MI-REC

Micro-Implan Recreation Economic Impact Estimation System

USERS' MANUAL
Version 3.0

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PART I.

ECONOMIC IMPACT ASSESSMENT; CONCEPTS AND MODELS

Part I of the MI-REC manual provides an introduction to economic impact assessment for recreation and tourism analysts. Selected regional economic concepts are defined and a conceptual overview is presented of the MI-REC system. Detailed procedures for using MI-REC are covered in Part II.

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CHAPTER 1. INTRODUCTION

This manual and related software were developed to assist planners, researchers, and economic analysts in assessing the local and regional economic impacts of actions affecting recreation and tourism activity. The system is designed to be compatible with Micro-Implan (MI - version 91-F), a microcomputer-based system for regional economic analysis of states, regions, and communities (Alward et al. 1989). Micro-IMPLAN is a system for estimating input-output models for designated sub-regions of the United States. The MI software also includes procedures for predicting impacts of final demand changes using these models.

Assessing the impacts of changes in recreation and tourism activity in a region is complicated by the lack of clearly defined recreation and tourism sectors, and the difficulties in obtaining suitable estimates of recreation and tourism spending in a given area. The MI-REC system helps facilitate the use of IMPLAN for recreation and tourism applications by providing spreadsheets for estimating recreation spending along with utilities for bridging these spending estimates into the IMPLAN system. The system also includes utilities to convert (parse) IMPLAN impact report files into a spreadsheet format.

The MI-REC system has been developed in conjunction with efforts to evaluate economic impacts associated with water-based recreation. Two major surveys, sponsored by the U.S. Army Corps of Engineers, provide the basis for the initial recreation spending files that are included with the MI-REC system. Spending data and categories for these surveys are therefore more detailed for items bought in conjunction with water-based recreation activities such as boating and fishing. The initial use of the MI-REC system is to apply the results of national and regional recreation spending surveys to subregional and local problems. The system has, however, been developed with very general recreation and tourism applications in mind. Provisions are made for extending the system to other applications by adding additional recreation and tourism spending data files from other existing and anticipated future surveys.

Purposes of the MI-REC System

The basic intent of the MI-REC system is to facilitate economic impact assessments of actions affecting recreation and tourism activity. We have been guided by our own experience and that of many other analysts in applying economic impact assessment methods to recreation and tourism problems. MI-REC attempts to address the most frequent problems and complaints:

- lack of recreation and tourism spending data, poor quality of the data that exists, and the costs of gathering spending data.
- lack of consistency in spending categories, units of analysis, measurement and analysis methods.
- misuse and misunderstanding of regional economic concepts and methods, e.g. multipliers.
- complexity of bridging recreation and tourism spending to regional economic sectors.

Regional economists generally find the lack of good recreation and tourism spending data the primary obstacle to applications, while recreation and tourism analysts often do not completely understand the regional economic methods or how to apply them to recreation problems. MI-REC provides some help to both groups as we attempt to fill the need for better quality and more consistent recreation spending data, while also simplifying access to the IMPLAN system for recreation and tourism analysts.
The system has evolved over a number of applications and will continue to be refined to keep up with spreadsheet and IMPLAN software changes. Our focus has been on developing a system for estimating impacts that:

- Does not require extensive primary data collection.
- Is applicable to a wide range of situations and questions.
- Can be carried out at different levels of detail and accuracy, as the situation may dictate.
- Can generate estimates of direct spending as well as estimates of indirect and induced effects in terms of output, income, and employment.
- Automates routine and technical matters so that users can focus on application and interpretation.
- Is tailored to the particular problems and characteristics of recreation and tourism applications.

The elements of such a system have been known for some time to regional economists and other researchers studying recreation and tourism impacts. The basic problem is to obtain reliable estimates of the changes in recreation and tourism spending associated with an action, usually for well-defined visitor market segments, and then to bridge these final demand estimates to regional input-output models in order to estimate local economic impacts (Propst 1985, 1988; Alward and Lofting 1988; Cordell et al. 1987; Bergstrom et al. 1990; Johnson et al. 1989).

