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THESIS

ESTIMATING THE ECONOMIC IMPACTS OF TOURISM
ON THE ECONOMY OF GRAND COUNTY, UTAH

Submitted by

Lynne Caughlan

Department of Agricultural and Resource Economics

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Fall 1998

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ABSTRACT OF THESIS

ECONOMIC IMPACTS OF TOURISM ON THE ECONOMY OF GRAND COUNTY, UTAH

The tourism industry represents one of the largest and fastest growing activities in Grand County, Utah. The explosive growth in tourism has led to rapid population growth and economic change in Grand County. Recreational uses are often in conflict with traditional use activities such as grazing and mining. Impacts from all these land uses are contributing to the deterioration of the region's sensitive natural resources, especially in areas where such uses are concentrated.

This thesis estimates the economic impacts of the current and projected visitation levels on the Grand County economy. IMPLAN was used to construct an input-output model of the Grand County economy to track changes in economic activity of spending by visitors as they ripple through the different industrial sectors of the economy. Information on how spending by tourists effects the Grand County economy will help in the process of defining management and policy options that can best provide economic opportunities while sustaining the region's fragile natural resource areas.

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CHAPTER ONE

INTRODUCTION

The tourism industry represents one of the largest and fastest growing activities in Grand County, Utah. Grand County (Figure 1) lies in the heart of the Colorado Plateau. The Plateau is world famous for its red rock canyons, arches, mesas, and dramatic landscapes. Within a 100 mile radius of Moab, the Grand County seat, are four national parks, four state parks, numerous national monuments, national historic sites, and millions of acres of land managed by the Bureau of Land Management. These lands provide visitors with numerous recreational uses including mountain biking, hiking, river rafting, fishing, camping, cultural heritage viewing, and four-wheeling.

Grand County has a history of economic and population booms, sometimes with a following bust. Past booms have included reports of gold in the 1890's, fruit growing in the 1910's, oil in the 1920's, and uranium in the 1950's (State of Utah 1995). The mining industry generated more than sixty percent of all income received by county residents during the 1960's through mid 1980's (State of Utah 1995). Since the late 1980's, tourism has replaced mining as the principal source of income, generating seventy eight percent of the County income in 1995 (Moab Chamber of Commerce 1997).

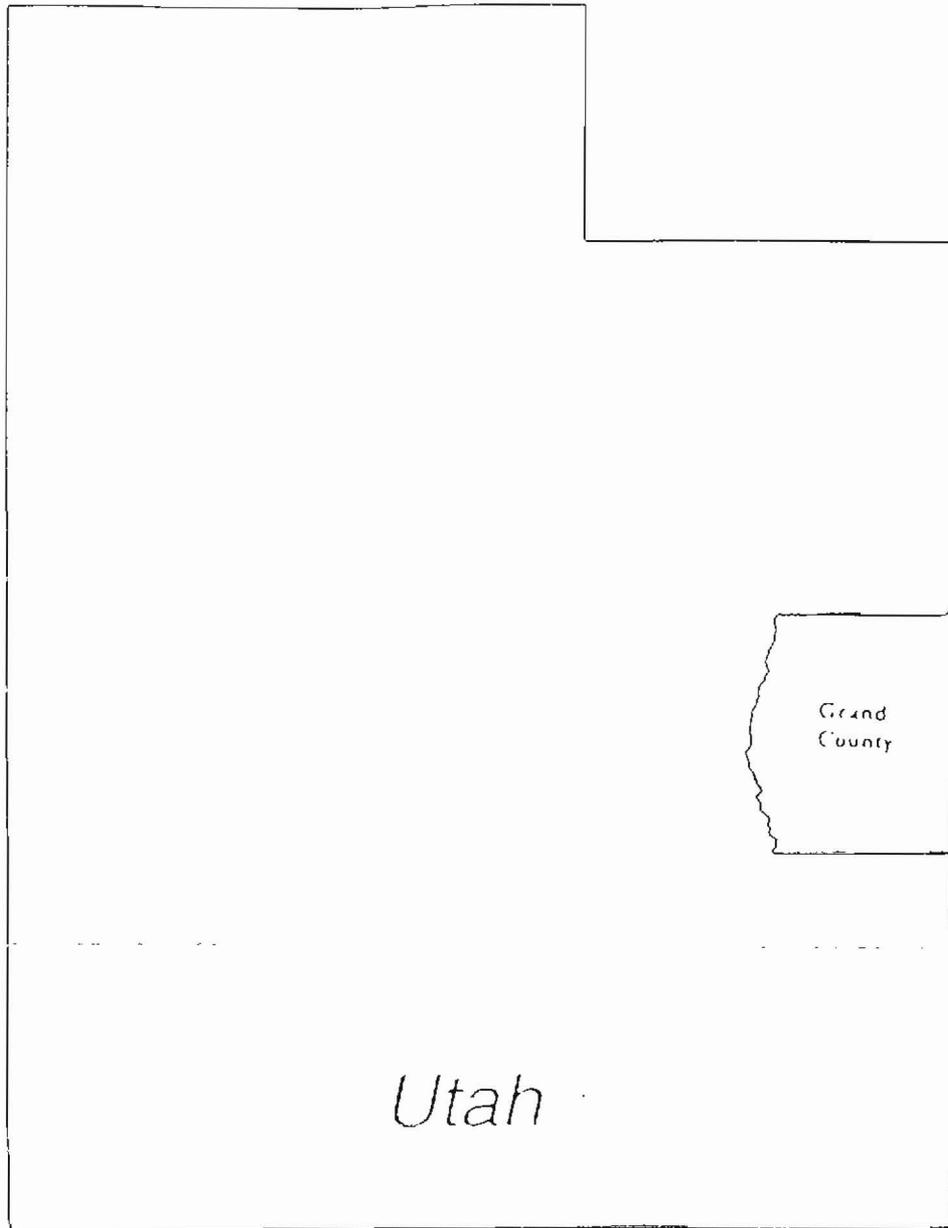


Figure 1. Map of Grand County
Source: 1996 Grand County General Plan

1.1 The Problem

Explosive growth in tourism has led to rapid population growth and economic change in Grand County. The increase in recreational uses has resulted in conflicting land-use demands on federal and state owned lands in Southeast Utah. Recreational uses are often in conflict with traditional use activities such as grazing and mining. Impacts from all these land uses are contributing to the deterioration of the region's sensitive natural resources, especially in areas where such uses are concentrated.

1.2 Purpose of Study

This study was conducted as part of the current research of the Social, Economic and Institutional Analysis Section (SEIAS), of the Biological Resources Division, U.S. Geological Survey. The purpose of SEIAS is to foster understanding of how ecosystems influence, and are influenced by, economic, social, and institutional processes, in an effort to improve management of natural resources.

The current SEIAS research focuses on the Colorado Plateau because this region provides an opportunity to shape land management practices under complex environmental and social conditions including fragile desert ecosystems sustaining increasing residential populations and heavy recreational use, all governed by a mosaic of public and private agencies. The central theme of the SEIAS study is the optimal allocation of publicly managed resources on the Colorado Plateau. The objective is to provide integrated ecological and economic systems information to public land managers and the people they serve.

Part of this interdisciplinary social science research is to understand how tourism effects the local economies of the Colorado Plateau. To understand the impacts of tourism on the Grand County economy requires constructing a detailed inter-industry model of the local economy that tracks changes in economic activity (such as tourism) as they ripple through the different industrial sectors of the economy. This information will help in the process of defining management and policy options that can best provide economic opportunities while sustaining the region's fragile natural resource components.

The intent of this study is to estimate the economic impacts of the current and projected Grand County visitation levels on the Grand County economy. The costs associated with increasing tourism and the benefits to the visitors themselves are not addressed in this study. This is a local study including only the Grand County economy, it does not include state or national level visitor spending impacts. The impacts on employment, value added, and total output should not be considered as national impacts. The impacts only include the Grand County economy.

Chapter 2 describes economic impact analysis and provides a literature review of past recreation studies. A profile of the Grand County economy is developed in Chapter 3. An analysis of how to measure visitor spending is presented in Chapter 4. The impacts of the current and projected levels of visitor spending are estimated and compared to the total county economic activity in Chapter 5. Chapter 6 summarizes the findings presented in this report.

CHAPTER TWO

LITERATURE REVIEW

2.1 Economic Impact Analysis

A tourist usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, food, transportation, and recreational equipment. Expenditures associated with tourism generate considerable economic benefits for the local businesses that provide services to them. As more visitors come to Grand County, local businesses will purchase extra labor and supplies to meet the increase in demand for additional services. The income and employment resulting from purchases by local businesses represent the *direct* effects of visitor spending within the county.

In order to increase supplies to local businesses, input suppliers must also increase their purchases of inputs from other industries (Bergstrom et. al. 1990). The income and employment resulting from these secondary purchases by input suppliers are the *indirect* effects of visitor spending within the county. The input supplier's new employees use their incomes to purchase goods and services. The resulting increased economic activity from new employee income is the *induced* effect of visitor spending (Jackson et. al. 1992).

The indirect and induced effects are known as the secondary effects of visitor spending. Multipliers capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes 1998). The most common multipliers are for output, income and employment. The output multiplier measures the total output required of the economy to support a one-dollar change in final demand. The income multiplier measures the total change in personal income throughout the economy resulting in a one-dollar change in income in response to a final demand change. Employment multipliers define the change in total employment resulting from a one-unit change in employment (Jones 1978).

