to salaries, which are a direct source of income to the region. In the WORI example, the induced effects of park employee spending in the area represented 13% of the total impact.

EXAMPLE 3: Impact of specific policy or management changes, road reconstruction in Glacier National Park.

MGM2 can be used to evaluate the economic impacts of virtually any policy or management actions (real or proposed) that alter economic activity in an area through changes in recreation and tourism activity. We provide an MGM2 analysis for one such action, the reconstruction of the "Going-to-the-Sun Road" in Glacier National Park. *In this example, our primary purpose is to illustrate how management actions affect the mix of visitor segments and how different mixes of visitors, in turn, result in variations in spending.* We are working on additional examples of how to use MGM2 to evaluate management or policy actions and will make them available when they are complete.

Background

Glacier National Park staff are interested in estimating the economic effects associated with two alternatives for reconstructing the Going-to-the-Sun Road, which is typically open from about June to the third week of October.⁷ The first alternative would take 9-10 years at a cost of \$90-100 million. Under this alternative, access to Logan Pass would be provided via a one-lane road with hour-long delays for passing traffic during June through August. Both sides of the pass would be closed after Labor Day. The second alternative would take 4-6 years at a cost of \$70-85 million. Under this alternative, access to the pass would be provided from only the east or the west side, while the other side, in turn, is being reconstructed.

There are six steps for estimating the economic impacts of the two alternatives using MGM2:

1. Go to SPEND Page and import the Glacier spending data
2. Determine the net change in visitation under both alternatives
3. Enter visitation figures for Glacier on VISIT Page and edit segment shares if necessary
4. Choose multipliers for the Glacier area region on MULTIPLIERS Page
5. Go to SUMMARY Page for the results
6. Repeat Steps 3 through 5 for each alternative

Step 1: Go to SPEND Page and import the Glacier spending data, "Glacier 1998.t12.xls" (detailed directions for this step are provided in Example 1 above).

The original VSP data for Glacier included spending for two additional visitor segments: local day users and backcountry users. However, since the sample sizes for these two segments were considered too small to be reliable, they were deleted when the "glacier-98.t12.xls" file was prepared. For local day users, the

⁷ The background and visitation data for this example is taken from Nickerson, N. P. and Nickerson, R. E. (1998). Economic impacts of Going-to-the-Sun Road Reconstruction: Montana and "Glacier Area" Impacts. Technical Completion Report 98-5. Missoula, MT: Institute for Tourism and Recreation Research, School of Forestry, University of Montana.

generic low profile from the MGM2 SPEND Page was deemed more reliable than the Glacier survey data and manually copied into the table (see Variation 1 of Example 1 for how to do this). The generic low profile for backcountry users was not copied as it was assumed that backcountry users would be only minimally affected by either road reconstruction alternative. The modified spending profile was renamed "GlacierRoad.t12.xls" and saved.

Table 1. Glacier National Park Spending per Party-Night, 1998.

CATEGORY	Local Day Users	Non-local Day Users	Staying in Motels	Campers
Motel, hotel cabin or B&B	0.00	0.00	114.97	0.00
Camping fees	0.00	0.00	0.00	13.72
Restaurants & bars	7.90	10.26	59.26	6.04
Groceries, take-out food/drinks	5.84	4.44	6.65	14.23
Gas & oil	4.46	5.22	17.74	8.07
Other vehicle expenses	0.42	0.35	1.18	1.81
Local transportation	0.00	0.00	0.00	0.00
Admissions & fees	2.10	4.08	14.82	7.75
Clothing	0.88	1.07	3.89	2.03
Sporting goods	0.78	1.06	3.85	2.01
Gambling	0.00	0.00	0.00	0.00
Souvenirs and other expenses	4.31	5.36	19.45	10.17
Total	26.68	31.84	241.81	65.83

Step 2: Determine the net change in visitation under both alternatives. Based on the Nickerson and Nickerson (1998) report, the first alternative would result in a loss of about 90,000 visitors (not visits) per year, whereas the second alternative would result in a loss of about 120,000 visitors per year.

Step 3: Enter visitation figures for Glacier on VISIT Page and edit segment shares if necessary. Applying party size (4.2 persons/party) and length of stay (2.7 nights/group) averages from the 1990 Glacier survey to the Nickerson and Nickerson visitor loss estimates, 90,000 visitors converts to a loss of 58,000 party nights while 120,000 visitors converts to a loss of 77,000 party nights. ***In the remainder of the example, the first alternative is analyzed. Repeat these steps for the analysis of the other road reconstruction alternatives.***

Based on park overnight stay data in the 1990 VSP Glacier survey, visitor segment shares were 3% local day users, 32% non-local day users, 34% motel users, and 31% campers. The first road reconstruction alternative would result in:

- Continuous alternating traffic flow in one lane at the work site
- Logan Pass being accessible June-August with hour-long delays expected
- Full road closure after Labor Day
- Full road closures at night all season

Assuming no change to the mix of visitor segments (i.e., the segment shares remain the same under this road reconstruction alternative), the VISITS Page will look like:

Table 2. USER INPUTS: ENTER THE FOLLOWING NUMBERS

- 1. NUMBER OF VISITS IN PARTY NIGHTS** 57,000
- 2. VISITOR TYPES : Enter the distribution of visits by segment**
- 3. Space is provided for up to 12 segments. Click on "Balance Shares" if percents do not sum to 100%.**

SEGMENT	SHARE	Party-Night
NL-Day User	32.0%	18,240
Motel	34.0%	19,380
Camp	31.0%	17,670
L-Day User	3.0%	1,710
CHECK SUM	100.0%	57,000

Step 4. On the MULTIPLIERS Page, choose the generic rural multipliers to reflect the Glacier area region

Step 5. Examine SUMMARY Page for results. Under this alternative, there would be a net loss of \$6 million in visitor spending in the Glacier area region. Furthermore this \$6 million spending loss would result in a decrease of \$3 million in household income, 162 jobs. All of these losses are on a per year basis for the first road reconstruction alternative.

Step 6: Repeat Steps 3 through 5 for each alternative

Example 3, Variation 1. Differential effects of policy change on visitor segments.

Now assume that the first road reconstruction alternative will drastically affect campers but have little or no affect on the other visitor types. In other words, day use (local and nonlocal) will remain the same as these visitors will adjust the timing of their visits, but not decrease overall visitation, to cope with traffic delays. Further assume that motel use will not decline but that campers will shorten their lengths of stay as they realize the difficulties associated with travel through the park (i.e., more campers will camp only on one side or the other to avoid traffic delays and therefore spend fewer nights camping). In short, assume that the loss of 57,000 party nights is attributable entirely to the loss in camper nights. In this case, on the SPEND Page, enter 100% for campers and 0's for the other three segments. The table would then look like:

Table 2. USER INPUTS: ENTER THE FOLLOWING NUMBERS

1. NUMBER OF VISITS IN PARTY NIGHTS 57,000

2. VISITOR TYPES : Enter the distribution of visits by segment

3. Space is provided for up to 12 segments. Click on "Balance Share if percents do not sum to 100%."

SEGMENT	SHARE	Party-Night
NL-Day User	0.0%	0
Motel	0.0%	0
Camp	100.0%	57,000
L-Day User	0.0%	0
CHECK SUM	100.0%	57,000

Examining the TOTSP Page reveals a net loss of \$4 million (versus \$6 million earlier), a 33% difference simply because the mix of visitors affected by the action was changed. The economic effects are similarly lowered when the alternative affects only campers instead of all visitor segments. Examining the SUMMARY Pages would show that the \$4 million spending loss would result in a decrease of \$1 million in household income and 88 jobs. From a purely economic impact standpoint, it would clearly be better to choose an alternative that would result in a decrease in camper nights but little or no effect on the other visitor segments.

EXAMPLE 4: Multi-park situations

MGM2 can be used to estimate the impacts on a region of visitors to a set of parks. The use of the party night as the unit of analysis handles many multi-park situations automatically, as spending is allocated to the locations where the visitor spends the night. If more than one park is visited on the same day, then an adjustment is required to avoid double counting. The two situations are summarized below using two parks, labeled A and B, to illustrate.

1. Parks A and B are "mutually exclusive". In other words, they are far enough apart in distance (e.g., Arches and Grand Canyon) that visitors typically do not visit both in the same day. Furthermore, the local regions impacted by visitor spending do not overlap. The VSP survey for Park A asks visitors to report spending within 50 miles of the park. The VSP survey for Park B asks visitors to report spending within 100 miles of the park. The two parks are far enough apart that the 50-mile zone and the 100-mile zone do not overlap.

In this situation, use MGM2 to estimate impacts for each park separately and then add the two results to obtain impacts for the larger region that encompasses both. It is safe to assume that you have not double-counted visitors or their spending. Since MGM2 requires visitation, and hence spending, to be reported on a "party-night" basis, there is no double-counting as long as groups do not visit both parks during the same day.

2. Groups visit Parks A and B during the same day. This situation is more likely the closer parks are located to one another in distance. For example, it would not be unlikely for a portion of visitors to visit Harper's Ferry NHP and Antietam NB during the same day. For this example, assume that some of these dual park visitors are non-local day users (i.e., live more than an hour from the area and return home the same day) and that some spend an average of one night in the area (camping or in hotels).

To avoid double-counting, one must know the percentage of visitors who visit both parks A and B in the same day. If you do not have this information, discussions with staff at both parks and judgment may be used to develop an estimate. Also, VSP surveys usually ask questions about whether or not the park was one of several destinations on a trip, the amount of time spent at the park versus the total length of the trip and other parks and attractions visited. Data from these questions may also be used to develop estimates of the percentage of visitors who visit other nearby parks the same day.

Assume that the number of visits are distributed as shown in Table B below.

Table B. Partitioning visits and trips in the case where some trips involve visits to both Parks A and B on the same day (hypothetical visitation data).

SEGMENT	Park A Visits	Park B Visits	# Visits in Common	Adjusted Park A Trips	Adjusted Park B Trips	Adjusted Total Trips
Day User	60,000	30,000	20,000	55,000	25,000	80,000
Motel User	30,000	20,000	10,000	27,500	17,500	45,000
Camper	10,000	30,000	10,000	7,500	27,500	35,000
Total	100,000	80,000	40,000	90,000	70,000	160,000
Sum A + B	180,000 Visits			160,000 Trips		

Park A has 100,000 visits annually, Park B, 80,000. Assume 40,000 visits (20,000 visitors) involve visitors who visit both parks on the same day. These 40,000 park visits represent only 20,000 distinct visitors or trips to the area. We can eliminate the double counting by assigning half of these trips to Park A and half to Park B. Eliminating the double counting yields an adjusted estimate of 90,000 trips assigned to Park A and 70,000 to Park B for a total of 160,000 distinct trips to the area.