Recent developments in microcomputer based input-output modeling software (Brucker, Hastings and Latham 1987) have made regional economic models much more accessible and therefore most recent efforts have been closely tied to such models. Building on the studies cited above, the MI-REC system relies extensively on the IMPLAN input-output modeling system. IMPLAN was developed by the Land Management Planning unit of the USDA Forest Service in Fort Collins, CO (Alward and Palmer 1983, Palmer and Siverts 1985, Alward et al. 1989). The U.S. Army Corps of Engineers Waterways Experiment Station in Vicksburg, MS has supported the development of spending profiles for various visitor segments and the general development of the MI-REC system described herein. The framework for the system and the research agenda to develop it were established in a national workshop on assessing the economic impacts of recreation and tourism held at Michigan State University in 1984 (Propst 1985).

The Importance and Uses of Economic Impact Assessment (EIA)

The value of EIA rests in its usefulness to natural resource policy and decision makers. EIA’s are useful to the extent that they: (1) estimate economic impacts for political jurisdictions, (2) make annual projections required for effective planning, (3) derive impacts for both “with” and “without project” conditions so that the consequences of a proposed action can be anticipated, (4) project business output by sector as an aid to fiscal impact analysis, (5) show the consequences of alternative development scenarios, (6) accept new information as it becomes available, and (7) produce revised impact estimates in a reasonable amount of time (Liestritz and Murdock 1981).

The MI-REC system and Micro-Implan meet these seven conditions. Proposed developments like a new state park or the addition of new slips to an existing marina can quickly be evaluated in terms of the change in economic activity (employment, income, sales, value added) stemming from the injection of new visitor spending into a region. Furthermore, these impacts can be evaluated on an annual basis for a variety of political jurisdictions from any single U.S. county or group of counties, up to and including the entire nation.

Micro-Implan assists the analyst in linking the production capabilities of a given land or water resource to the broader economic community in which it is located. For example, it is possible to demonstrate the regional economic effects of raising or lowering water levels in river systems, and to compare the results among competing resource uses, such as hydroelectric power production versus...
recreational water access and use. Micro-Implan provides detailed descriptions of the structure of a region's economy. These descriptions or "regional accounts" identify which industries are present, their relationship to other industries, and current production, consumption, and employment levels in the region. An understanding of the regional economic structure can be useful during initial planning phases when issues are being defined, as well as in the formulation and evaluation of alternatives later in the planning process.

The MI-REC system is quite flexible. In situations where little data may exist for estimating spending, MI-REC will help you to generalize spending patterns from regional and national surveys or other sites, and then apply these estimates to a particular application. Where good local spending data is available and/or necessary, MI-REC provides a structure for organizing these data and importing recreation spending information into a regional economic analysis system. In either case, the MI-REC system will help you to estimate the regional economic effects of existing or planned policies, actions, and developments that will affect recreation and tourism activity in an area.

In considering applications for which MI-REC is most suitable, the following general impact model is helpful (Figure 1-1). One must first define the action or policy change for which impacts are desired. The nature and extent of recreation and tourism activity affected by the action must be determined. The MI-REC system helps to estimate the spending associated with these changes in recreation activity and IMPLAN’s regional economic models are used to estimate the effects of these spending changes on a regional economy.