2.2 Input-Output Analysis

The sums of the direct, indirect and induced effects describe the total economic effect of visitor spending in Grand County. Economic input-output (I-O) models are commonly used to predict the total level of regional economic activity that would result from a change in spending (Jackson et. al. 1992). I-O analysis can track effects throughout an economy to determine which economic sectors will and will not be affected by demographic, economic, and land use changes. This information gives the decision-maker the ability to evaluate the potential economic effects of policy alternatives and communicate the potential impacts to local interests (Jackson et al. 1992).

Non-survey input-output models usually are used where funding or time is insufficient to collect complete detailed survey data from firms and government agencies in a region. The Impact Analysis for Planning (IMPLAN) program will be used in this

study. IMPLAN is a computerized database and modeling system that provides a regional input-output analysis of economic activity in terms of 10 industrial groups involving as many as 528 sectors (Strauss and Lord 1995). IMPLAN was developed by the USDA Forest Service and the Federal Emergency Management Agency to estimate the regional impact of management plans for national forests (Alward et al. 1985). It is currently maintained and updated by the Minnesota IMPLAN Group (Olson 1996).

The IMPLAN system has been in use since 1979 and has evolved from a mainframe, non-interactive application to a menu-driven microcomputer program that is completely interactive (Olson, 1996). A detailed description of input-output modeling and IMPLAN is discussed in the *IMPLAN Professional User's Guide* (Olson, 1996). IMPLAN allows greater flexibility in the methods and assumptions in generating multipliers and social accounts than most other non-survey input-output databases. IMPLAN's databases are periodically updated. The version used in this study was based on 1995 economic data.

2.3 Model Adjustments

Applications to a wide range of impact studies have revealed some weaknesses in non-survey input-output models. Any non-survey input-output database will suffer from errors due to the use of the national input-output table or national averages that may be inappropriate for a particular region of the United States. This issue becomes particularly important when building county level models.

One method of dealing with inaccurate spending distributions is to check the

validity of the IMPLAN data with published budget data for the specific region under study. Data provided by the State of Utah's Division of Travel Development, Grand County Travel Council, Moab Area Economic Development Office, and the U.S. Census Bureau was used to check the validity of the IMPLAN data for this study. In checking the data, the U.S. Census Bureau estimates were a bit higher than the state and local estimates for value added, total output and employment. The IMPLAN data estimates for value added and total output were in between the higher U.S. Census Bureau estimates and the lower state and local estimates. The IMPLAN employment estimates were very close to the State of Utah's Division of Travel Development estimates.

Another issue to cause concern is aggregation errors due to loss of data detail. Errors are introduced from production functions, output per worker averages, and other value added ratios (Olson 1996). MIG suggests this is particularly important when comparing local and statewide impacts based on a single local impact. Local and statewide visitor spending impacts will not be compared in this paper.

2.4 IMPLAN Case Studies

The economic impact of travel and tourism has been analyzed with IMPLAN in several regions and for various types of recreational activities. Dawson et al. (1993) analyzed the impact of the establishment of Great Basin National Park on local economies. Data from the 1988 Great Basin National Park Visitor Survey was used to calculate visitor expenditures and their impacts in surrounding rural counties. Data from 1,032 visitor groups from outside the counties indicated that visitors spent an average of

\$23.73 per person per trip in the study counties in 1988. Total visitor expenditures accounted for 0.5% of total gross output, 0.5% of value added and 0.7% of employment in the three counties. To increase the economic benefits of National Parks in regions similar to the area surrounding Great Basin NP, Dawson et al. recommended implementing strategies for increasing visitor expenditures and length of stay in the area.

Strauss et al. (1996) estimated the economic impact of travel and tourism within a nine-county region of southwestern Pennsylvania. Travel and tourism was described on the basis of 28 activities that attracted visitors to the region. On site interviews were used to obtain expenditure information within each activity. Total expenditures from all visitors amounted to \$662 million, with 68 percent coming from non-residents (Strauss et al. 1996). Tourism based activities generated 67 percent of the non-resident expenditures, with the remainder tied to business and transient travel.

Bergstrom et al. (1990) estimated the economic effects of recreational spending on selected rural areas in Georgia. Recreational expenditures associated with visits to state parks were estimated from data provided by the Public Area Recreation Visitor Study (PARVS). Recreation related multipliers estimated for gross output, employment, and income were relatively large (ranging from 1.45 to 4.35), suggesting that recreational spending stimulates a considerable amount of economic activity in rural economies. This suggests that outdoor recreation can provide a viable development strategy for rural communities.

Cordell et al. (1990) analyzed the economic effects on local regions of managing rivers for outdoor recreation. Recreational expenditures associated with visits to state

parks were estimated from data provided by PARVS. Results indicate that visitor spending generates a considerable amount of economic activity and growth in local regions. Economic effects include increases in total gross output ranging from \$2.6 million to \$13.4 million, increases in total income ranging from \$1.2 million to \$5.6 million, and increases in employment ranging from 60 to 292 jobs. Estimated regional multipliers suggest that there is a great potential for stimulating additional economic growth in local regions by taking action to increase visits from nonresidents to recreational rivers (Cordell et al. 1990).

Johnson et al. (1989) estimated the contribution to local income from tourist's spending in six different economic sectors. A survey of Coastal Oregon businesses was used to estimate the proportion of sales to non-local households and the distribution of local input purchases. This data was substituted into IMPLAN for the tourism sectors of interest. Income response coefficients for the six sectors show that sales by restaurants, lodging places, amusements, and charter and marine services generate the most local income per dollar of sale (Johnson et al. 1989).

In summary, IMPLAN has been used in numerous ways to determine the economic impact of travel and tourism activities. Most studies report the output, income, and number of jobs supported in the region. While these studies reflect the level of economic activity produced by travel and tourism, they do not necessarily reflect the actual impact. In order to determine the impact of travel and tourism within a specific region, the economic benefits of tourism must be compared to the total economic activity within the region.

CHAPTER THREE

GRAND COUNTY PROFILE

In this analysis, individual industries are aggregated into one of the nine major business sectors for the economy. This allows for comparison between county, state, and national economies. The sectors are described in Appendix A.

Detailed economic descriptions of the sectors identify the role various industries play in providing employment and household income, generating sales revenues, and maintaining other economic activities. Employment, total output, value added, and other measures of economic activity will be analyzed to provide a profile of the Grand County economy.

3.1 Employment

Employment is total wage and salary employees and self employed jobs in a region (Olson 1996). IMPLAN estimates include both full time and part time workers and is measured in total jobs.

The Grand County employment level has changed drastically since the early 1980's. Employment losses in the mining industry caused nonagricultural employment to fall from 3,272 in 1980 to 2,025 in 1988 (Figure 2). Employment started to rise again in 1989 when tourism started to rise. Since then, the nonagricultural employment level has increased rapidly, reaching 4,751 in 1995, a forty three percent increase.

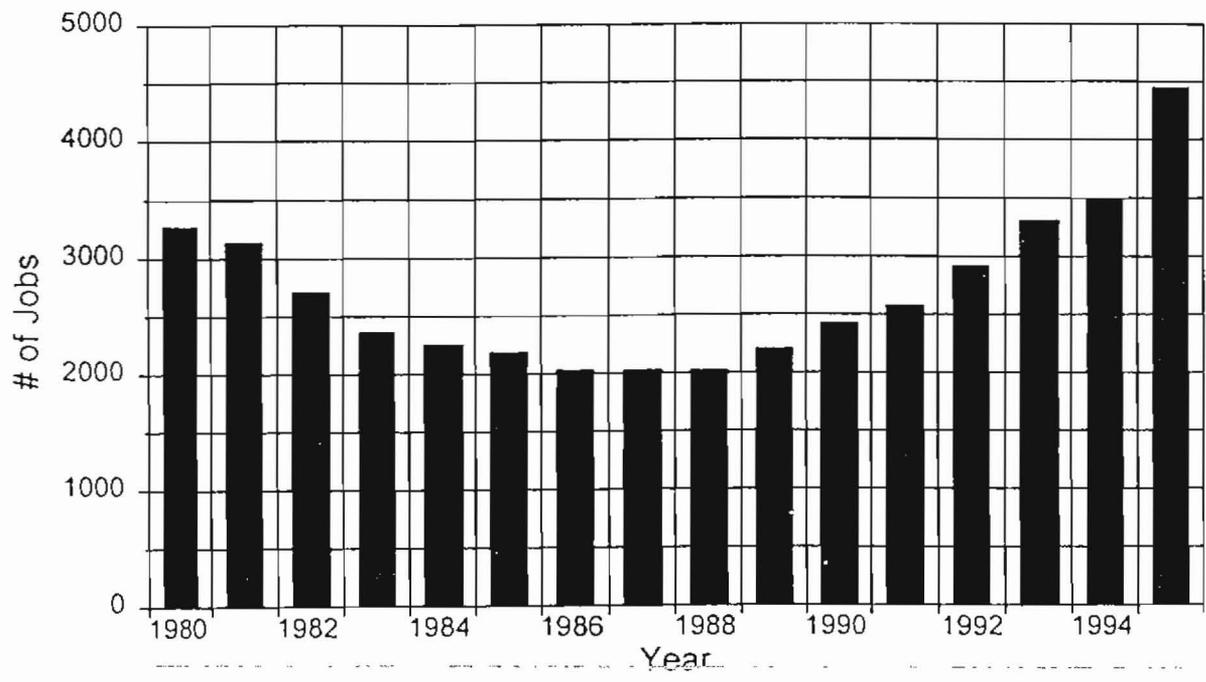


Figure 2. Grand County Nonagricultural Employment, 1980-1995.