To estimate the economic impacts on the region of all of these visitors, use the adjusted total trips. If estimates are desired for each park separately, use the adjusted trips for Parks A and B. The sum of these will equal the total. In this case, we have assumed that the spending profiles are the same regardless of whether visitors visit one or both parks on the same trip. This assumption may be relaxed by treating the multiple park visitors as a distinct segment and assigning a different spending profile.

More complex situations involving several parks can be handled in a similar fashion, although the number of combinations to consider increases. The best approach is to treat multiple park visitors as a distinct segment (or group of segments). Park visits across these parks must be adjusted to identify the number of distinct trips to the region by multiple park visitors. A distinct spending profile can then be assigned to this segment.

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Chapter 4. MGM2 Technical Description

Introduction

MGM2 is an update of the National Park Service's (NPS) Money Generation Model (MGM), originally developed by Dr. Ken Hornback over 10 years ago. The purpose of the MGM2 model is to estimate the impacts of NPS visitor spending on the local economy. In the following we will use the acronym "MGM" to refer to the current or original version and "MGM2" for our revision and update.

This technical description of the MGM2 model is written for readers with some familiarity with regional economic concepts, multipliers, and the original Money Generation Model. The MGM2 manuals provide a less technical description of the model (MGM2pt1) and explain how to use the MGM2 Excel workbooks (MGM2pt2). The original MGM model is described further in (USDI, 1995) and at the NPS planning website [Money Generation Model](#). A basic introduction to the application of regional economic concepts to recreation and tourism is provided in Stynes (1997, 1998). A review of the MGM by Duffield et. al. (1997) and our study proposal (Stynes and Propst 1999) provide further background. Our [MGM2 website](#) includes most of the above documents as well as the MGM2 software that can be downloaded.

The MGM has been used primarily in a pencil and paper fill-in form version to estimate the annual economic impacts of all visitors to a particular park. The key inputs in the MGM model were (1) park visits adjusted to omit local visitors, (2) an aggregate average visitor spending figure, and (3) aggregate economic multipliers. The model also included a tax calculation using a taxable income ratio. The model was subsequently extended to estimate impacts of park operations (federal government expenditures) and other non-local spending induced by the park (concessionaire investments, state road construction, etc.). Also, the MGM worksheet was converted to a simple spreadsheet. A summary of the MGM model may be found at the [NPS planning website](#).

MGM2 focuses on estimating impacts of visitor spending. The basic impact equation remains the same:

Economic impacts = Number of Visitors * Average spending per visitor * economic multipliers (1)

MGM2 addresses a number of weaknesses in the original MGM model that are identified in Duffield's (1998) review of the model and our proposal (Stynes and Propst 1999). The most important are:

- (1) Aggregation errors in spending and multipliers
- (2) Weaknesses in the default spending and multiplier values along with limited guidance in selecting appropriate spending values and multipliers for a particular application
- (3) Problems with the recreation visitor day or visit as the unit of analysis for economic analyses
- (4) Perhaps too much focus on secondary or total effects vs the direct effects and more attention to sales and jobs as the impact measures versus income and value added.
- (5) The MGM model was not readily applied to evaluate particular management policies or decisions

The general approach to these problems in the MGM2 is to disaggregate the model, provide spending and multiplier datasets that are specific to NPS applications, replace recreation visit or visitor day with the party night in the area as the appropriate unit of analysis for spending, shift the focus somewhat to the direct effects of visitor spending using income and value added as preferred impact measures, and to tailor the model for use as an evaluation tool.

(1) Aggregation issues: MGM2 disaggregates the three components of equation (1), breaking visitors into distinct segments, spending into distinct spending categories, and multipliers into sector-specific

multipliers. This reduces aggregation error, while also making it easier to adapt model parameters to different kinds of parks, visitors and regions.

Visitors are divided into a small number of "market segments" that have distinct spending patterns. These segments can also be tied more easily to management and policy decisions being evaluated. MGM2 can handle any segments for which visits and spending may be estimated. We recommend a set of lodging-based segments, as these tend to best explain variations in spending. NPS overnight stay data can be used to estimate nights by visitors staying inside the park in lodges, developed campgrounds or backcountry campsites. Day visitors to the park must be separated into day users to the local area and those staying overnight outside the park in motels, campgrounds or private homes. Visitors staying overnight in the local area will spend more money and have greater economic impacts than day visitors.

Spending is divided into 12 spending categories to better capture all visitor spending in the area, to identify which local economic sectors receive the spending, and to be able to match spending with sector-specific multipliers. The default spending data used with the original MGM model covered only lodging and restaurant expenses. Parks lacking visitor spending studies (which is the majority of parks), estimated spending based on state average per night room and restaurant spending of business travelers, as reported by AAA and Runzhiemer. These figures would likely not apply to most NPS visitors. MGM2 uses more detailed and complete spending profiles for distinct visitor segments estimated from surveys of NPS visitors. The disaggregation of spending averages by segment and spending categories makes it easier to adapt spending averages from one area to another, to update spending averages over time using price indices, and to construct reasonable spending profiles using manager judgment or an engineering approach (see below for an explanation of the engineering approach).

Multipliers are disaggregated to a dozen sector-specific multipliers that capture the differences in the multiplier effects of spending in different sectors of the economy. For example, a dollar spent in the lodging sector will have a different impact than a dollar spent in retail trade or amusements. The use of aggregate multipliers in MGM made it impossible to adapt multipliers for different kinds of spending.

(2) Choosing spending averages and multipliers: MGM provided limited guidance for choosing the key inputs, namely, spending averages and multiplier values. Users without local spending data were referred to state AAA or Runzhiemer per night business traveler spending averages for rooms and meals. The aggregate nature of the model made it difficult to adapt either spending or multipliers to particular applications. Given wide variation in the types of visitors and their spending, it is virtually impossible to estimate an overall average without identifying the mix of visitors and their distinct spending patterns. Duffield reports variations in average per visitor per day spending from \$3.33 to \$225 across parks that have conducted visitor spending surveys. These differences clearly indicate that quite distinct kinds of visitors are encountered at different parks. Differences are also due to variations in methods as well as sampling and other kinds of survey errors.

MGM multipliers were generally chosen from a suggested range (e.g. the 1995 MGM manual suggests that the sales multipliers vary from 1.2 to 2.8 with an average of 2.0). In more recent applications, MGM multipliers were subjectively adjusted to local areas from state level RIMS II multipliers for lodging and restaurant sectors (Duffield 1997).

Adapting spending and multipliers to individual parks and applications is the most important and most difficult part of the MGM model. Multipliers are easier to address than spending as variations in multipliers between different kinds of regions surrounding National Parks are smaller than spending variations and more easily explained. By using input-output modeling systems like IMPLAN Pro, multipliers can be readily estimated for any region. However, most NPS analysts will not have direct access to IMPLAN or have a firm grasp of multipliers and their use.

We have therefore developed four sets of "generic" multipliers that can be used to represent regions of different size and levels of economic diversity (below the state level) . These generic multipliers were

estimated using IMPLAN Pro 2.0. Models were estimated for some 114 regions and formed into four groups (development of generic multipliers is described more fully below). With just a basic understanding of the surrounding region's size, population and economic development, MGM2 users may choose one of these generic multiplier sets for a particular application. Users may also pick multipliers from a "comparable" region using one of the 114 regions for which multipliers are provided.

Users with access to IMPLAN data, may also extract multipliers from any IMPLAN Pro model for use with MGM2. The generic multipliers were evaluated by comparing impact estimates with the individual region multiplier values versus the appropriate "generic" multipliers. Our conclusion is that with any reasonable choice of the appropriate generic multipliers, errors from using "generics" are generally less than 5% in estimating sales, income value added or job estimates and rarely worse than 10%.

Explaining differences in spending across different parks and types of visitors proved more difficult. Existing spending information for NPS visitors is fairly thin and confounded by inconsistencies across studies and parks. Of 35 park visitor surveys with spending information, so far we have been able to develop reasonably consistent spending profiles for 4 historic sites and 6 resource-based parks. We have supplemented these with spending results from selected other studies, most notably a large scale survey at 16 U.S. Army Corps of Engineers Projects and several recent general tourism surveys.

MGM2 takes a similar approach to spending as with multipliers. First, we provide actual spending averages and multipliers for several illustrative (and available) parks/regions. From these and other sources, we have developed sets of generic spending profiles, a low, medium and high version each for resource-based parks and historic sites (See Appendix B for detailed description of spending data sets). The problem for an individual park is choosing spending averages from within these observed ranges for a particular application, based on an understanding of the kinds of visitors affected and their spending patterns in the local area. Unless a reliable visitor spending survey exists or can be carried out for a particular park, spending averages must be selected based on judgment and a good understanding of visitors.

Our experience across a range of problems is that sound judgment and an engineering approach can in many cases be as reliable as a visitor survey. The **engineering approach** works best if visitors are divided into segments with relatively homogeneous spending patterns. An engineering approach identifies the goods and services that must be purchased to produce a particular "trip" or visit. For a party of 3 staying two nights in a motel outside the park, this includes 2 nights lodging at the local average room rate, meals for 2-3 days for three people, perhaps a tank of gas, some groceries, admissions for one or more local attractions, and some souvenirs. The MGM2 spending profiles are sufficiently detailed to itemize these kinds of expenses or to adjust spending profiles from one park to another based on different prices or greater or fewer spending opportunities in the area.

Using the available spending averages for the handful of parks we currently have and some judgment, we have estimated an initial set of "generic" spending profiles. These will be updated as new and better information becomes available. Separate spending profiles are provided for resource-based parks and historic sites. For each park type, a set of low, medium and high spending profiles are provided. Parks in rural areas with limited development or spending opportunities should use the "low" versions of generic profiles, while parks located in popular tourist areas or near large metropolitan areas should use the "high" version. MGM2 users may fine tune these profiles based on knowledge of local conditions and visitor use patterns. When time, resources, and needs permit, spending can be estimated directly using a visitor survey.

MGM2 establishes an economic impact estimation system and spending database that can be extended and updated as new spending studies are conducted. A consistent set of spending categories are proposed and recommended procedures for gathering and analyzing spending data accompany the MGM2 model (Stynes, 1999a).

(3) Visit units : MGM2 attempts to capture all spending in the local area associated with a visit to a National Park. It therefore requires that park visits or recreation visitor days be translated into party days or nights in the local area. NPS visitor surveys and use statistics have tended to focus on time spent in the park rather than in the region (RVD's). For most parks, the majority of spending occurs outside the park and levels of visitor spending are more closely related to time spent outside the park than inside. The MGM2

model focuses on days or nights spent in the region rather than just in the park. It is expected that in most cases, visitors staying overnight outside the park will spend more than day users or visitors staying overnight inside the park. As the mix of day or overnight visitors staying inside or outside the park will vary a great deal from park to park, model users must estimate these parameters from local visitor surveys or judgment. While relying on manager judgment causes concern to some, we believe that even rough estimates of visitor segment shares will yield much more accurate estimates of visitor spending, than those that essentially treat all visitors as an "average visitor". Clearly visitors staying in motels around the park spend very differently than day users, campers in developed campgrounds or backcountry campers. One can't really estimate an average visitor spending without some knowledge of the types of visitors. Understanding the mix of visitors is critical to generalizing an average from one park to another and also to evaluating impacts of more narrowly defined management actions.