![Figure 1.1. Tracing the Impacts of An Action on the Regional Economy Thru Recreation Spending](image-url)

Recreation and tourism can be treated as a set of intervening activities that are used to link a given policy or action with the action's regional economic effects. MI-REC can be helpful in evaluating any policy or action that affects the regional economy through changes in recreation and tourism activity. The action may be internal to the recreation and tourism system, such as the opening or closing of a major recreation area. The action may also be largely external to recreation and tourism, but involve significant impacts on recreation and tourism activity. For example, the U.S. Army Corps of Engineers is interested in the regional economic impacts of changes in policies related to navigation, flood control, and hydro-electric generation. Such policies have direct effects on industries dependent on the availability and prices of electric power and water transportation. They also have indirect regional economic effects through their impacts on recreation and tourism activity in the region. The MI/MI-REC systems permit all of these regional economic effects to be evaluated using a common set of economic models and accounts. This permits a consistent and comprehensive analysis of the regional economic effects of specific policies and actions.
The most common uses of regional economic analysis within recreation and tourism are:

1. To evaluate the economic impacts of changes in the supply of recreation and tourism opportunities. Supply changes may involve a change in quantity, such as the opening of new facilities, closing of existing ones, or expansions and contraction in capacity. Supply changes may also involve changes in quality, including changes in (a) the quality of the environment, (b) the local infrastructure and public services to support recreation and tourism, or (c) the nature of the recreation and tourism products and services that are provided in an area.

2. To evaluate the economic impacts of changes in the demand for recreation and tourism in an area due to population changes, changes in the competitive position of the region, marketing activity or changing consumer tastes and preferences.

3. To evaluate the effects of other policies and actions which affect recreation and tourism activity either directly or indirectly. For example, increased air pollution standards have been opposed in some regions due to the predicted economic consequences of plant closings. Tourism interests counter these arguments with estimates of potential losses of income and jobs in tourism industries that depend on good air quality and visibility.

4. To understand the economic structure and interdependencies of recreation and tourism-oriented economies. Such understandings are helpful in targeting industries, and addressing economic stability, seasonality, and growth issues.
CHAPTER 2. REGIONAL ECONOMIC CONCEPTS

Before summarizing the key elements of the MI-REC system, we define a few basic concepts. Appendix G of the Micro-IMPLAN manual provides a brief introduction to input-output modeling. Here we distinguish among four sets of terms that are commonly encountered in applying regional economic models to recreation and tourism.

* economic value vs economic impacts
* economic impact vs significance
* direct, indirect, and induced effects
* trip spending, durable goods spending, and government spending

Economic Value versus Economic Impact

There is some confusion between the notion of economic value/benefit and economic impact. Values or benefits involve economic efficiency, while economic impacts usually involve the distribution of costs and benefits associated with economic activity across designated regions.

Public resource agencies have traditionally evaluated recreation developments in terms of their contribution to National Economic Development (NED) using efficiency criteria (U.S. Water Resources Council 1983). Benefit cost analysis is the appropriate tool here, with recreation benefits generally measured using unit day, travel cost, and contingent valuation methods (Walsh 1986). These recreation valuation methods measure the net willingness to pay (or consumer surplus) associated with visits to recreation sites. Benefits measured in this case are generally non-monetary benefits to visitors or local users of a facility. No monetary exchanges or directly measureable economic transactions need take place to produce benefits to users. Recreation valuation and benefit estimation methods are used when evaluating programs on the basis of the benefits they provide to users.

Economic impacts, on the other hand, are the changes in economic activity resulting from an action. These changes have traditionally been expressed in terms of sales, industrial output, income, value added, employment or government revenues and costs. Multipliers, economic base models and input-output analysis are the principal tools for conducting economic impact analyses. Conventional theories stress the importance of export activities as the basis for regional economic growth. Tourism is an export activity in that it brings income and dollars into a region in exchange for products and services produced within that region. An important use of economic impact assessment tools is to measure or predict the regional economic effects of changes in tourism development and activity.

To perhaps oversimplify the issue, we are generally interested in the benefits of recreation and the impacts of tourism. This is because recreation is often provided by local organizations for the benefit of local residents. In serving local recreation needs, organizations are interested in satisfying the need in an efficient manner. Generating economic activity and stimulating the local economy is usually not a significant purpose of local recreation programs. The economic exchange between consumer and provider in this case is usually taxes and political support for user benefits and recreation opportunities.