Nearly all the gains in employment during the past ten years are in the trade and service sectors, with smaller gains in government and construction. In 1995, over sixty three percent of the county's employees worked in services and trade related jobs (Table 1). Agricultural employment accounted for less than three percent of the county workforce.

Table 1. 1995 Grand County Employment by Sector.

Sector	Employed (# Jobs)	% Total Employment (%)
Agriculture	140	2.86%
Mining	102	2.08%
Construction	349	7.14%
Manufacturing	168	3.44%
Transportation	120	2.45%
Trade	1,617	33.06%
F.I.R.E.	184	3.76%
Services	1,483	30.32%
Government	728	14.89%
Total	4891	100%

Source: IMPLAN

3.1.1 Employment characteristics of the key industries

Trade and Services. In 1995, thirty three percent of the county workforce was employed in trade related jobs and thirty percent in services related jobs. Most of these positions are tourism-related in hotels, restaurants, and recreation related services (Table 2). Grand County is the third highest Utah county in terms of total tourism related jobs in percentage terms behind Garfield and Summit counties (State of Utah 1992).

Table 2. 1995 Employment by Top Ten Industries.

Industry	Sector	Employment (# Jobs)	% Total Employment
Eating & Drinking Establishments	Trade	832	17.01 %
Hotels & Lodging Places	Services	551	11.27 %
State and Local Government- Education	Government	330	6.75 %
Miscellaneous Retail	Trade	246	5.03 %
Amusement and Recreation Services	Services	201	4.11 %
Food Stores	Trade	187	3.82 %
Federal Government Non Military	Government	171	3.50 %
State and Local Government- Non Education	Government	166	3.39 %
Automotive Dealers & Services	Services	132	2.70 %
Accounting, Auditing, & Bookkeeping	Services	119	2.43 %
Top 10 industries		<u>2,935</u>	<u>60.01 %</u>
All industries		4,891	100%

Source: IMPLAN

Government. In 1995, over fourteen percent of the county's employees worked in government related jobs. Since 1988, steady gains have been reported every year in the number of government employees. The National Park Service and the U.S. Bureau of Land Management rank among the top six employers in the county.

Mining. In 1995, less than three percent of the county's employees worked in mining related jobs. This is a decrease of over twenty percent of the mining employment from the early 1980's. The fall in the number of miners is actually greater than the employment numbers indicate. Several hundred miners who lived in Grand County and worked in neighboring San Juan County mines also lost their jobs (State of Utah 1995).

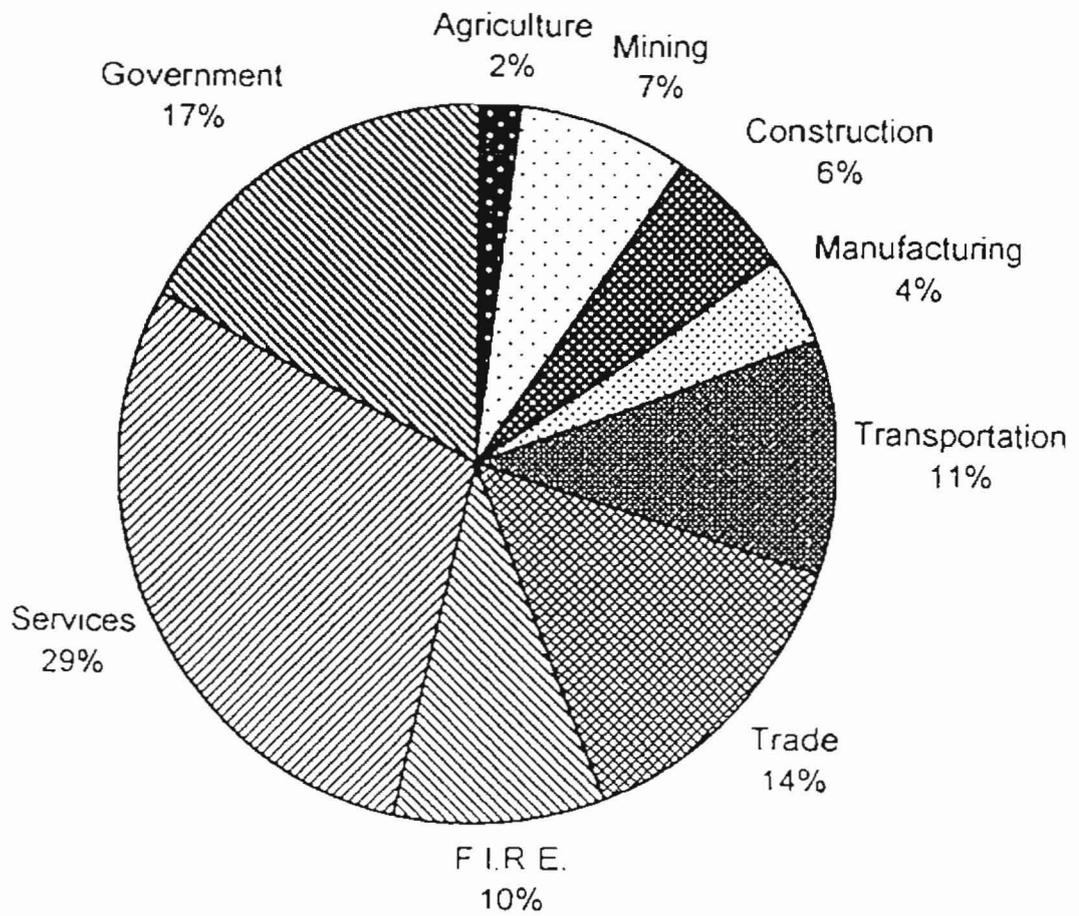


Figure 3. Total Value Added by Sector, Grand County 1995

3.5 Population

Grand County has experienced rapid population growth since the early 1990's. Population has increased from 6,620 in 1990, to 8,350 in 1995 (Figure 4). According to Moab Chamber of Commerce, the current growth rate is approximately five percent per year. The county's population is expected to surpass the 9,000 mark before the turn of the century (Grand County General Plan, 1996).

3.6 Land Ownership

The Federal and State government manage ninety four percent of Grand County's total land area. Figure 5 shows the amount of land administered by each agency. These lands have many diverse uses, including recreation, woodland products, wildlife management, livestock grazing, and mineral resources. Different recreational activities are permitted in these areas, depending on which government agency administers the land.

Arches and Canyonlands are the most heavily visited National Parks in the Grand County area. A 1992 study by the Governor's Office of Planning and Budget projected that the number of visitors to Utah's National Parks will grow at a long-term rate of about 3.5% per year (State of Utah, 1992). The average annual percent change in visitors to Arches and Canyonlands National Parks has been approximately 6.7% for the last five years (Figure 6). This growth in visitor use is over three percent higher than the state average for National Park visits.

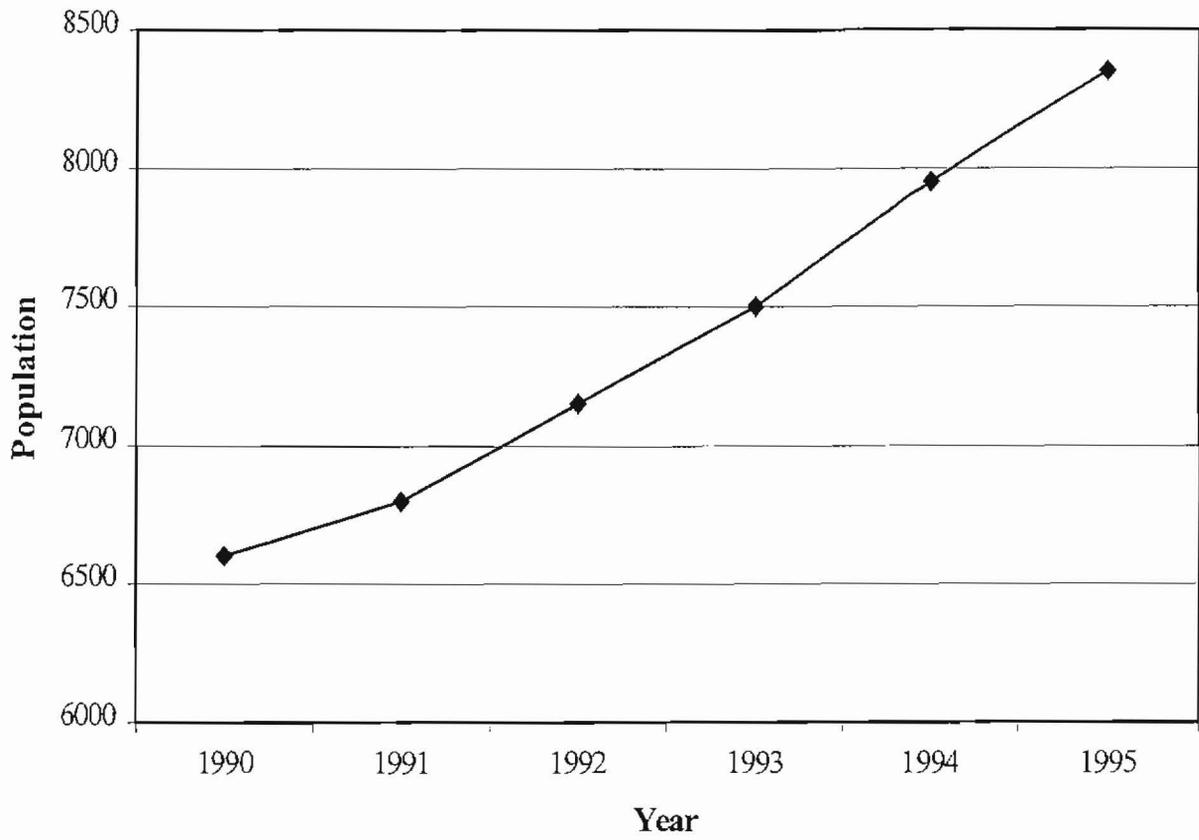
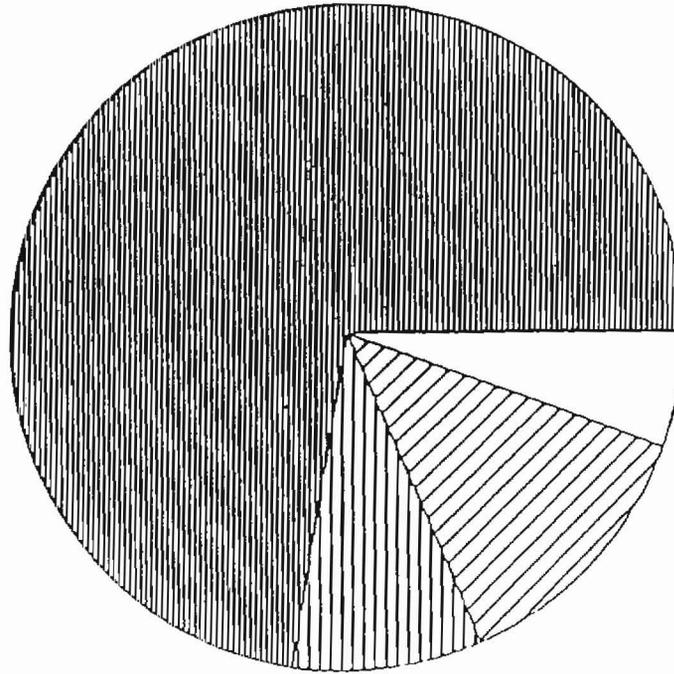