A significant source of variation in spending is the length of stay. We therefore recommend reporting spending averages on a party day or night basis. This requires a translation from park visits to days or nights in the area using average length of stay and adjusting for multiple park visits (entries) on a single trip. Accurate visitation data in appropriate units is perhaps the most important input to MGM2. A conversion routine has been developed to assist NPS personnel in converting current park visitation statistics to the inputs required by MGM2 (party nights in the area by lodging segment). Park overnight stay data directly estimates person nights for visitors staying inside the park. The key missing information is the number of visitors and nights spent outside the park in nearby motels, campgrounds, etc. When estimating impacts of particular management or policy actions, users will likely estimate changes in visits directly in terms of party nights by lodging segment.

(4) **Impact measures** : MGM2 shifts the emphasis in impact measures toward a more complete understanding of the direct effects before adding in secondary effects. MGM2 estimates direct effects by sector in terms of sales, income, jobs, and value added. Direct effects are most closely tied to the park and do not rest on assumptions about multipliers. Exaggerated estimates of induced effects can reduce the credibility of park impact estimates, even when the direct spending and impacts are fairly solid. Secondary and total effects are summarized in the aggregate. MGM2 uses IMPLAN's type SAM multipliers versus the normal Type II multipliers (used in MGM) and many other models (MIG. Inc, 1999) . Type SAM multipliers are more conservative (lower) as they adjust for patterns of commuting to work and employee benefits that are not immediately re-spent (e.g. retirement contributions) when estimating induced effects. We believe the type SAM multipliers are much more realistic for NPS applications. IMPLAN's Type SAM sales multipliers generally range from 1.2 to 1.8, considerably lower than the 1.2 to 2.8 suggested in MGM.

We give more attention to personal income and value added as the preferred measures of local economic impacts in MGM2. Both sales and job measures can be misleading, as sales in different sectors can yield quite different levels of income for the region, and job estimates are confounded by part time positions, particularly so in tourist areas.

(5) **MGM2 as an evaluation tool**: Disaggregation and other changes in the MGM2 model help to expand the potential uses of the model to evaluate particular management and policy decisions. MGM2 is designed to be quite flexible. The applications are limited largely by the user's imagination, knowledge of regional economic concepts and tools, and the available data. A set of illustrative applications will be included in the MGM2 manual to illustrate how to use the tool for different situations. These will include adjusting spending for multi-purpose trips, handling groups of parks, special problems posed by historical sites and monuments, and how to evaluate the economic impacts of particular management, policy and marketing decisions.

Ease of Use of MGM2

MGM2 represents a significant advance over MGM in terms of its technical structure. Disaggregation of visitors, spending categories and multipliers significantly increases the ability to adapt the model to particular circumstances, as MGM2 has many more parameters that can be adjusted to represent a particular application. The conversion to an Excel workbook reduces computational calculations as, for the most part, these are built into the spreadsheet.

These advances, however, offer a larger set of decisions and can make greater demands relative to the input data. A pervasive issue in developing MGM2 has been the tradeoff between simplifying the model for use by personnel with perhaps limited understanding of regional economics and making the model more accurate, more flexible, and more powerful.

It is unrealistic to think that the model can provide reliable estimates of the economic impacts of park visitor spending without some information about the kinds of visitors attracted to the park and their spending patterns. Whether based on sound manager judgement or reliable visitor surveys, this information must be estimated largely outside the model. Disaggregation of spending data by both visitor segments and spending categories makes it much easier to construct or adjust spending profiles to suit a particular area. For example, local camping fees or room rates may be substituted for the generic spending profiles or a spending profile from a similar park. The structure offered by MGM2 also provides guidelines for future visitor surveys to improve the database of NPS visitor spending patterns over time.

Our selfassessment of MGM2 weaknesses and areas that may require further work

1. Visitor information - The NPS visitation databases have not been developed with spending and economic impact analysis in mind. NPS visitor surveys do not consistently gather some of the key parameters needed by the model (such as length of stay in the area, lodging types, and park re-entries on a given trip). MGM2 users may therefore need to use considerable judgment in converting visitation data to party nights in the area. We are recommending a set of variables and suggested questions to be included in future park visitor surveys to help fill some of the gaps. To estimate impacts of particular actions, MGM2 model users must be able to translate the action or policy into a change in the number and types of visitors. Demand for park visits is treated as exogenous to the impact model.
2. Spending data - NPS visitor spending information is fairly thin and inconsistencies in existing studies make it difficult to develop a consistent database of spending profiles that can be used with MGM2. We have been able to estimate spending profiles for about a dozen parks from the VSP databases and other available NPS visitor surveys and supplement these with spending profiles from other sources. These are clearly not adequate to cover all situations and may not fully represent the range of variation to be expected. Most spending studies are not sufficiently well documented to assess their accuracy or which populations or regions they might represent. There are not enough spending studies that are carried out in a consistent fashion to predict how spending will vary from one region to another based solely on empirical studies. On the other hand, combining existing empirical studies with a modicum of judgment likely yields estimates that are adequate for the intended uses.
The conclusions we draw from our analyses of NPS spending surveys are the same one's we have drawn in developing general spending profiles for US Army Corps of Engineers visitors (Propst and Chang, 2000), and tourists to Michigan (Stynes, 1999b). First, lodging segments are likely the best predictors of spending. We have found in many cases that differences in visitor spending from one region or park to another can be explained by the mix of visitors attracted (e.g. the ratio of local residents to day users to campers to visitors in motels). The question then is how much spending within a particular lodging segment may vary from one park or region to another. Do visitors staying in campgrounds in region A spend similarly as those in region B? Variations in some spending categories are readily explained by different room rates or camping fees, while others are more complex (e.g. spending on souvenirs and amusements). The lack of consistent data across many regions, along with reasonably large sampling errors when visitors are broken down into segments

(sample sizes within segments are usually less than 100 cases and often smaller than 50). Coupled with fairly high variance in individual spending yields sampling errors for segment spending averages in the 20 - 40% range for many studies. Differences across regions within segments often fall within these sampling errors. The state of knowledge and data do not permit estimation of simple models to predict how spending varies from one region to another.

MGM2 therefore uses a set of "generic" spending profiles to start with and relies on user judgment to adapt these to a particular application. While not ideal, we believe this is a considerable improvement over the old MGM, as spending profiles are complete and apply specifically to NPS visitors. Our recommended spending survey procedures should help to expand the current spending datasets over time to represent a wider range of situations. We should note that the MGM2 price adjustment procedure has proven quite reliable in updating spending profiles over time. For example, spending averages for lodging segments at Great Smoky Mts NP (GRSM) estimated using a 1985 survey are not statistically different from those generated from a 1996 VSP study at GRSM when both are price adjusted to 1996. This means the spending database can be a cumulative one, drawing from studies over 10 years old.

3. The MGM2 multiplier procedures are probably more than adequate for most NPS applications. While some "purists" may balk at the idea of "generic" multipliers, our tests indicate that with any reasonably correct choice of the appropriate generic multipliers, the errors introduced by the use of "average" multipliers are on average between 2 and 5% and at most 10%. These errors are likely well below the errors we may expect in spending estimates (which even with a fairly substantial visitor survey can approach 20% sampling errors, not taking into account measurement errors, sampling biases, non-response error and problems with outliers). Errors can also be substantial in park visitation information, particularly in estimating the percentage of visitors that are local, staying overnight in the area, and re-entering the park multiple times during a trip. Our recommendation is that improvements in park impact estimates should focus first on the visit information and secondly on spending levels. Multipliers, while receiving considerable attention, are probably the least important of the three inputs. Multipliers may change slowly over time, requiring updates of the multiplier files, but changes will generally be small unless major structural changes are taking place within the region. MGM2 adjusts the job to sales ratios over time using an aggregate price index and assuming that job to sales ratios will be reasonably stable, when expressed in constant dollars.
4. Users unfamiliar with economic impact analysis or with limited analytical experience will require some training before using MGM2. Some NPS analysts will be able to download the software, read the manuals, and apply the tools correctly, if given the time and incentive to do so. We have found that a short demonstration and explanation helps considerably. For many NPS units, use of MGM2 rests considerably on time and staff. Many applications of the original MGM were carried out by Ken Hornback and his staff (personal communication with Butch Street) , as individual parks lacked the time, skills, or confidence to use the model. MGM2 offers a richer framework for analysis, at the expense of possibly a steeper learning curve. The number of computations embedded in the spreadsheet will require some simplification for a pencil and paper version. Users must first be comfortable with Excel procedures. For users reasonably proficient in Excel, the automation afforded by Excel macros and formulas in MGM2 compensate for the greater complexity relative to the original MGM paper and pencil worksheet.

Formal Calculations in MGM2

Spending:

Spending is computed by multiplying a vector of per unit average spending values by the number of visitor units. The model recommends the party day or party night as the unit of analysis, although it can accommodate any units for which visits and spending are available. The model also suggests making these computations segment by segment in order to capture variations in spending across different types of visitors. We recommend some variation or subset of the following eight lodging-based segments:

Day visitors to the area

1. Local day users
2. Non-local day users

Overnight visitors staying inside the park

3. Motel, cabin, etc.
4. Developed campground
5. Backcountry

Overnight visitors staying outside the park in local area

6. Motel, cabin, etc.
7. Campground
8. In private homes (owned seasonal homes or stays with friends or relatives)

Table 1 shows a sample spending dataset. These are the "generic" per party night spending averages in 1998 dollars for a resource-based park using the medium spending profiles. The "low" and "high" spending averages are shown at the bottom. These are computed as a constant adjustment across all spending categories and segments. The low figures are 30% less than medium and the high figures are 30% larger. These are the ranges observed across parks for which consistent spending profiles could be estimated.