Tourism is quite different. Here the providers and consumers generally are not part of the same region or economic unit. A tourism provider, whether an individual business or a community, normally expects some fair payment in exchange for the products and services enjoyed by the tourist. Tourists pay indirectly for the services of the local climate, natural resource endowment, parks, and public services by contributing to the local economy. Spending of tourists in a host community or region creates sales, income, jobs, tax revenues, and related economic activity. For tourism we are usually interested in these economic impacts, and not so much the benefits obtained by the tourists themselves. MI-REC deals with assessing economic impacts, not recreation values.
Economic Impact versus Significance

It is useful to distinguish between two types of economic impact analysis. The traditional "impact analysis" estimates the economic effects of export activity; that is, the effects on a region of selling products and services outside the region. In a recreation or tourism application this would mean only including the spending within the local region that comes from outside the region, i.e., from tourists. A significant problem in carrying out recreation impact analyses is isolating the part of trip spending that occurs within the local region and separating the spending of local residents from the spending of tourists.

There are some situations where we want to include the effects of both resident and non-resident spending in a local area. We will call this type of analysis a "significance analysis". Others have termed it an "importance analysis", as it measures the importance or contribution that recreation and tourism activity has in a local area.

Figure 2-1 illustrates graphically which spending is included in an impact vs a significance analysis. Notice that the spending to be included depends on the definition of the region and, in the ideal situation, the same regional boundary is used to determine both residency and place of purchase. "New" money to a region must come from outside and be spent within the region.

The argument for not including resident spending in an impact analysis is that resident spending on recreation in the area would simply be shifted to some other local account, if the particular recreation opportunity were not available. Hence, there would be no loss of money to the economy, but only a shift within the economy. When there is an interest in which particular sectors of a local economy may gain or lose, there are good reasons to include shifts in resident spending to fully account for changes among economic sectors within the economy. In these cases, conduct a significance analysis. When concerned more with the growth of the overall economy, conduct an impact analysis.

Another argument for including some portion of resident spending in an impact analysis is the possibility of import substitution. If local users of a park would make trips outside the region for recreation, in the event that the park were unavailable, then the local residents' spending for trips to this park would represent a potential loss to the local economy. This loss should be treated the same as the equivalent amount of money spent by a tourist, who no longer visits the area if the park is closed. Include the portion of resident spending involving import substitutions within an impact analysis.

Both impact and significance analyses may use absolute or relative measures of the changes in economic activity. The total change in sales, income or jobs resulting from some action are absolute measures. These changes may be expressed as a percentage of all sales, income, or jobs prior to or after the change. The IMPLAN system provides convenient base year estimates of economic activity in the region by sector. The absolute measures of change estimated in an impact analysis may be divided by these base year estimates to indicate the relative importance or contribution of the change to the regional economy. One use of a significance analysis is to measure the portion of economic activity in an area associated with a given activity. e.g., What portion of all jobs in a region or those in particular sectors, are due to a major recreation development or tourist resort?

The critical point in evaluating the regional impacts of particular actions is to carefully assess the changes in spending within the region and to keep track of the net flows of spending and income across the regional boundary. The MI-REC system can be used for either impact or significance type analyses, and in many cases both types of analysis are useful.
**IMPACT ANALYSIS** includes only Non-resident spending in the local area.

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>Within the Local Area</th>
<th>Outside the Local Area</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Resident</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Non-Resident</td>
<td></td>
<td><strong>IMPACT</strong></td>
<td></td>
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<tr>
<td>Total</td>
<td></td>
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<td></td>
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</tbody>
</table>

**SIGNIFICANCE ANALYSIS** includes all spending in the local area.

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>Within the Local Area</th>
<th>Outside the Local Area</th>
<th>Total</th>
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<tr>
<td>Non-Resident</td>
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</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>SIGNIFICANCE</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 2-1. Impact and Significance Analysis*
Direct, Indirect, and Induced Effects

The economic effects estimated with MI are described by direct, indirect, and induced changes in such economic parameters as gross outputs (sales), employment, income, and value added. The sum of direct, indirect, and induced impacts is the total impact of a change in recreation spending within a region.