Figure 4. Grand County Population 1990 to 1995



federal
 tribal
 state
 private

<i>owner</i>	<i>acres</i>	<i>share</i>
Bureau of Land Management	1,534,287	67.2%
National Park Service	65,475	2.9%
Forest Service	57,527	2.5%
other federal agencies	1,797	0.1%
TOTAL FEDERAL LANDS	1,659,086	72.6%
UINTAH-OURAY INDIAN RESERVATION	200,275	8.8%
STATE LANDS	300,631	13.2%
PRIVATE LANDS	124,125	5.4%
TOTAL LAND AREA	2,284,117	3,569 square miles

Figure 5. Grand County Land Ownership

Source: 1996 Grand County General Plan

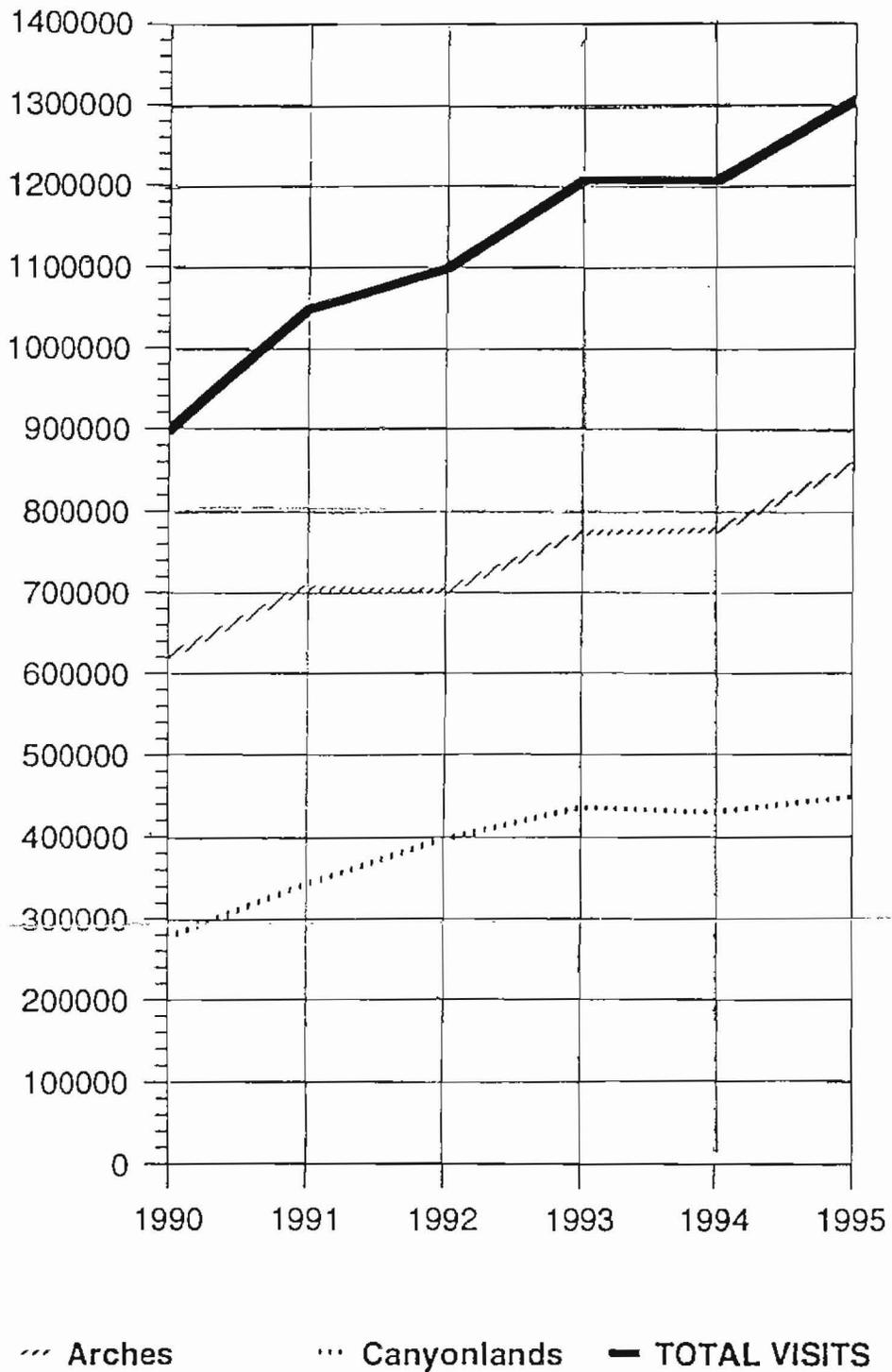


Figure 6. National Park Visitation
 Source: 1996 Grand County General Plan

CHAPTER FOUR

CONDUCT THE ANALYSIS

4.1 Visitor Expenditure Profiles

A key step in estimating total visitor expenditures is the development of visitor expenditure profiles. An expenditure profile is a series of mean expenditure rates for individual goods and services purchased either during a recreation trip or for use on a recreation trip (Jackson 1992). Changes in visitor spending can be applied to a model of the local economy to estimate multiplier effects (indirect and induced) or to convert spending changes to associated changes in income and employment (Stynes 1998).

Visitor spending estimates have been estimated by expert judgement, from secondary sources, through primary data collection, or through some combination of these methods (Stynes 1998). Collecting primary data through on-site visitor surveys increases the accuracy and detail of the regional spending estimates as compared to using secondary source data. On-site visitor surveys will also increase the time and expense of the study. Existing visitor expenditure profiles are used when funding or time is insufficient to conduct primary data. In order to use an existing visitor expenditure profile, it must be a reliable source of expenditure data closely matching the same type of recreation activities within the study area.

Average daily travel related expenditure profiles for various recreation activities were derived from the 1991 National Survey of Hunting, Fishing and Wildlife-Related Recreation (U.S. Dept. of Interior 1991) by the U.S. Forest Service (Alward 1997). The Survey reports the trip-related spending within each state for state residents and non-residents while participating in eight different recreation activities (Table 5).

Table 5.

Activities Reported in the Survey of Hunting, Fishing, and Wildlife-Related Recreation

Big Game Hunting

Small Game Hunting

Migratory Bird Hunting

Other Game Hunting

Great Lakes Fishing

Other Fresh Water Fishing

Salt Water Fishing

Non-Consumptive Wildlife Recreation (observing, feeding or photographing fish and wildlife)

Each expenditure profile describes the composition, in terms of spending on specific commodities, and magnitude of average expenditures within the state per person (state residents and non-residents) per day for each recreation activity (Alward 1997).

For this study, the visitor expenditure profile for non-resident, non-consumptive wildlife recreation within the state of Utah was used since it most closely matches the types of recreation activities in Grand County. The visitor expenditure profile used in this study is presented in Appendix C.

Some of the items listed in the expenditure profile are most likely expended outside the county. In the case of airfare, some visitors fly into Moab airport, but most of the visitors fly into the larger airports outside the county. Even though most of the airfare

spending on traveling to Grand County happens outside the county, within Grand County four businesses offer scenic guided air tours over the local areas. For this study it will be assumed that even though some of the spending, such as airfare, happens outside the county, there still is enough spent within the county to justify the visitor spending levels listed in the expenditure profile. Overall, this expenditure profile is considered to be the most consistent source of expenditure data available for Grand County.