Table 1. Visitor Spending in Party Nights, 1998, National Parks Profile: Generic, Medium

CATEGORY	SEGMENT							
	L-Day User	NL-Day User	Motel-In	Camp-In	Backcountry Campers	Motel-Out	Camp-Out	VFR
Motel, hotel cabin or B&B	0.00	0.00	90.84	0.00	4.50	80.26	0.00	0.00
Camping fees	0.00	0.00	0.00	15.08	2.00	0.00	19.53	0.00
Restaurants & bars	11.28	14.98	32.59	9.27	5.80	36.11	11.35	11.00
Groceries, take-out food/drinks	8.34	5.69	5.52	12.04	4.16	6.01	8.31	11.24
Gas & oil	6.37	7.97	10.19	13.74	5.00	12.75	10.65	8.54
Other vehicle expenses	0.60	0.82	1.80	1.07	0.00	1.14	1.17	0.20
Local transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.58
Admissions & fees	3.00	6.00	9.50	4.99	3.00	9.12	12.08	3.39
Clothing	1.25	2.00	4.50	2.90	0.96	5.49	6.73	3.05
Sporting goods	1.12	1.05	1.08	1.13	2.54	1.54	0.61	2.00
Gambling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Souvenirs	6.15	6.57	9.92	5.47	6.04	10.31	12.06	10.00
Total	38.11	45.08	165.94	65.69	34.00	162.73	82.49	50.00
Low	26.68	31.56	116.15	45.98	23.80	113.91	57.74	35.00
High	49.54	58.60	215.72	85.40	44.20	211.55	107.24	65.00

The MGM2 model can be run with any segments for which visits and per unit spending can be estimated. This includes a one segment model where visitors are not broken down or an analogue of the original MGM that divides visitors into two groups: local and non-local. To exclude local visitors, local day use visits are set to zero or the local day user column may be omitted

Spending data are input on the SPEND page and total spending by segment and spending category are calculated on the TOTSP page based on the spending data and number of visits entered on the VISITS page. An overall average visitor spending is computed as a weighted average of the individual segment spending profiles using the segment shares of total visits as weights.

Spending equations are :

$$S_j = N * \sum_{i=1}^m M_i * s_{ij} \quad (1)$$

where

S_j = total spending in category j , $j=1, \dots, J$

N = total number of visitors

m = number of segments

M_i = segment i 's share of total visits, $i=1, \dots, m$.

s_{ij} = average spending of a member of segment i on category j (we call the s_{ij} vector a "spending profile" for segment i).

Total spending by segment i can be calculated by summing across spending categories. Total spending is reported on the TOTSPEND page by segment and spending category.

Spending price adjustments

Spending data may be price adjusted to any year using Bureau of Labor Statistics (BLS) price indices for each spending category. Price indices using 1990 as the base year are given in Table 2. To adjust prices from year X to year Y , spending in year X is multiplied by the ratio of the two indices (index for Y /index for X). The adjustment is automated in MGM2 via a price adjustment button.

Table 2. Price indices by spending category and year

Category	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Series
lodging out	100	114	121	124	128	133	140	147	154	158	se2102
food & beverage	100	104	105	107	110	113	116	119	122	124	sa1
food out	100	103	105	107	109	112	114	118	121	124	se19
gasoline	100	98	98	97	97	99	105	105	91	97	ss4701a
services	100	105	109	113	117	121	125	129	132	135	sas
sporting goods	100	103	105	105	106	108	107	107	106	105	se60
amusements	100	105	109	111	116	121	128	132	136	143	se6203
retail goods	100	103	105	105	105	104	106	107	107	106	se36
Parts & repair	100	105	109	112	115	118	122	125	128	132	setd
Overall CPI	100	104	107	111	113	117	120	123	125	127	Avg. CPI

Price indices from Bureau of Labor Statistics

Visits

The number of visitors, visits or party nights for which spending will be estimated must be entered by the user on the VISITS page. Visits must be entered in the same units as spending averages, usually in party nights, treating day visitors as one night. The distribution of visits across segments must also be entered either as shares of the total or party nights by segment. The NPSCONVERT routine provides procedures to convert NPS recreation visits and overnight stays to party nights by lodging segments. This conversion applies primarily when estimating overall economic impacts of current visitors, as was generally done with MGM. The conversion routine is described in detail in the npsconvert.doc file (available at mgm2 website). The key inputs are the annual recreation visits and overnight stay data for the park (e.g. USDI, 1997). A set of parameters covering party size, length of stay in the area, nights spent in the park, park entries per trip, and the percentage of nights attributable to the park visit are used to make the conversion. The parameters are specific to each segment.

As noted in the formulas above, total spending is computed by spending category and segment by multiplying visits by spending averages segment by segment and then summing across segments. These computations are carried out on the TOTSP page in MGM2.

Economic Impact Calculations

The economic impacts of visitor spending on a particular region are computed by applying a set of sector-specific economic ratios and multipliers to the spending vector. Impacts are computed for the spending totals. Impacts may be estimated for individual segments by entering only a single segment (on VISITS page, set shares for that segment to 100% and percents for other segments to 0).

Multiplier calculations are carried out on the MULTIPLIER page. The workbook interface is designed so that novice users may simply select a set of multipliers and proceed to the results on the SUMMARY page. Advanced users may inspect the multipliers, make adjustments, and carry out sensitivity analyses by choosing different sets of multipliers. The retail and wholesale margins, and local purchase coefficients (LPC's) may also be adjusted. The latter indicate the portion of goods within each category that are manufactured in the local area.

Multipliers

All economic ratios and multipliers are derived from input-output models estimated with IMPLAN Pro 2.0 using 1996 databases (MIG Inc., 1999). IMPLAN's Type SAM multipliers are used to estimate secondary effects including both indirect and induced effects. The Type SAM multipliers provide more conservative and more realistic estimates of the induced effects compared to traditional Type II (the RIMS II multipliers used in earlier MGM were Type II) as they exclude income that is not immediately re-circulated in the area (e.g. contributions to retirement programs and income of workers commuting from outside the region) (Alward and Lindall, 1996).

Relative to the original MGM model, MGM2 focuses more on direct effects and gives greater attention to income and value added relative to sales and jobs as the most useful impact measures. Direct effects are reported by spending category (roughly matched with economic sectors). Impacts are reported in terms of sales, personal income, value added and jobs. Personal income includes wage and salary income and proprietor's income. Value added is the sum of personal income, rents and profits and indirect business taxes. Job estimates are not full time equivalents.

Direct Effects

Direct effects of visitor spending are computed by first identifying the retail and wholesale margins on goods bought by visitors at retail, accumulating these margins across spending categories, and placing the total in retail and wholesale trade sectors. A local purchase coefficient (LPC) is applied to the producer

prices of these goods to allocate a portion to the local economy. LPC's are the averages from IMPLAN models for each sector. LPC settings for production sectors for the generic regions are shown in Table 3.

Table 3 . LPC settings for production sectors for generic regions

Sector	Rural	Small Metro	Large Metro	State
Food processing	5%	42%	45%	53%
Clothing	1%	3%	5%	7%
Petroleum refining	5%	8%	11%	29%
Sporting goods	2%	2%	3%	4%
Manufacturing	0%	2%	2%	3%
Wholesale trade	47%	53%	71%	91%

a. LPC's on all service sectors and retail trade are 100%.

Margining and use of LPC's may be illustrated using visitor spending on groceries as an example. The retail margin on groceries is 25% and the wholesale margin is 12%. For each \$100 that visitors spend on groceries, MGM2 allocates \$25 to the retail trade sector \$12 to wholesale trade. The remaining \$63 is the producer price that is allocated to food processing and production sectors. The LPC's in Table 3 indicate the percentage of this \$63 that would accrue to local producers. For a rural area, the model allocates 5% or about \$3 to the local economy's food processing sectors. The other \$60 represents imports to the region and does not appear as direct sales for the local economy. The LPC's increase with the size of the local economy and MGM2 figures may be adjusted where necessary to reflect greater sales to local producers.

Economic ratios and multipliers are applied to the sales in each category that is captured by the local economy. Sector-specific multipliers for 12 economic sectors are applied to the spending in each of 12 corresponding spending categories. Table 4 is a sample multiplier dataset used in MGM2. There are 8 distinct multipliers for each of 12 sectors, 4 covering direct effects and 4 total effects. The use of sector-specific multipliers captures the differences in economic structure and secondary effects across different economic sectors. Direct effects are computed for each spending category/sector and then summed to yield totals. Table 5 shows a sample direct effects output table produced by MGM2.

Direct jobs = direct sales captured * jobs/sales ratio

Direct personal income = direct sales captured * personal income/sales ratio

Direct Value added = direct sales captured * value added/sales ratio

Table 4. Multipliers for selected tourism-related sectors (small metro areas)

Sector	direct effects				total effects			
	jobs/ sales	Personal inc/sales	Property Inc/sales	Value Added /sales	Sales Type II	Total jobs/ MMsales	Total income / sales	Total VA /sales
Hotels	24.57	0.33	0.11	0.50	1.52	33.04	0.52	0.83
Eating & Drinking	32.28	0.34	0.07	0.47	1.44	38.80	0.49	0.74
Amusements/ Recreation	33.34	0.35	0.18	0.57	1.45	40.61	0.51	0.85
Auto repair and service	12.75	0.31	0.14	0.48	1.41	18.87	0.45	0.72
Local transportation	30.74	0.57	0.09	0.67	1.43	37.71	0.73	0.94
Food processing	5.60	0.12	0.11	0.23	1.33	11.21	0.25	0.45
Apparel	14.36	0.21	0.04	0.25	1.36	19.70	0.34	0.46
Petroleum refining	0.51	0.04	0.05	0.11	1.05	2.77	0.10	0.24
Sporting goods	12.57	0.21	0.15	0.39	1.42	18.48	0.36	0.64
Manufacturing	10.42	0.21	0.14	0.36	1.33	15.83	0.35	0.58
Retail Trade*	30.89	0.51	0.13	0.80	1.38	37.00	0.65	1.04
Wholesale trade	12.74	0.40	0.13	0.69	1.38	18.93	0.55	0.92

* Retail trade is the average of 7 IMPLAN retail trade sectors

Table 5. Sample Direct Effects Table , MGM2 output

Sector/Spending category	Direct Effects			
	Direct Sales \$000's	Jobs	Personal Income \$000's	Value Added \$000's
Motel, hotel cabin or B&B	2,620	43	1,001	1,521
Camping fees	485	8	185	282
Restaurants & bars	2,401	63	915	1,274
Groceries, take-out food/drinks	522	3	81	160
Gas & oil	394	2	26	112
Other vehicle expenses	115	1	38	59
Local transportation	8	0	5	5
Admissions & fees	856	23	306	501
Clothing	31	0	9	10
Sporting goods	6	0	2	3
Gambling	-	-	-	-
Souvenirs and other expenses	31	0	8	13
Retail Trade	1,302	28	664	1,037
<u>Wholesale Trade</u>	<u>401</u>	<u>3</u>	<u>163</u>	<u>277</u>
Total	9,171	175	3,400	5,256

Total effects

Total effects are estimated in a similar fashion as the direct effects using the total effects multipliers (IMPLAN's Type SAM multipliers for each sector). The total effects multipliers represent the change in sales (respectively income, jobs and value added) across all sectors for each dollar of additional direct sales in a given sector. The model cannot therefore break down secondary effects to those sectors receiving them. Total effects are reported in the aggregate as shown in Table 6.

Total sales = direct sales captured * Type II (SAM) sales multiplier

Total jobs = direct sales captured * total jobs/sales ratio

Total personal income = direct sales captured * total personal income/sales ratio

Total Value added = direct sales captured * total value added/sales ratio

Table 6. Sample Table of Direct and Total Economic Impacts , MGM2

Economic measure	DIRECT EFFECTS	Multiplier	TOTAL EFFECTS
Output/Sales (\$ 000's)	\$ 9,171	1.71	\$ 15,639
Personal Income (\$ 000's)	\$ 3,400	1.70	\$ 5,789
Value Added (\$ 000's)	\$ 5,256	1.76	\$ 9,238
Jobs	175	1.41	247
Total Visitor Spending (\$ 000's)		\$ 10,445	
Capture rate		88%	
Effective spending multiplier		1.50	

The capture rate is ratio of direct sales to total visitor spending. The effective spending multiplier is the sales multiplier times the capture rate. This multiplier may be applied to visitor spending to yield total sales effects.

Multipliers and ratios are based on 1996 input-output models. The assumption is that the structure of the regional economies will not change significantly between the year of the multipliers (I-O model) and the year of the spending data (likely covering years from 1998 to 2001). An automatic adjustment is made to the job/sales ratios in the MGM2 model for changes over time. For example, if prices increase by 10% between 1996 (year of the multiplier) and say 2000, the year of spending data, we assume that an increase in sales of 10% will not involve any change in the number of jobs. Hence, the job to sales ratios are adjusted by an overall consumer price index to reflect any difference between the year of the spending and year of the multipliers. Multiplier datasets and price indices in the model can be updated over time.

Choice of Multipliers

By building multipliers into the MGM2 spreadsheet, errors in how multipliers are applied should be reduced and appropriate margining and local purchase adjustments are automatically made. There still remains the problem of choosing an appropriate set of multipliers for a given application.

MGM2 provides four sets of "generic" multipliers that represent regions of increasing size and economic diversity. Model users may choose one of these sets for a given application based on simple descriptions of population size, geographic area, location of the region relative to nearby higher order central places, and illustrative examples (See Table 7). Users may also choose from a database of multipliers for some 114 individual regions and advanced users may create multiplier datasets for use with MGM2 from any IMPLAN Pro 2.0 model (see Appendix A for a list of regions and models for this project). It is anticipated, however, that most users will not have direct access to an input-output modeling program like IMPLAN, and many will have at best a limited understanding of multipliers. Most users will simply choose a set of multipliers and proceed to the results. The model allows advanced users to edit any of the multipliers or ratios to better fit a particular application.

Impacts may be estimated for a local region, a larger surrounding area, or an entire state by choosing the appropriate set of multipliers. Users may check the sensitivity of the results to the choices of multipliers by simply making different choices. The primary intended use for MGM2 is to estimate impacts in local regions of from 30-120 miles around the park. These regions will normally cover from one to perhaps a dozen counties around the park. It should be emphasized that the multipliers represent the region's economy, not the park. Sample regions for which multipliers are reported include some that surround a National Park unit, as well as others that do not.

Development of Generic Multipliers

The four sets of generic multipliers represent averages for different kinds of economic regions. They were developed by estimating input-output models for 114 regions and then grouping regions with similar multipliers. Models were estimated with the IMPLAN Pro system using 1996 databases and all of the IMPLAN defaults including use of Type SAM multipliers. Spending categories were matched with 12 IMPLAN sectors that capture the bulk of visitor spending. The key tourism-related sectors have a direct matching sector (e.g. lodging, eating and drinking establishments, amusements, retail trade, wholesale trade). Representative IMPLAN sectors were matched with other production and service sectors such as apparel, sporting goods, general manufacturing, local transportation, petroleum refining, etc.). Sector-specific multipliers for these 12 sectors were extracted from the IMPLAN models into an Excel spreadsheet, where the generic groups were formed and average values computed for each group. Selected descriptive variables such as population size, area of the region, and population density were included to help characterize the groups. See appendix A for a complete list of regions and multiplier values within each group. Table 7 summarizes the four generic regions.

Table 7. Characteristics of the generic regions

<p>Group 1: Rural</p> <ul style="list-style-type: none"> • Smaller rural regions with low population (below 30,000). • Low sales multipliers and high job to sales ratios. • Representative regions: Pictured Rock NL, Dinosaur NP, Bents NM
<p>Group 2: Small metro</p> <ul style="list-style-type: none"> • Larger rural regions or small metro areas with population up to 500,000. Regions with smaller populations that serve as population centers of the surrounding areas may fit into this category. • Low to medium sales multipliers and medium to high job to sales ratios. • Representative regions: Redwood NP, Mesa Verde NP, Gainesville MSA (FL)
<p>Group 3: Large metro</p> <ul style="list-style-type: none"> • Medium to larger metro areas with population up to 1,000,000. Regions with smaller populations that serve as population centers of the surrounding areas may fit into this category. • Medium to high sales multipliers and medium to low job to sales ratios. • Representative regions: Rocky Mt. NP, Lassen Volcanic NP, Springfield MSA (MA), Santa Barbara MSA (CA)
<p>Group 4: State</p> <ul style="list-style-type: none"> • State level regions or regions including larger metro areas (1,000,000 and more). • High sales multipliers and low job to sales ratios. • Representative regions: State models, Everglades NP, San Diego MSA (CA), Denver MSA (CO)

Table 8 illustrates how the multipliers for the generic regions vary with increasing size and economic development using the hotel sector to illustrate. Notice that direct job to sales ratios decline with increasing economic development, while sales, income and value added multipliers and ratios increase. Users are perhaps most familiar with the Type II sales multipliers. For the generic regions these increase from 1.37 for rural regions to 1.70 for larger state regions. The Type SAM multipliers are lower than the traditional Type II multipliers as the induced effects are smaller. The Type SAM multipliers are likely much more realistic for NPS applications.

Table 8 . Multipliers for the hotel sector by generic region

Multipliers	Rural	Small Metro	Large Metro	State
Direct effects				
Jobs/ MM sales	28.88	24.57	20.93	18.02
Personal inc/sales	0.29	0.33	0.35	0.37
Property Inc/sales	0.10	0.11	0.12	0.13
Value Added /sales	0.44	0.50	0.54	0.57
Total effects				
Sales I	1.25	1.32	1.36	1.38
Sales II (SAM)	1.37	1.52	1.62	1.70
Total jobs/ \$ MM direct sales	35.24	33.04	30.26	27.41
Total income/ direct sales	0.42	0.52	0.59	0.64
Total value added / direct sales	0.67	0.83	0.93	1.01

Methods for generating the generic regions

The 114 regions for which multipliers were estimated were first sorted based on their Type II sales multipliers. Break points were identified to form four initial groups of regions with average Type II multipliers of roughly 1.3, 1.45, 1.55, and 1.65. Sales, income and value added multipliers were highly correlated so the resulting groups were also reasonably homogeneous across sales, income and value added multipliers. Job to sales ratios did not correlate as well with sales multipliers. Some regions experienced job to sales ratios that were 10-15% below the average for their group. These typically were large metropolitan regions, rural areas with substantial tourism development, and regions with a strong year-round tourism market. Using hotels as an example, the lower job to sales ratios could be a result of higher room rates, larger scale hotels experiencing economies of scale, or fewer part time jobs.

For each generic group of regions, those regions with job to sales ratios more than 10% lower than the group average were split out into a separate group. The sales, income and value added multipliers for these groups matched the original parent group quite closely. Job multipliers, on average, were 10% lower across all subgroups relative to the parent group.

Based on this analysis, four groups of generic multipliers are included in the MGM2 model. The job to sales ratios for these groups are the values with the regions experiencing lower ratios excluded. Using the generic group job to sales ratios may inflate job estimates by about 10% if applied to a region with lower ratios. A button is included in the MGM2 model to adjust job to sales ratios downward by 10% when using generic multipliers (on MULTIPLIER PAGE). The adjustment can be made when the user knows the intended region has lower than average ratios. The button is placed less prominently, as it is intended to be used only by more advanced users who can assess the merits of such an adjustment in a particular situation.

Evaluation of generic multipliers

The generic multipliers can be evaluated by comparing the impact results when generic multipliers are used as compared with IMPLAN multipliers for the particular region. For this analysis, we focused on the four sectors receiving the bulk of visitor spending: lodging, eating and drinking establishments, amusements, and retail trade. These four sectors account for 82 percent of the spending from a typical visitor (Table 9). Aggregate visitor spending multipliers were computed as a weighted average of the sector-specific multipliers for these four sectors, where each sector was weighted in proportion to the spending it receives. These aggregate multipliers would correspond to what might be used in the old MGM model, when only a single multiplier is applied to visitor spending.

Table 9. Weights for combining multipliers into an aggregate visitor spending multiplier

Spending category/ Sector	Pct of Spending	Weight = Pct among top four categories
Lodging	26	32%
Eating and Drinking	24	29%
Recreation	11	13%
Retail	21	26%
<u>Other</u>	<u>18</u>	
Total	100	100%

Source: Tourism spending profiles (Stynes, 1999). Spending is adjusted for the percentage captured by the local economy.

For each of the 114 regions, aggregate multipliers were computed using the multipliers for each individual model and then compared with the aggregate generic group multiplier (using the generic group to which the region belonged). Errors were computed as

$$MAPE = \frac{|\text{individual multiplier} - \text{group multiplier}|}{\text{group multiplier}}$$

On average, the mean absolute percent errors (MAPE) range from only 1% to 4% within each group for the aggregate sales multipliers (Table 10). The average MAPE's are slightly higher for the aggregate jobs multipliers at about 3% to 5%. All the MAPE's for income multipliers are less than 4% within each group.

The maximum MAPE represents the greatest errors within each group. Except for a couple of regions, the maximum errors are less than 10% within each group for each type of multiplier. That is, the errors from using generic multipliers will almost always be less than 10% when the appropriate set of multipliers is selected and in most cases will fall in the 2-5% range. Potential errors in impact estimates due to multipliers are modest relative to those attributable to visits or spending inputs. When more accurate estimates of secondary effects are desired, multipliers for the specific region may be imported into MGM2 from an IMPLAN model. We also point out that multiplier estimates from IMPLAN or any other model will be subject to errors in the same range as we report when using the MGM2 "generics".

Table 10. Variation of multipliers for regions within each generic group

		Sales II Agg. ⁴	Jobs II Agg.	Income II Agg.	Population
Rural	mean	1.32	39.64	0.47	17,789
	range (min)	1.18	36.28	0.42	5,478
	(max)	1.40	43.08	0.51	38,240
	CV ¹	5%	6%	5%	
	MAPE ²	4%	5%	4%	
	Max MAPE ³	11%	9%	10%	
Small metro	mean	1.45	36.72	0.54	193,447
	range (min)	1.38	33.72	0.51	21,999
	(max)	1.51	38.68	0.58	529,898
	CV	2%	4%	3%	
	MAPE	2%	3%	3%	
	Max MAPE	5%	9%	7%	
Large metro	mean	1.55	34.70	0.59	445,838
	range (min)	1.51	32.01	0.57	108,371
	(max)	1.60	38.22	0.63	1,101,194
	CV	1%	5%	2%	
	MAPE	1%	4%	2%	
	Max MAPE	3%	9%	6%	
State	mean	1.63	31.75	0.65	6,217,572
	range (min)	1.58	29.13	0.62	1,008,633
	(max)	1.71	36.08	0.67	31,878,234
	CV	2%	6%	3%	
	MAPE	2%	5%	2%	
	Max MAPE	4%	12%	5%	

1. CV= Coefficient of variation = standard deviation/mean
2. MAPE =Mean Absolute Percent Error (comparing group average multiplier with multipliers for each individual region in the group).
3. Max MAPE= Maximum absolute percentage error, the largest error in the group
4. Aggregate multipliers were computed as a weighted average of four sector-specific multipliers - lodging, eating and drinking, recreation, and retail trade. Sales 2 is type SAM, Jobs2 = total jobs /\$ million direct sales, Income 2 = total income/direct sales.