4.2 Economic Impact Estimates

Economic impact estimates for the number of visitors to Grand County in 1995 will be calculated to determine the economic effects of visitor spending on the county economy. No data existed on the exact number of visitors during 1995. According to National Park visitation data, 859,372 people visited Arches National Park in 1995. This was the actual number of visitors counted by rangers stationed at the park entrance gate during the peak visitation season (late spring, summer, and early fall). Visitor numbers were not counted when a ranger was not stationed at the entrance gate during the off season months. The Arches visitation data does not include visitors to Grand County who do not visit Arches National Park. The Arches visitation data will not be used as the estimate for total Grand County visitors since it only accounts for peak season visitation to Arches National Park.

The Grand County Council (1996) states that Grand County's year round population is joined by more than a million visitors to Arches and Canyonlands national parks and other natural attractions of southeastern Utah each year. The Moab Economic

Development Office estimates tourists spent approximately 1.5 million visitor days in Grand County in 1995. This estimate was the only estimate available for the total number of visitors to Grand County.

One way to check the accuracy of the visitation estimate provided by the Moab Economic Development Office would be to add up the number of visitors to each recreation area within the county and build this number up to get the estimate for total number of visitors. The Utah Travel Council collects visitation data for National Parks and State Parks in Utah. Information on the average number of annual visitors to Slickrock bike trail, managed by the Bureau of Land Management, is collected by Moab Americorps (Bigler). Information for other Bureau of Land Management sites within Grand County was not available.

Table 6 shows the 1995 annual visitation for recreation areas within Grand County. In 1995, the number of visits to recreation areas within Grand County totaled to 1,672,593 visits. From this estimate the actual number of visitor days can not be determined since it is not known how many visitors went to more than one recreation area within the county. Also, only part of Canyonlands National Park lies within Grand County, the majority of the park is in San Juan County. Due to the problems associated with double counting, the more conservative estimate of 1.5 million visitors provided by the Moab Economic Development Office will be used as the 'current' total number of visitors to Grand County.

Table 6. 1995 Annual Visitation for the Grand County Area

Recreation Area	Number of Visits
Arches National Park	859,374
Canyonlands National Park	448,769
Dead Horse Point State Park	205,769
Slickrock Bike Trail	158,681
Total	1,672,593

On account of the lack of data available on the exact 'current' number of visitors to Grand County, 'high' level and 'low' level estimates are calculated to provide the likely range of economic impacts resulting from visitor spending. The 'high' level was constructed by increasing estimated visitation by 10 percent. Likewise, the 'low' level was constructed by decreasing estimated visitation by 10 percent.

Due to the assumption of linearity within the input-output model, using 10 percent as the range allows for easy computation for all other ten percent increments in visitation levels. For example, if the change in employment for a ten percent increase in visitor levels resulted in 500 additional jobs to the current level of employment, a twenty percent increase would result in 1000 additional jobs to the current level of employment. A thirty percent decrease would result in the reduction of 1500 jobs from the current level of employment. Similarly, a five percent change in visitors can be calculated by taking half of the difference between the current level of visitors and the ten percent change in visitor level estimates. The tables needed to make these comparisons are presented in Appendix D.

4.3 Visitation Projections

In order to determine the economic impacts of changes in tourism levels, estimates for ten percent, twenty percent, and thirty percent increases and decreases from the 'current', 'high' and 'low' level estimates are calculated to show the range of economic impacts resulting from different levels of visitor spending. This information on how the different sectors of the economy are effected by changes in tourism levels can help local officials plan and respond to changes in growth and tourism.

CHAPTER FIVE

RESULTS

The direct, indirect, induced, and total effects of visitor spending for the current, low and high visitation levels are presented in Table 7. Estimated 1995 visitor expenditures amounted to \$55.31 million in terms of total gross output, \$30.77 million in value added, and resulted in 1,206 jobs. The estimated economic impacts for the low visitation level are 90 percent of those for the current level, while the impacts for the high visitation level are 110 percent of those for the current level. This is due to the assumption of linearity within the input-output model framework.

Table 7. 1995 Economic Impacts of Visitor Spending by Visitation Levels.

Visitation Level	Total Gross Output (Million \$)	Total Value Added (Million \$)	Employment (# of Jobs)
<u>Low</u>			
Direct	27.840	14.800	663.8
Indirect	9.964	5.733	184.4
Induced	<u>11.972</u>	<u>7.158</u>	<u>237.3</u>
Total	49.776	27.691	1085.5
<u>Current</u>			
Direct	30.934	16.445	737.6
Indirect	11.070	6.370	204.9
Induced	<u>13.303</u>	<u>7.953</u>	<u>263.6</u>
Total	55.307	30.768	1206.1
<u>High</u>			
Direct	34.027	18.089	811.3
Indirect	12.178	7.007	225.4
Induced	<u>14.633</u>	<u>8.748</u>	<u>290.0</u>
Total	60.838	33.845	1326.7

5.1 Multipliers for the Grand County Economy

The type I multipliers for total output, value added, and employment by sector for the Grand County economy are presented in Table 8. The type I multiplier measures the direct and indirect effects of a change in economic activity (Olson 1996). The type I multiplier only reflects the indirect inter-industry effects. An example of this would be industries buying from local industries.

Table 8. Type I Multipliers for Grand County

Sector	Total Output	Value Added	Employment
Agriculture	1.24	1.24	1.17
Mining	1.27	1.29	1.64
Construction	1.34	1.55	1.53
Manufacturing	1.29	1.44	1.48
Transportation	1.31	1.29	1.95
Trade	1.29	1.27	1.19
F.I.R.E.	1.26	1.22	1.47
Services	1.38	1.42	1.29
Government	1.01	1.00	1.00

Type I = (Direct + Indirect) / Direct

The type II multipliers for total output, value added, and employment by sector for the Grand County economy are presented in Table 9. The type II multiplier measures the direct, indirect, and induced effects of a change in economic activity. In addition to the inter-industry effects, the type II multiplier also takes into account the income and expenditures of households (Olson 1996). The type II multiplier is often the appropriate

one to use to capture the full long-run effects of a permanent change in final demand in a local economy (Loomis 1993).

Table 9. Type II Multipliers for Grand County

Sector	Total Output	Value Added	Employment
Agriculture	1.55	1.58	1.39
Mining	1.52	1.55	2.62
Construction	1.70	2.16	2.08
Manufacturing	1.56	1.84	1.94
Transportation	1.56	1.53	3.03
Trade	1.73	1.69	1.48
F.I.R.E.	1.39	1.34	1.78
Services	1.83	1.94	1.66
Government	1.69	1.42	1.51

Type II = (Direct + Indirect + Induced) / Direct

5.2 Economic Impacts By Number of Visitor Days

The economic impacts of visitor spending for 10,000 visitor days to Grand County are presented in Table 10. Estimated visitor expenditures for 10,000 visitor days amounted to \$369 thousand in terms of total gross output, \$205 thousand in value added, and resulted in eight jobs. In this study, the 10,000 level was chosen for the number of visitors on account of using a lower number of visitors resulted in no employment effects.

Showing the economic impacts in terms of the number of visitor days provides the local managers and planners an easy way to calculate the economic impacts for an associated change in the number of visitors. The assumption of linearity within the input-output model framework allows for the easy calculation of other changes in visitor levels by 10,000 visitor day increments. For example, if the land manager was interested in determining the economic impacts of 100,000 additional visitor days, the manager can

multiply the estimates presented in Table 10 by ten (10,000 visitor days * 10 = 100,000 visitor days) for the economic impacts associated with 100,000 additional visitor days.

Table 10. Impacts for 10,000 Visitor Days to Grand County

Sector	Total Gross Output (\$)	Total Value Added (\$)	Total Employment (# Jobs)
Agriculture	852	485	0.0
Mining	2,069	1,153	0.0
Construction	5,477	1,921	0.1
Manufacturing	15,704	6,079	0.2
Transportation	24,820	15,591	0.1
Trade	63,039	39,125	1.8
F.I.R.E.	28,644	19,809	0.2
Services	220,744	113,661	5.4
Government	<u>7,333</u>	<u>7,274</u>	<u>0.2</u>
TOTAL	368,681	205,099	8.0

5.3 Relative Contributions to the Grand County Economy

Table 11 presents the range of economic impacts for each sector (from the low and high visitor levels) attributed to nonresident visitor spending within the county. The values in Table 11 provide a measure of the additional economic activity in Grand County that can be attributed to visitor spending within each sector. Comparing the economic impacts of visitor spending from Table 11 to the total Grand County economic activity from Chapter 3 will determine the degree to which visitor spending is an integral component of the Grand County economy.

Table 11. 1995 Range of Economic Impacts by Sector from the Low and High Visitor Levels

Sector	Total Gross Output (\$ Millions)	Total Value Added (\$ Millions)	Total Employment (# Jobs)
Agriculture	.12 - .14	.07 - .08	3.1 - 3.8
Mining	.28 - .34	.16 - .19	1.4 - 1.7
Construction	.74 - .90	.26 - .32	9.6 - 11.7
Manufacturing	2.12 - 2.59	.82 - 1.00	23.7 - 28.9
Transportation	3.35 - 4.10	2.11 - 2.57	15.7 - 19.2
Trade	8.51 - 10.40	5.28 - 6.48	246.9 - 301.7
F.I.R.E.	3.87 - 4.73	2.68 - 3.27	33.1 - 40.5
Services	29.80 - 36.42	15.35 - 18.75	725.1 - 886.2
Government	.99 - 1.21	.98 - 1.2	26.9 - 32.9
TOTAL	49.78 - 60.83	27.71 - 33.86	1085.5 - 1326.6

The economic impacts presented in Table 12 represent the relative magnitude visitor spending has on each sector of the economy. In 1995, visitor spending accounted for 19 to 24 percent of total output produced in Grand County, 18 to 22 percent of value added, and 22 to 27 percent of the county's total employment. The services, trade, manufacturing, and transportation sectors are the most impacted. Between 49 to 60 percent of the services sector's output, value added, and employment is attributed to visitor spending. The mining, agricultural, and construction sectors are the least impacted by tourism activities.