TAX effects

Tax effects of visitor spending are computed on the TAX page of MGM2. Applicable federal, state, and local tax rates must be entered. These are then applied to spending and direct income estimates to produce estimates of taxes accruing to federal, state, and local government units. We are preparing a table of effective income and sales tax rates by state. The effective income tax rates adjust for nontaxable income and typical deductions. For example, the effective state income tax rate for Michigan is 3.4%, somewhat less than the 5% Michigan flat income tax rate. For regions involving more than one state, MGM2 users must compute a weighted average based on the portion of sales or income accruing to each state in the region. Users must also enter their own local tax rates. Distinct sales or use tax rates may be entered for each spending category to include special room assessments and adjust for items that are not taxed. MGM2 only computes taxes on the direct effects.

Application of MGM2

This technical report focuses mainly on the input data, computational procedures, and assumptions of the MGM2 model. All technical decisions in developing MGM2 also had to consider how the model will be used and the skills of intended users. Our implementation represents a quite flexible economic impact estimation system. The flexibility lets users adapt the model to different problems, but puts some burden on the user to structure the problem within the MGM2 framework. A set of sample applications will be developed to illustrate how to use MGM2 to handle different situations. We will also offer a formal training session in May for NPS personnel.

The model is designed as a tool that users will master as they tackle a variety of problems. While MGM2 can be used for quick one time applications, parks considering this use might consider obtaining some technical assistance as a better option. Many of the one time applications of the original MGM model were actually completed by Ken Hornback or his staff, as field personnel lacked the time, confidence or expertise to plug in the correct numbers and interpret the results. MGM2 is a more complex model, but likely imposes similar requirements for beginning users. Some time to play with the model, carry out sensitivity analysis, and do some background reading are recommended. For one time users, a brief consultation with someone more familiar with the model will likely suffice to structure the problem, make the key decisions and generate results.

It may help to briefly indicate the kinds of anticipated uses and how they would be handled in MGM2. These issues are covered more fully in the MGM2 Manual Part 3.

(1) Estimate overall impact of visitors to a particular park. This has been the most common use of the original MGM model. A strict replication of the old model would identify only two visitor segments - local users and non-local. One would select the generic spending profiles that best match the park, edit as desired, and price adjust if necessary. Alternatively, one of the custom profiles estimated for individual parks could be used. Visits would be entered in party nights by segment on VISITS page. The NPSCONVERT routine may be used to convert from park recreation visits and overnight stays. One of the four generic multiplier sets are chosen and results appear on SUMMARY page.

(2) Same problem with some local spending information. If a park visitor spending survey has been conducted, the spending data may be entered on the SPEND page by editing the spending profiles. If the sample is representative of all park visitors, a single set of spending averages could be used (excluding locals) or profiles for two or more segments may be entered. Otherwise proceed as in (1).

(3) A park for which custom multipliers or spending data are available. If a spending or multiplier file exists for the given park, it may be imported and results will be based on data that is unique to this park and region.

(4) Estimating impacts of a particular policy or action. In this case, the user must translate the action into a change in the number and kinds of visitors. Operationally, they must estimate the change in party nights by visitor segment. For example, if evaluating the closing of a campground in the park, they must determine

how many of the existing camper nights might be shifted to campgrounds outside the park, to day use, or perhaps represent lost visits to the area. Then spending profiles for these segments may be applied to the change in visits to estimate the change in spending.

(5) Estimating impacts for sites that may be part of multi-purpose trips. Historic site visits are often one of many activities of tourists to a region. In these cases the individual park cannot take credit for all of the spending by these visitors while in the area. In these cases it may make more sense to count one day's spending for each visit to the park and even to adjust the per day spending figure to reflect the additional spending associated with the park visit. In MGM2 this can be done by treating most visitors as day users, even if staying overnight in the area. Visitors who would not have made the trip if the park did not exist can be separated into a distinct visitor segment. All spending in the local area could be counted for these visitors.

(6) Multi-destination, multi-park trips. Touring western parks or more generally a set of National Parks in a given region is fairly common. If the parks are separated into distinct regions, then impacts may be estimated separately for each park. By using the party night as the unit of analysis, only spending on nights spent near the park are attributed to a given park. For overnight visitors, the model automatically allocates spending to where the visitor spends the night. Day visitors are also handled as the spending profiles for a day visitor only include spending within a given distance of the park. If the parks are sufficiently separated in space, the portion spent in each region will be attributed to that park.

If parks are located nearby in the same region, they can either be combined to do a single impact analysis or treated separately. In the former case, an estimate of the percentage of visitors to the region visiting both parks must be identified to avoid double counting of spending. Segments might identify visitors to park A, park B, or both. Spending or visits for the "both" segment would need to be divided by two if visits to the two parks are summed. If estimating impacts separately for each park, visitors who frequent both parks must be identified and their spending allocated to the two parks (either half to each or in proportion to time or money associated with each park).

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Appendices

Appendix A: Glossary of Economic Impact Terms

Appendix B: Converting Visits to Party Nights : The Npsconvert.xls workbook.

Appendix C: MGM2 Spending Data Files

Appendix D: Tips for Estimating Spending Profiles for Your Visitors

Appendix E: MGM2 Multiplier Data Files

Appendix F: Extracting Multipliers from IMPLAN Pro 2.0 Models, the Extractor.xls workbook

Appendix G: MGM2 Shortform: The MGM2Short.xls Workbook

Appendix H: Money Generation Model Version 2, Instructions for Pencil and Paper Version

Appendix I: List of MGM2 Files

Appendices A and D included here. Others are in separate documents

Appendix A. Glossary of Economic Impact Terms

Terms are presented in groups within a logical rather than alphabetical order

Region – defines the geographic area for which impacts are estimated. NPS impact regions are generally an aggregation of one or more counties. MGM2 can also make estimates for larger regions.

Sector is a grouping of industries that produce similar products or services. Most economic reporting and models in the U.S. are based on the Standard Industrial Classification system (SIC code) or the new North American Industrial Classification System (NAICS). Tourism is more an activity or type of customer than an industrial sector. While hotels (SIC 70) are a relatively pure tourism sector, restaurants, retail establishments and amusements sell to both tourists and local customers. There is therefore no simple way to identify tourism sales in the existing economic reporting systems, which is why visitor surveys are usually required to estimate tourist spending.

Impact analysis estimates the impact of dollars from outside the region (“new dollars”) on the region’s economy. Impact analysis typically includes only the spending of visitors from outside the region.

Significance analysis estimates the importance or significance of an industry or activity to a region and usually includes spending by both local residents and visitors from outside the region.

Input-output (I-O) model. An input-output model is a representation of the flows of economic activity between sectors within a region. The model captures what each business or sector must purchase from every other sector in order to produce a dollar’s worth of goods or services. Using such a model, flows of economic activity associated with any change in spending may be traced either forwards (e.g., spending generates employee wages which induces further spending) or backwards (e.g., visitor purchases of meals leads restaurants to purchase additional inputs -- groceries, utilities, etc.). Multipliers for a region may be derived from an input-output model of the region's economy.

IMPLAN is a micro-computer-based input output modeling system. With IMPLAN, one can estimate I-O models of up to 528 sectors for any region consisting of one or more counties. IMPLAN includes procedures for generating multipliers and estimating impacts by applying final demand changes to the model. The current version of IMPLAN is IMPLAN Pro 2.0.

Final Demand is the term for sales to final consumers (households or government). Sales between industries are termed **intermediate sales**. Economic impact analysis generally estimates the regional economic impacts of final demand changes. Visitor spending is one type of final demand.

Direct effects are the changes in economic activity during the first round of spending. For tourism this involves the impacts on the tourism industries (businesses selling directly to tourists) themselves.

Secondary effects are the changes in economic activity from subsequent rounds of re-spending of tourism dollars. There are two types of secondary effects:

Indirect effects are the changes in sales, income or employment within the region in backward-linked industries supplying goods and services to tourism businesses. For example, the increased sales in linen supply firms resulting from more motel sales is an indirect effect of visitor spending.

Induced effects are the increased sales within the region from household spending of the income earned in tourism and supporting industries. Employees in tourism and supporting industries spend the income they earn from tourism on housing, utilities, groceries, and other consumer goods and services. This generates sales, income and employment throughout the region’s economy.

Total effects are the sum of direct, indirect and induced effects.

Multipliers capture the size of the secondary effects in a given region, generally as a ratio of the total change in economic activity in the region relative to the direct change. Multipliers may be expressed as ratios of sales, income or employment, or as ratios of total income or employment changes relative to direct sales. Multipliers express the degree of interdependency between sectors in a region's economy and therefore vary considerably across regions and sectors.

Type I multipliers include only direct and indirect effects. **Type II** multipliers also include induced effects. **Type SAM** multipliers used by IMPLAN adjust the Type II multipliers for income that is not normally re-spent immediately within the region, e.g. wages of commuting workers who live outside the region and contributions to retirement programs.

A **sector-specific multiplier** gives total changes throughout the economy associated with a unit change in sales in a given sector.

Aggregate tourism multipliers sum multiplier effects across many sectors with a single number. They are based on an assumed distribution of tourist spending across these economic sectors, i.e., a weighted average of sector specific multipliers with the percentage of spending in each sector as the weights.

Capture rate is the percentage of spending that accrues to the region's economy as direct sales or final demand. All tourist spending on services within the region is captured, however, tourist purchases of goods is generally not all treated as final demand to the region. For imported goods bought at retail establishments, typically only the retail and possibly wholesale margins will accrue to the local economy.

Purchaser prices are the prices paid by the final consumer of a good or service. **Producer prices** are the prices of goods at the factory or production point. For manufactured goods the purchaser price = producer price + retail margin + wholesale margin + transportation margin. For services, the producer and purchaser prices are equivalent. The **retail, wholesale and transportation margins** are the portions of the purchaser price accruing to the retailer, wholesaler, and shipper, respectively. Only the retail margins of many goods purchased by tourists accrue to the local region, as the wholesaler, shipper, and manufacturer often lie outside the local area.

Measures of economic activity:

Sales or output is the dollar volume of a good or service produced or sold

Final Demand = sales to final consumers

Intermediate sales = sales to other industrial sectors

Income is the money earned within the region from production and sales. **Personal income** includes wage and salary income, including income of sole proprietor's profits and rents. **Total income** also includes income from rents and profits.