Table 12. 1995 Relative Impacts of Visitor Spending by Sector on the Grand County Economy

Sector	Total Gross Output (%)	Total Value Added (%)	Total Employment (%)
Agriculture	2.33 - 2.71	2.38 - 2.72	2.21 - 2.71
Mining	1.36 - 1.65	1.40 - 1.66	1.37 - 1.67
Construction	2.75 - 3.35	2.76 - 3.40	2.75 - 3.35
Manufacturing	14.09 - 17.21	14.08 - 17.17	14.11 - 17.20
Transportation	13.08 - 16.01	13.12 - 15.98	13.08 - 16.00
Trade	15.26 - 18.65	15.26 - 18.72	15.27 - 18.66
F.I.R.E.	18.03 - 22.03	18.05 - 22.02	17.99 - 22.01
Services	48.89 - 59.75	48.91 - 59.74	48.89 - 59.76
Government	<u>3.70 - 4.52</u>	<u>3.69 - 4.52</u>	<u>3.70 - 4.52</u>
TOTAL	19.28 - 23.56	18.10 - 22.11	22.19 - 27.12

5.4 Changes in Visitor Levels

Many factors can influence why tourists choose to visit an area. Advertising or increasing the quality of the visitor's experience can increase the number of trips by non-resident visitors. Improving visitor facilities by building visitor centers and improving local roads to make scenic areas more accessible are examples of ways to increase the visitor's experience. The more a visitor enjoys their stay in Grand County, the more likely they are to come visit again and tell their friends about their stay.

Alternatively, a recession in the national economy could decrease the number of trips by non-resident visitors. Uncontrolled tourism can damage natural resources by adversely impacting soils, vegetation, water, and scenic quality. If not managed properly, tourism can strain local facilities and services including water, waste disposal, and public safety. This depletion of natural resources and local facilities can cause tourism to decline.

As the number of visitors to Grand County increases, so does the amount of economic activity associated with visitor spending. Likewise, the amount of economic activity associated with visitors spending decreases as the number of visitors to Grand County decreases. Figures 7-9 shows the changes in the level of total output, total value added, and total employment for different levels of Grand County visitors as visitation increases or decreases by ten percent, twenty percent, and thirty percent from the present level. The impacts for each sector are presented in Appendix B.

Information on how changes in tourism levels effects the Grand County economy provides one of the pieces needed for defining the optimal allocation of publicly managed resources in Grand County. This information needs to be combined with information on sensitivity of the region's natural resources to tourism levels, provided by local resource managers, to find the level of tourism that is best for the local economy and conserving the area's natural resources.