Jobs or employment is a measure of the number of jobs required to produce a given volume of sales/production. Jobs are usually not expressed as full time equivalents, but include part time and seasonal positions.

Value Added is the sum of total income and indirect business taxes. Value added is the most commonly used measure of the contribution of a region to the national economy, as it avoids double counting of intermediate sales and captures only the "value added" by the region to final products.

Appendix D: Tips for Estimating Spending Profiles for your Visitors

The MGM2 workbook provides a number of ways to establish a set of spending profiles for a given park. A spending profile gives the average amount spent within a set of 12 spending categories for a given subgroup of visitors (segment) on a party night basis. A party night is one party staying one night in the area. For day users, treat one day as equivalent to one night.

Spending estimates for a particular subgroup of visitors at a particular park may be derived by (a) adapting spending averages from visitor spending studies at similar parks/regions, (b) conducting a visitor survey or adjusting data from a recent visitor spending survey, or (c) using manager judgment or an "engineering" approach.

In some situations you may use a combination of these methods. For example, perhaps a recent park visitor survey was conducted that provides good spending estimates for park day visitors and campers, but the sample sizes were inadequate to profile visitors in motels or backcountry users. The profiles for these two segments might be taken from one of the generic datasets provided in MGM2, from a similar park, or estimated using some judgment. Perhaps a good spending profile for motel users can be taken from a similar park, but the room rates do not match those in the region around your park. You therefore adjust the expense per night for lodging to reflect the local situation.

Be aware that both spending surveys and manager judgment can be prone to error. Spending estimates derived from surveys rest on representative samples⁸, clear spending questions and accurate recall, and careful analysis of the data to handle outliers, missing data and other problems common in spending surveys. Sometimes sample sizes are too small for particular segments to reliably estimate a spending average, particularly if spending varies widely within the segment. Managers and other local "experts" may not have a good idea of what visitors spend in the area, particularly outside the park. The itemizing of spending in narrow categories makes it somewhat easier to "construct" a spending profile using what is sometimes called an engineering approach. This involves identifying the products and services a visitor must purchase to "create" their experience and costing each item separately. This method works best if segments are separated based on the items included. For example, visitors in motels will incur a lodging expense that on average should equal the average room rate for the area, while day visitors have no lodging expense. Campers pay the average per night rate for campsites in the area, etc.

Three Approaches or Methods for Generating Spending Profiles

There are three general approaches to estimating spending. These are introduced below and then discussed in more detail. In a given situation you may use just one of these or a combination.

Method A: Adapting spending from other studies. In developing MGM2, we have reviewed a number of previous park visitor surveys and assembled spending profiles from these datasets. Six "generic" spending profiles represent averages across a range of parks, reflecting low, medium, and high spending patterns at different historic sites and parks. Several "custom" spending profiles are also included with MGM2 and these will be expanded as new park visitor surveys are completed. MGM2 users may choose from any of the generic or custom datasets to represent a particular set of park visitors.

Method B: Entering spending profiles from your own visitor survey. If you have spending profiles from a visitor survey conducted at the park or in the local region, you may enter the figures into an MGM2 spending dataset. Spending averages for each segment should be entered onto the MGM2 spending template. You may retrieve the blank.t12.xls template or use the Edit button on the MGM2 workbook Spend page. You must match spending categories from your survey to the twelve MGM2 spending categories. In some cases, this may require apportioning spending to more than one category, for example, many VSP studies ask spending in only four categories: lodging, food, transportation and other. When entering these figures into MGM2, spending on food must be divided between restaurants and groceries.

⁸ Watch for non-response bias if response rates are low, or some groups being over-represented due to a higher chance of being chosen.

Method C: Constructing spending profiles using an "engineering" or cost approach. When empirical spending data is lacking or not very reliable, you can construct spending profiles based on judgment using what is sometimes called an "engineering" approach. This is similar to estimating costs for a construction project. You must identify the goods and services the visitor must purchase to "construct" their visitor experience and identify a per unit price for each component. In MGM2, the use of segments, detailed spending categories, and the party-night as the unit of analysis all help to facilitate this approach.

Once you have constructed the spending profiles using any of the methods above, you may adjust them as needed. For example, spending averages reported in previous studies may be price adjusted to a recent year, once they are assembled in the format required by MGM2. The price adjustment will handle changes over time due primarily to increases or decreases in prices. If the mix of goods and service changes, other manual adjustments may be recommended. For example, if local casinos were added after the previous survey, then a new estimate will be needed for casino spending. Similarly, if there were major changes in spending opportunities due to expansion or reductions in restaurants or attractions, spending on the corresponding items might be changed accordingly.

Details for Method A : Choosing and adjusting an existing spending dataset

The following steps are recommended for choosing and/or adjusting any of the spending datasets provided with the MGM2 model.

If using the generic spending profiles, the process has three steps (Figure 1):

1. Choose park type (historic or national)
2. Choose the high, medium, or low profile
3. Review the figures and adjust as needed to fit your visitors

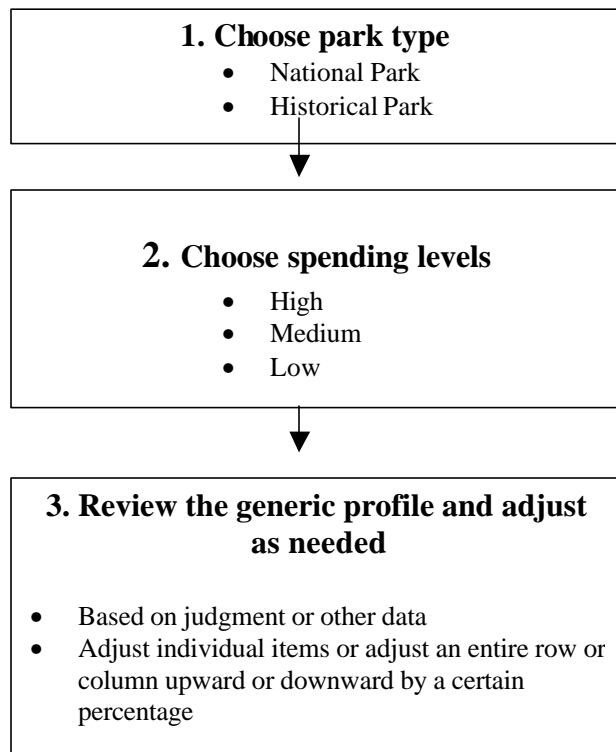


Figure 1: Four step process for selecting and modifying a generic NPS visitor spending profile.

1. Choose a park type. Spending profiles and segments vary somewhat between larger natural resource-based parks, which often include some accommodations within the park versus smaller historic sites and monuments, which usually do not. Historic sites and monuments are more likely to be located in urban areas, where visits are part of a trip involving other purposes, attractions and activities in the area. Larger natural resource-based parks are more likely to be the primary destination of the trip.

- "Park" spending profiles will likely apply best to National Parks, Preserves, Recreation Areas, Seashores, Lakeshores, and in some cases Parkways, Trails, and Affiliated Areas. The park profiles include eight segments based on lodging types. You may omit any of these that may not apply in a particular situation or may combine two or more segments that have similar spending or due to a lack of ability to discriminate between them.
- Historic Site spending profiles will usually apply better to Historic Sites, Historic Parks, Monuments, Battlefields, and Cemeteries. Historic site profiles include only four segments, local and non-local day users and overnight visitors in motels or private homes (staying with friends or relatives).

2. Choose spending levels. To capture the variations observed across parks in different settings, MGM2 provides low, medium, and high spending profiles. Parks in unique settings may fall outside these ranges, e.g., parks in very remote areas with few nearby places to spend money or parks located in expensive tourist areas. Factors to consider in choosing between the low, medium and high profiles are (1) prices in the area, (2) spending opportunities inside and outside the park, (3) the geographic extent of the region, and (4) kinds of visitors and activities attracted.

- The amount that visitors spend on different items will be partly explained by their cost. The per night costs for motel rooms and campsites in the "generic profiles" can be adjusted to match local rates.
- Visitor spending will be directly related to the spending opportunities in the area. Restaurant spending will be lower in areas with few restaurants or only fast food establishments, and higher in areas with a greater variety of restaurants.
- The larger the geographic region for which you are estimating impacts, the more visitor spending you will likely capture.
- Higher spending profiles will be associated with higher income visitors and special activities requiring additional expenses in the area (e.g. cave tours, downhill skiing or golf). General tourists who spend a small amount of time in the park and more time in gateway communities frequenting other local attractions and souvenir shops will generally outspend visitors who spend most of their time in the backcountry or on long hikes. Be aware of special programs inside and outside the park that involve additional spending. For example, commercial cruises in Kenai Fjord National Park, cave tours in Mammoth Cave National Park, and rock climbing in City of Rocks National Reserve. Visitors participating in recreation activities like these will generally spend larger amounts on admission fees, sporting goods, clothing, souvenirs and other items. We illustrate how to adjust the generic profiles to reflect these kinds of situations below.

3. Review the generic profile and adjust to best fit your visitors. Due to the uniqueness of each park, the selected generic profile should be carefully examined and adjusted, as needed, to best fit your visitors. Presenting the spending profiles by segment, within detailed categories and on a party-night basis should help facilitate the adjustments. For example, the amount reported for lodging expenses should reflect the local room and campsite rates. Visitors included in the motel segment will incur a room cost which on a party night basis should equal an average room rate for the area. Expenses that are more difficult to estimate are ones that only some visitors may incur and the amount spent varies widely, e.g. souvenirs. Observe that in the absence of the lodging segments, identifying an average spending on rooms would be quite complicated, as it reflects both what percentage of visitors stay in a motel and the average room rate for those who do. If the unit for spending were the person night or party trip, the average would depend on party size or length of stay in the area.

Example: Adjusting Spending Profiles

Some of the kinds of adjustments that might be made to adapt a given set of spending profiles are illustrated below:

(1) **adjusting spending for a single segment up or down by a fixed percentage**, usually to reflect something unique about that particular subgroup of visitors at this park, e.g. campers at the park in question are high income and there are many spending opportunities near the campgrounds - adjust all camper spending categories upward by 20%. You might use the high spending profile for campers, while choosing the medium ones for all other segments. To do this start with medium profiles and manually replace camping segment columns.

(2) **adjusting spending in one category for all segments**, usually to reflect spending opportunities and prices for that set of goods or services. E.g., many fine restaurants nearby, increase restaurant spending by 10% across all segments. Or if the park has a casino nearby. Add figures for casino spending to each segment.

(3) adjusting spending for individual categories and individual segments. Start by adjusting lodging expenses to reflect local room and campsite rates, adjust admissions and fees to reflect the park entrance fee and fees at other nearby attractions. See Method C details for other tips for adjusting spending data.