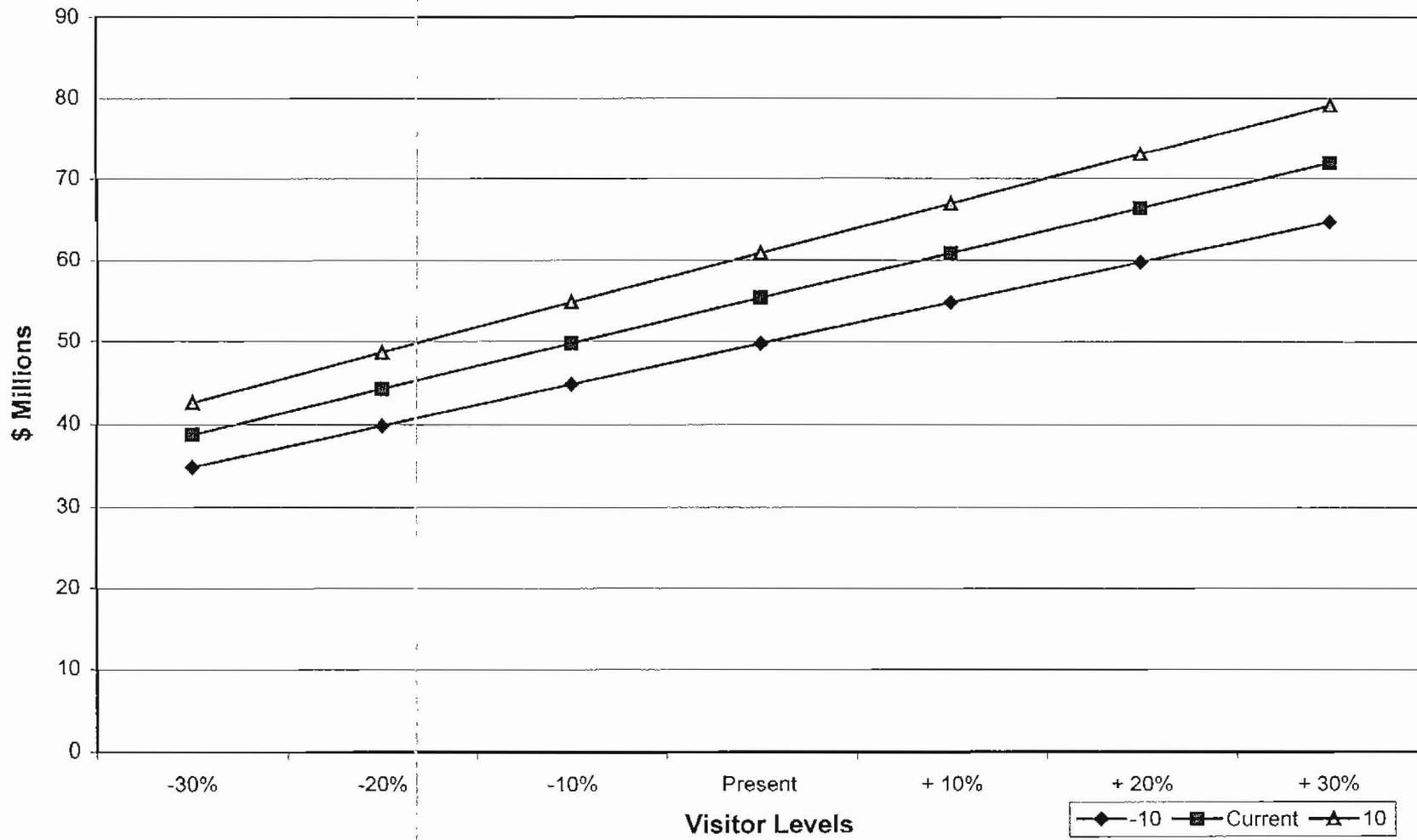


Figure 7. Total Output Impacts for Changes in Visitor Levels

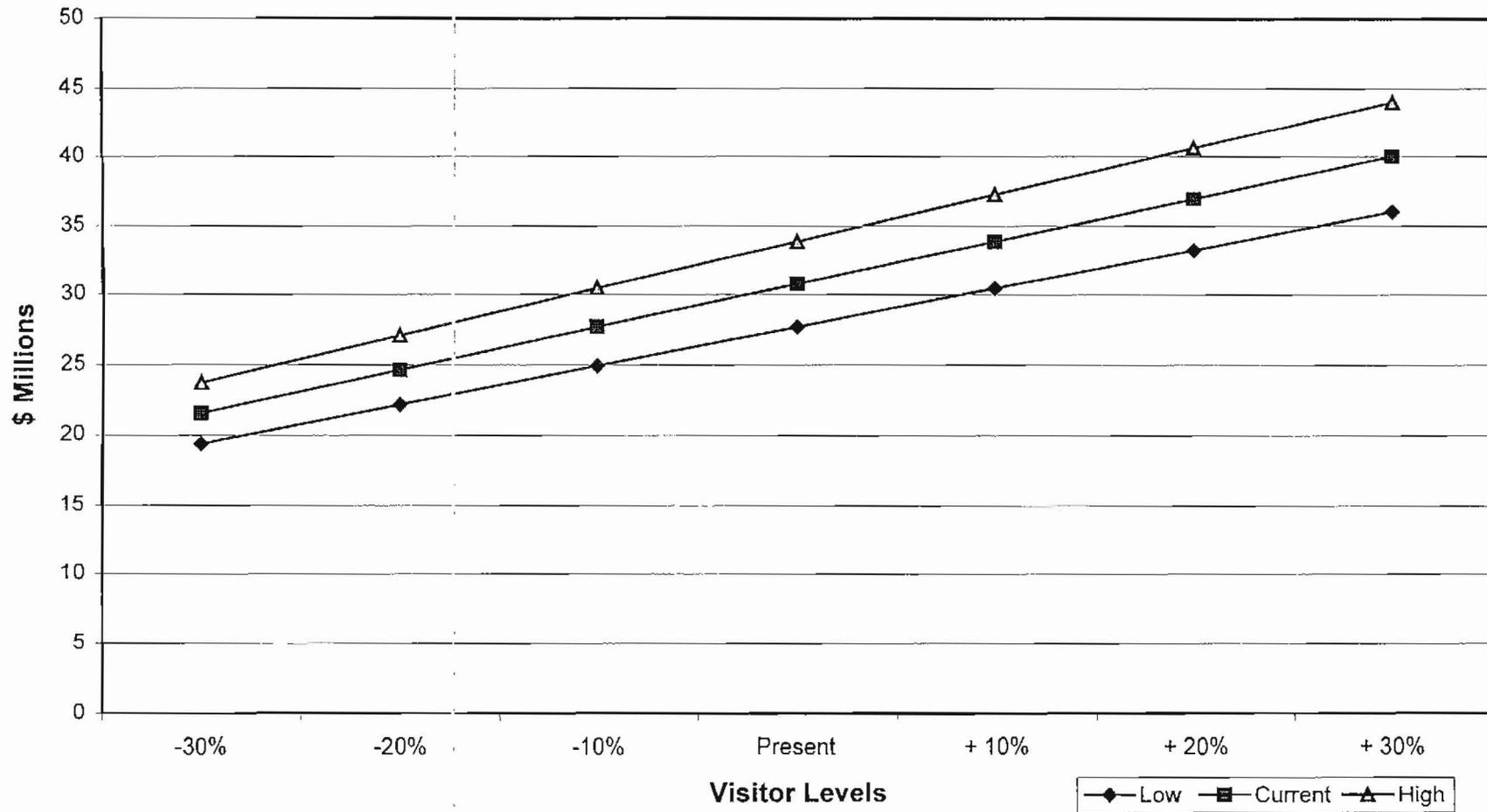


Figure 8. Value Added Impacts for Changes in Visitor Levels

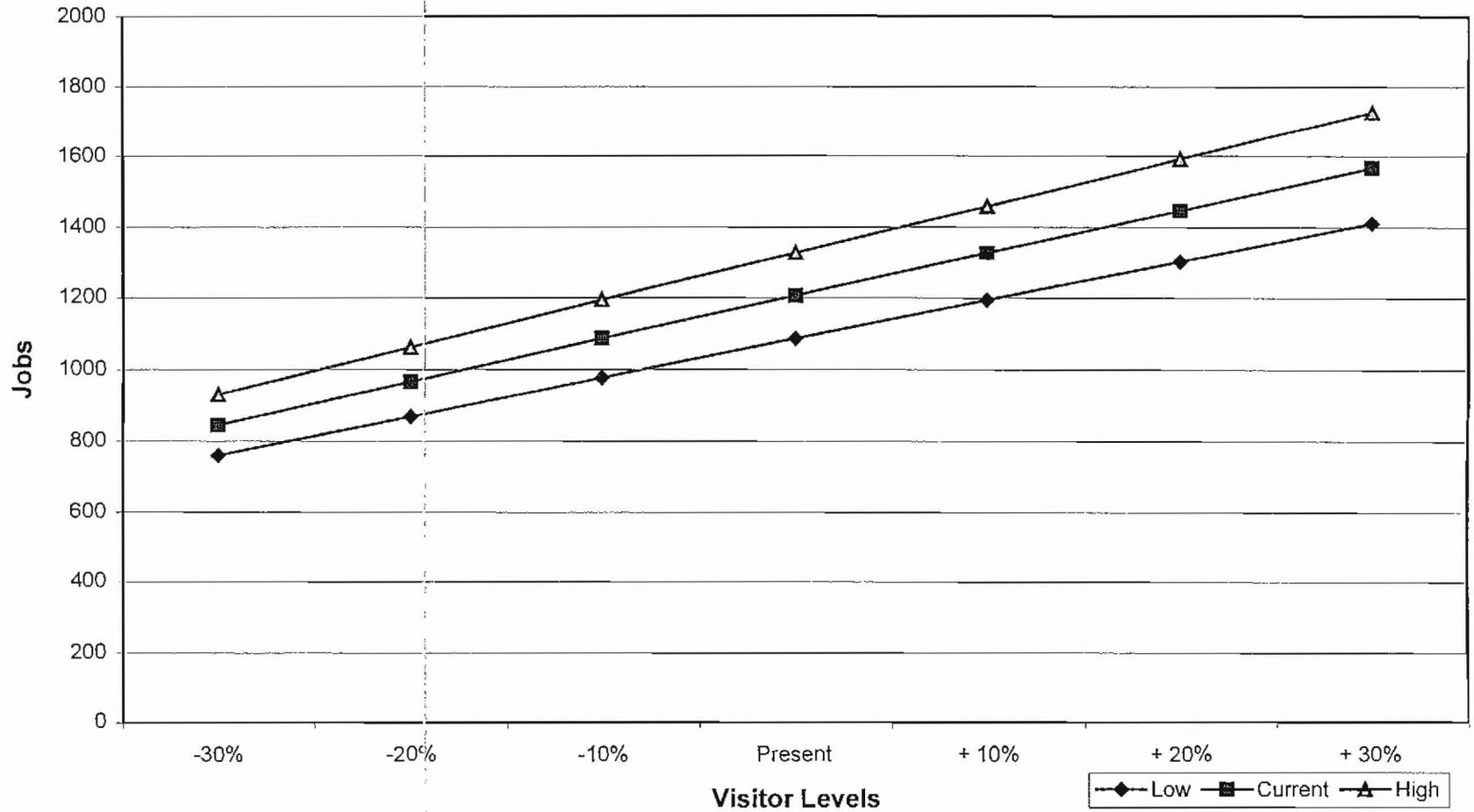


Figure 9. Employment Impacts for Changes in Visitor Levels

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

This study was conducted as part of the current research of the Social, Economic and Institutional Analysis Section (SEIAS), of the Biological Resources Division, U.S. Geological Survey. The intent of the SEIAS research is to provide integrated ecological and economic systems information to public land managers and the people they serve. The current SEIAS research focuses on the Colorado Plateau because this region provides an opportunity to shape land management practices under complex environmental and social conditions including fragile desert ecosystems sustaining increasing residential populations and heavy recreational use, all governed by a mosaic of public and private agencies. Part of this research is to understand how tourism effects the local economies of the Colorado Plateau. To understand the impacts of tourism requires constructing a detailed inter-industry model of the local economy that tracks changes in economic activity (such as tourism) as they ripple through the different industrial sectors of the economy.

The impacts of spending by visitors for 1995 were identified for Grand County, Utah. A visitor expenditure profile created by the U.S. Forest Service was used to determine non-resident visitor spending for Grand County. Due to the lack of data available on the number of visitors to Grand County, 'current', 'high' and 'low' level

estimates were calculated to provide the likely range of economic impacts resulting from visitor spending. Visitor impacts were estimated with an IMPLAN model of Grand County using 1995 data.

Estimated 1995 spending by visitors amounted to \$50 to \$61 million in terms of total gross output, \$28 to \$34 million in value added, and resulted in 1086 to 1327 jobs. Visitor spending accounted for 19 to 24 percent of total output, 18-22 percent of total value added, and 22 to 27 percent of the county's total employment. The services, trade, manufacturing, and transportation sectors are the most impacted by visitor spending.

6.1 Recommendations for Future Studies

This type of study could be improved by having better estimates of the number of visitors to Grand County and their associated expenditures within the county. Grand County provides visitors with numerous recreational uses including mountain biking, hiking, river rafting, fishing, camping, cultural heritage viewing, and four-wheeling. If data existed on the number of visitor days by type of recreation or tourism activity within Grand County, on-site visitor surveys could be conducted to create visitor expenditure profiles for each different recreation activity. This information on the number of visitor days by type of recreation activity can increase the accuracy and detail of the regional spending estimates as compared to using secondary source data.

Information on how tourism effects the Grand County economy provides one of the steps in the process of defining management and policy options needed for determining the optimal allocation of publicly managed resources in Grand County. This

information needs to be combined with information on the sensitivity of the region's natural resources to tourism levels, in order to determine the level of tourism that is best for the local economy and conserving the area's natural resources.

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APPENDIX A: ECONOMIC SECTOR DESCRIPTIONS

Appendix A. Economic Sector Descriptions

Agriculture includes traditional crop and livestock operations as well as horticulture and greenhouse businesses. The agriculture includes twenty seven industries.

Mining includes metals, petroleum, and natural gas extraction industries. Mining also includes raw materials for construction such as sand, gravel, and stone. The mining sector includes twenty industries.

Construction includes residential, commercial, and infrastructure projects; three construction maintenance industries are also included. The construction sector includes ten industries.

Manufacturing includes the largest number and broadest spectrum of industries, ranging from food processing to fabric mills and from wood products to munitions manufacturing. The manufacturing sector includes 375 industries.

Transportation, Utilities, Communication are labeled an abbreviated "Transportation." Transportation includes fourteen industries.

Trade sector combines wholesale and retail businesses. Trade includes nine industries.

Services includes personal and business services, health care (four industries) and education (four non-government industries) among others. The sector includes forty seven industries.

Finance, Insurance, Real Estate (F.I.R.E.) is a self-descriptive sector. Real estate includes only property sales, not construction. The F.I.R.E. sector includes seven industries.

Government is a sector is segmented into Federal (military and nonmilitary) and State/Local (education and non-education). The government sector also includes specialized services industries that do not fit other categories, such as household laborers, scrap dealers, etc. The government sector includes nineteen industries.

Source: Draper 1992

APPENDIX B: IMPACTS FOR CHANGES IN VISITOR LEVELS BY SECTOR

Impacts for a Ten Percent Change in Visitor Levels

Sector	Total Gross Output (\$ Millions)	Total Value Added (\$ Millions)	Total Employment (# Jobs)
Agriculture	0.1408	0.0803	3.85
Mining	0.341	0.1903	1.65
Construction	0.9042	0.3168	11.77
Manufacturing	2.5916	1.0032	28.93
Transportation	4.0964	2.5729	19.25
Trade	10.4038	6.457	301.73
F.I.R.E.	4.7267	3.2692	40.48
Services	36.4232	18.7539	886.16
Government	<u>1.21</u>	<u>1.2001</u>	<u>32.89</u>
TOTAL	60.8377	33.8437	1326.71

Impacts for a Twenty Percent Change in Visitor Levels

Sector	Total Gross Output (\$ Millions)	Total Value Added (\$ Millions)	Total Employment (# Jobs)
Agriculture	0.1536	0.0876	4.2
Mining	0.372	0.2076	1.8
Construction	0.9864	0.3456	12.84
Manufacturing	2.8272	1.0944	31.56
Transportation	4.4688	2.8068	21
Trade	11.3496	7.044	329.16
F.I.R.E.	5.1564	3.5664	44.16
Services	39.7344	20.4588	966.72
Government	<u>1.32</u>	<u>1.3092</u>	<u>35.88</u>
TOTAL	66.3684	36.9204	1447.32

Impacts for a Thirty Percent Change in Visitor Levels

Sector	Total Gross Output (\$ Millions)	Total Value Added (\$ Millions)	Total Employment (# Jobs)
Agriculture	0.1664	0.0949	4.55
Mining	0.403	0.2249	1.95
Construction	1.0686	0.3744	13.91
Manufacturing	3.0628	1.1856	34.19
Transportation	4.8412	3.0407	22.75
Trade	12.2954	7.631	356.59
F.I.R.E.	5.5861	3.8636	47.84
Services	43.0456	22.1637	1047.28
Government	1.43	1.4183	38.87
TOTAL	71.8991	39.9971	1567.93

APPENDIX C: VISITOR EXPENDITURE PROFILE

Visitor Expenditure Profile for Non-Resident Non-Consumptive Wildlife Recreation for
the State of Utah

IMPLAN Sector	Value
Poultry and Eggs	0.130998000
Feed Grains	0.009314168
Hay and Pasture	0.004972688
Fruits	0.456640600
Tree Nuts	0.015764810
Vegetables	0.721332300
Oil Bearing Crops	0.001601113
Greenhouse and Nursery Products	0.022384790
Forestry Products	0.002617204
Commercial Fishing	0.193534600
Potash, Soda, and Borate Minerals	0.000092372
Phosphate Rock	0.000046186
Chemical, Fertilizer Mineral Mining, N.E.C.	0.000046186
Meat Packing Plants	1.370676000
Sausages and Other Prepared Meats	1.198171000
Poultry Processing	0.648712600
Creamery Butter	0.051235620
Cheese, Natural and Processed	0.343685100
Condensed and Evaporated Milk	0.174983200
Ice Cream and Frozen Desserts	0.110353600
Fluid Milk	0.878087500
Canned Specialties	0.337434600
Canned Fruits and Vegetables	0.783236900
Dehydrated Food Products	0.118605500
Pickles, Sauces, and Salad Dressings	0.219090800
Frozen Fruits, Juices and Vegetables	0.287846300
Frozen Specialties	0.438859000
Flour and Other Grain Mill Products	0.055207620
Cereal Preparations	0.393781500
Rice Milling	0.031652780
Blended and Prepared Flour	0.206497400
Wet Corn Milling	0.059210400

Dog, Cat, and Other Pet Food	0.400062800
Prepared Feeds, N.E.C	0.048141170
Bread, Cake, and Related Products	1.073716000
Cookies and Crackers	0.398092200
Sugar	0.123208700
Confectionery Products	0.563222400
Chocolate and Cocoa Products	0.081749140
Chewing Gum	0.074267020
Salted and Roasted Nuts & Seeds	0.068539960
Soybean Oil Mills	0.001847438
Shortening and Cooking Oils	0.097129070
Malt Beverages	1.305257000
Wines, Brandy, and Brandy Spirits	0.354208700
Distilled Liquor, Except Brandy	0.408350300
Bottled and Canned Soft Drinks & Water	1.393353000
Flavoring Extracts and Syrups, N.E.C.	0.155692900
Canned and Cured Sea Foods	0.140359100
Prepared Fresh Or Frozen Fish Or Seafood	0.049711480
Roasted Coffee	0.294004400
Potato Chips & Similar Snacks	0.374537300
Manufactured Ice	0.018074100
Macaroni and Spaghetti	0.071249540
Food Preparations, N.E.C	0.616105300
Cigarettes	2.051129000
Cigars	0.040993220
Chewing and Smoking Tobacco	0.086164400
Fabricated Textile Products, N.E.C.	0.004172383
Polishes and Sanitation Goods	0.006187426
Chemical Preparations, N.E.C	0.006096547
Petroleum Refining	6.053980000
Lubricating Oils and Greases	0.141449860
Tires and Inner Tubes	1.195746000
Rubber and Plastics Hose and Belting	0.004264151
Gaskets, Packing and Sealing Devices	0.011451480
Fabricated Rubber Products, N.E.C.	0.003655310
Glass and Glass Products, Exc Containers	0.000363730
Hardware, N.E.C.	0.008684875
Steel Springs, Except Wire	0.001004463

Miscellaneous Fabricated Wire Products	0.000548745
Refrigeration and Heating Equipment	0.005524658
Carburetors, Pistons, Rings, Valves	0.000882559
Electric Lamps	0.008934801
Lighting Fixtures and Equipment	0.002162098
Radio and TV Receiving Sets	0.021028230
Printed Circuit Boards	0.000365259
Electronic Components, N.E.C.	0.000737089
Storage Batteries	0.047873870
Engine Electrical Equipment	0.024469870
Motor Vehicle Parts and Accessories	0.092615850
Railroads and Related Services	0.299589000
Local, Interurban Passenger Transit	0.681629000
Motor Freight Transport and Warehousing	0.064898600
Water Transportation	0.129258200
Air Transportation	10.704390000
Arrangement Of Passenger Transportation	0.712015300
Building Materials & Gardening	0.000015395
General Merchandise Stores	0.000046186
Food Stores	0.000061581
Automotive Dealers & Service Stations	0.000030791
Apparel & Accessory Stores	0.000015395
Furniture & Home Furnishings Stores	0.000015395
Eating & Drinking	8.535094000
Miscellaneous Retail	0.000061581
Hotels and Lodging Places	16.047430000
Automobile Rental and Leasing	3.496237000
Automobile Parking and Car Wash	0.351774000
Automobile Repair and Services	4.404060000
Motion Pictures	0.039360630
Theatrical Producers, Bands Etc.	0.006662962
Commercial Sports Except Racing	0.003319780
Racing and Track Operation	0.006162830
Amusement and Recreation Services, N.E.C.	1.594225000
Membership Sports and Recreation Clubs	0.002598068
Other Nonprofit Organizations	0.001724899
Other State and Local Govt Enterprises	0.135201400

Noncomparable Imports	0.103502700
Scrap	-0.025716170
Used and Secondhand Goods	-0.007039097
TOTAL	74.484661755

APPENDIX D: HOW TO CALCULATE THE IMPACTS FROM A TEN PERCENT
CHANGE IN VISITOR LEVELS

How to Calculate the Impacts from a Ten Percent Change in Visitor Levels

Table D.1 presents the impacts of the current visitation level estimates for output, value added, and employment for each sector of the Grand County economy. The impacts for a ten percent change from the current visitation level for output, value added, and employment for each sector are presented in Table D.2. From Table D.1 and Table D.2, all other ten percent increments in visitation levels can be calculated.

Table D.1. 1995 Impacts of Current Spending on the Grand County Economy by Sector

Sector	Total Gross Output (\$ Millions)	Total Value Added (\$ Millions)	Total Employment (# Jobs)
Agriculture	0.128	0.073	3.5
Mining	0.31	0.173	1.5
Construction	0.822	0.288	10.7
Manufacturing	2.356	0.912	26.3
Transportation	3.724	2.339	17.5
Trade	9.458	5.87	274.3
F.I.R.E.	4.297	2.972	36.8
Services	33.112	17.049	805.6
Government	<u>1.1</u>	<u>1.091</u>	<u>29.9</u>
TOTAL	55.307	30.767	1206.1

For example, the spending by the current number of visitors to Grand County generated \$33.112 million in 1995 (Table D.1). A ten percent increase in the number of visitors increases output in the services sector by \$3.311 million (Table D.2), for a total of \$36.422 million. A twenty percent increase in the number of visitors doubles the ten

percent increase in output by the services sector, for a total of \$39.733 million. Decreases by ten percent of the visitation level are calculated by decreasing the current visitation estimates by the impacts for a ten percent change from Table D.2.

Table D.2. Impacts for a Ten Percent Change from the Current Visitation Level

Sector	Total Output (\$ Millions)	Total Value Added (\$ Millions)	Total Employment (# Jobs)
Agriculture	0.013	0.007	0.3
Mining	0.032	0.017	0.2
Construction	0.082	0.029	1.0
Manufacturing	0.235	0.091	2.6
Transportation	0.372	0.234	1.7
Trade	0.946	0.587	27.4
F.I.R.E.	0.43	0.297	3.7
Services	3.311	1.706	80.6
Government	<u>0.11</u>	<u>0.109</u>	<u>3.0</u>
TOTAL	5.531	3.077	120.5