Table D1 illustrates the process by adjusting an entire spending profile, category by category, to fit a particular park and subgroup of visitors. It begins with the generic medium level spending profile for visitors staying inside the park in a lodge or cabin and adjusts the profile for this segment to fit a local situation. You may repeat this process for each segment. In choosing which segments and categories to adjust, pay the most attention to those spending categories that account for the greatest amount of spending and those segments with higher spending averages and accounting for a higher percentage of visitors.

Table D1. Adjusting the generic park medium spending profile for a particular application

Spending Category	Medium generic profile	Local Conditions	Adjusted Value
Motel, hotel cabin or B&B	90.84	Average room/cabin rate charged within the park is \$85 per room per night	\$85.00
Camping fees		Not relevant to motel segment, \$ 0.	0.00
Restaurants & bars	32.59	Few restaurants nearby, lower priced ⇒ decrease by 10%	$32.59 * 0.9 = 29.33$
Groceries, take-out food/drinks	5.52	Few nearby grocery stores, limited selection ⇒ decrease by 10%	$5.52 * 0.9 = 4.97$
Gas & oil	10.19	Rural area, sightseeing popular, region is 150 mile radius around park, available gas stations ⇒ increase by 20%	$10.19 * 1.2 = 12.23$
Other vehicle expenses	1.80	No change	\$1.80
Local transportation	0.00	None available, no change	\$0.00
Admissions & fees	9.50	Park entrance fee of 5 dollar per vehicle per day Major park attraction charges another 3 dollars per person, half of these visitors attend. Fee* average party size * participation rate = $3 * 3$ people * 50% = \$4.50.	$5 + 4.50 = 9.50$
Clothing	4.50	Many stores with popular selling t-shirts, hats etc., large gift shop in lodge ⇒ increase 10%	$4.50 * 1.1 = 4.95$
Sporting goods	1.08	Most lodge guests not participating in activities requiring special gear, limited gear available locally ⇒ decrease by 20%	$1.08 * 0.8 = 0.86$
Gambling	0.00	No casinos here, keep at 0.	\$0.00
Souvenirs and other expenses	9.92	Average number of moderately priced souvenir shops, typical visitor spending ⇒ no change	\$9.92
Total	\$165.94	Overall about a 5% increase from original value	\$158.56

Details for Method B: Entering spending data from a local visitor survey.

If you do not wish to base your spending profiles on one of the generic or custom datasets, we recommend using the blank.t12.xls worksheet utility (Table D1). The "blank.t12.xls" file is provided to help you construct your own set of spending profiles, either from judgment/an engineering approach or a recent visitor survey. If you enter the data in designated cells on this template and save the file with the *.t12.xls extension, it can be imported for use in the MGM2 workbook (choose import custom spending profiles).

You may also use the Edit Spending profiles button on the SPEND page of the MGM2 workbook to enter a complete set of spending data.

Table D21. The blank.t12.xls worksheet template

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Table 1. Visitor Spending by Lodging Segment in Local Area						Spending Unit	Park Name			Year		
2	SEGMENT												
3	CATEGORY	Seg1	Seg2	Seg3	Seg4	Enter segment names on this row							
4													
5	Motel, hotel cabin or B&B												
6	Camping fees												
7	Restaurants & bars												
8	Groceries, take-out food/drinks												
9	Gas & oil												
10	Other vehicle expenses												
11	Local transportation												
12	Admissions & fees												
13	Clothing												
14	Sporting goods												
15	Gambling												
16	Souvenirs and other expenses												
17	Total												

Steps:

1. Retrieve the file, **Blank.t12.xls**
2. Enter information as follows:
 - Enter year of the survey/spending data in Cell L1 (Year)
 - Enter name of the park in Cell I1 (Park name)
 - Enter the spending unit in Cell G1 (Spending Unit). For consistency with other MGM2 datasets we recommend entering spending on a party night basis.
3. Enter segment names in row 3 starting in Cell B3. Whenever possible, develop distinct spending profiles for different segments. Lodging segments are recommended, but you can use any segments for which you will be able to estimate both spending and visits.
4. Enter spending averages by item for each segment in the appropriate cell. As part of this process you may need to adjust the spending averages to a party night basis or otherwise modify individual values to reflect the portion to be attributed to the park visit and to be included in the analysis.

4a. Converting across spending units: If the original spending profile is based on units other than party-nights, it must be converted to a party night basis. The conversion routine should be applied segment by segment, to take into account different lengths of stay and party sizes of each segment.

- To convert from party-trip to party-day:

$$\text{Party day spending} = \text{party trip spending} / \text{average length of stay}$$

- To convert from person-day to party-day:

$$\text{Party day spending} = \text{person day spending} * \text{average group size}$$

- To convert from person-trip to party-night:

$$\text{Party day spending} = \text{person trip spending} * \text{average group size} / \text{length of stay}$$

4b. Redistributing spending across spending categories: The twelve MGM2 spending categories are fixed, so spending must be adjusted to fit these categories. Many National Park Service visitor surveys have measured spending in only four categories- *Lodging, Travel, Food, & Other*. When entering the data into MGM2, *Food* must be divided between restaurants and groceries, *travel* between gas & oil, vehicles expenses, and local transportation and *Other* between admission fees, clothing, sporting goods, gambling, and souvenirs. The percentages needed to make these allocations may be taken from any of the generic or custom profiles that would best fit the situation. Judgment or other data may also be used to redistribute the spending.

5. Enter supporting information:

Space is provided at the bottom of each *.t12.xls file for supporting information, such as segment shares, number of cases, length of stay in area, party size, etc. The supporting information is not retrieved into the MGM2 model when you import a spending dataset, but it serves to document the spending data. To inspect information in any of the MGM2 *.t12.xls files, retrieve it directly in Excel (choose File, Open, and enter the file name in the box - if you enter *.t12 in the File name box, Excel will display all of the t12 spending files in the active folder.)

6. When finished, Save the file as an Excel workbook, maintaining the *.t12.xls extension. When prompted for a file name, enter NAME.t12. Excel will add the xls extension. This file can now be imported using the "import custom spending profile" button on Spend page of MGM2 workbook.

7. Cautions

- The format of the *.t12 template is fixed. All numbers must be entered into the appropriate cells. Do not alter the spending category labels. You may change segment names in row 3.
- The expenses entered in the *.t12 file should cover all spending in the local region that you wish to include in the analysis. Airfares and purchases of durable goods should generally be excluded from trip expenses, as they do not generally accrue to the local region.
- When entering data from visitor surveys, be aware of possible errors due to biases in the sample or question formats. Spending averages for each segment should be based on at least 50 cases, and preferably more than 100.

Details for Method C. The Engineering approach.

In an engineering approach, you identify the goods and services that a visitor will purchase to "construct" their trip and then cost out each item. For example, for a park visitor who stays two night in the area with a travel party of 3 people, the per night expenses would entail (1) the cost of a room or campsite, (2) food for three people for one day, (3) transportation, park admissions and other amusements expressed on a per party per day basis, and (4) souvenirs and other purchases expressed on a per party per day basis.

Careful choice of segments and the spending units can help in estimating spending. For example, segments based on lodging type and spending based on party nights allow you to use the nightly room rates for those who use motels, campground rates for campers, and to omit lodging for those staying with friends and relatives or on day trips. These segments can also be helpful in estimating other expenses, such as the split of food between groceries and restaurants.

Some spending categories are best estimated on a party night basis (lodging), others on a person day (meals), and still others on a party trip basis (souvenirs, transportation). We recommend estimating each item on the most logical basis first and then converting all to a common basis (such as party nights). One must also be careful to account for the fact that some visitors may not spend anything in a given category. The averages for each segment must reflect both spenders and non-spenders. The lodging segments help to separate those who spend money on lodging from those who do not.

There are a number of simple, but useful procedures/rules to keep in mind when estimating spending averages for a particular visitor segment.

Rule 1: Adjusting for non-spenders.

Spending average = percent of visitors spending money on the item times the average expense of those who do.

e.g. If half of Mammoth Cave NP visitors take a cave tour and those who do spend \$10 on tours, the average spending across all visitors is \$5 (50% * \$10).

Rule 2: Expanding per person spending to party spending.

Spending average for party = per person spending average times party size

e.g. If the average meal expense per person per day is \$15 and the average party size is 2.0, then spending per party is \$30 per party per day.

Rule 3: Distributing trip expenses across the length of stay in the area.

Spending average per night = total trip expense /length of stay in area

e.g. If a typical party spends \$20 on fuel in the area and averages a four night stay, they average \$5 per party per night.

Rule 4 : Using local motel or campsite rates to estimate per night lodging expenses.

- Information regarding average room rates across different lodging types may be obtained from local sources. Fees charged within the park should be obtained from park staff or concessionaires.

- Smith Travel Research reports average room rates⁹ for limited-service¹⁰ and full-service¹¹ hotels based on location and price category.
- Be careful to adjust lodging rates to reflect seasonal differences and any special discounts for seniors or others. The rates used in MGM2 should reflect the accommodations that park visitors use and the rates they pay.

Table D3. Average room rates for limited service hotels for 1996 and 1999 by location and price category

Room Rate	Location					Price Category			
	Urban	Suburban	Airport	Highway	Resort	Upscale	Mid-Price	Economy	Budget
1996	\$ 71.20	\$ 61.31	\$ 55.37	\$ 51.94	\$ 69.83	\$ 75.74	\$ 58.10	\$ 48.81	\$ 43.05
Price adjust to 1999	\$ 80.18	\$ 69.04	\$ 62.35	\$ 58.49	\$ 78.64	\$ 85.29	\$ 65.43	\$ 54.97	\$ 48.48

Table D4. Average room rates for full service hotels for 1996 and 1999 by location and price category

Room Rate	Location					Price Category			
	Urban	Suburban	Airport	Highway	Resort	Upscale	Mid-Price	Economy	Budget
1996	\$ 107.39	\$ 81.64	\$ 83.90	\$ 69.83	\$ 119.20	\$ 120.98	\$ 84.90	\$ 73.29	\$ 56.98
Price adjust to 1999	\$ 120.93	\$ 91.94	\$ 94.48	\$ 78.64	\$ 134.23	\$ 136.24	\$ 95.61	\$ 82.53	\$ 64.17

Rule 5. Adjusting Admissions & fees to a party night basis.

Expenses for admissions and fees may include expenses in the park and outside. In some cases, fees paid directly to the park should be omitted in the analysis. Admission fees may be collected on a per person, per vehicle, or per trip basis. Rules 1-3 will frequently be used to convert admissions and fees to a party night basis.

- For attractions with a per person admission, use Rules 1 and 2.
- If the park admission fee covers several days, use Rule 3.
- Use reported admissions fees in the same way lodging rates are used in Rule 4.
- Be careful to adjust for rates and spending that may vary by season and to take into account any special discounts.

⁹ The data for 1996 average room rates is provided by Smith Travel Research

¹⁰ Limited-service refers to hotels with few services and amenities, without food & beverage service.

¹¹ Full-service refers to hotels with a restaurant, lounge facilities, meeting space, and generally, a higher price.