Direct Effects are production changes associated with the immediate effects of changes in recreation expenditures. For example, an increase in the number of tourists staying overnight in hotels would directly yield increased sales in the hotel sector. The additional hotel sales and associated changes in hotel payments for wages and salaries, taxes, and supplies and services are direct effects.

Indirect Effects are the production changes resulting from various rounds of respending of the hotel industry’s receipts in other backward-linked industries (i.e., industries supplying products and services to hotels). Changes in sales, jobs, and income in the linen supply industry, for example, represent indirect effects of changes in hotel sales. Businesses supplying products and services to the linen supply industry represent another round of indirect effects, eventually linking hotels to varying degrees to most other economic sectors in the region.

Induced Effects are the changes in economic activity resulting from the changes in household income that are generated through the direct and indirect effects. For example, hotel employees spend their income in the local region for housing, food, transportation, and the usual array of household product and service needs. The sales, income, and jobs that result from household spending of added wage and salary income are induced effects.

By means of indirect and induced effects, changes in a particular sector can impact virtually every sector of the economy in one way or another. Induced effects are particularly noticed when a large employer in a region closes a plant. Not only are supporting industries (indirect effects) hurt, but the entire local economy suffers due to the reduction in household income within the region. Similar effects in the opposite direction are observed when there is a significant increase in jobs and household income.

Final Demand is the term used for sales to the ultimate consumers of goods and services. In almost all cases, the final consumers of recreation and tourism goods and services are households. You can therefore generally substitute the term “visitor spending” for final demand when dealing with recreation and tourism. Government spending may also be considered final demand when evaluating the impacts of government spending to operate and maintain park and recreation facilities.

Trip Spending, Durable Goods Spending, and Government Spending.

The majority of recreation and tourism impact assessments focus on the impacts of the expenses that people incur while on trips. More recently, interest has developed in assessing the impacts of durable goods purchases, and the impacts of government spending in an area. Each of these kinds of spending are handled somewhat differently in a recreation impact assessment.

Trip spending involves the variable costs of trips for recreation. As the name implies, recreation trip spending is directly associated with specific trips. Expenses the traveler incurs to produce the trip are normally counted as trip spending, e.g. lodging, food, transportation, information, and recreation equipment and fees. Souvenirs and any other items purchased while on the trip are also generally a part of trip expenses. In a strict accounting of the flows of dollars across regions, one would include any and all purchases made in one region by a visitor from outside the region. If a traveler from New York purchases a new car in Michigan while on a ski trip, there is a flow of dollars into Michigan associated with the ski trip. Whether one chooses to include this item in a particular impact analysis as a “trip expense” depends on the particular action being evaluated and the purposes of the analysis. The auto purchase may or may not be directly related to the trip purpose. The critical question in an impact analysis, say with or without the ski area, is whether the purchase would have been made in the local region if the ski area did not exist.
**Durable Goods** are items that last for more than three years and are typically used on many trips. Interest in the economic impacts of durable goods purchases arises naturally from the major investments that consumers have made in recreation equipment and the significance of recreational equipment manufacturing industries, particularly boating, camping, hunting and fishing. Durable goods purchases are generally not associated with a particular trip or recreation site, and it is therefore difficult to attribute durable purchases to actions that alter the availability or quality of a single recreation opportunity. Other actions such as increases in gasoline prices, tax incentives or disincentives related to luxury goods, and policies restricting the use of recreation equipment can have very direct effects on the sales and use of recreation durables.

Major durables tend to be purchased at home rather than on trips. In assessing the economic impacts of durable goods purchases, we recommend using fairly large regions (state and above) and generally favor **significance** type analyses over **impact** analyses.

Trip and durable goods spending primarily involves household or consumer spending. In some cases we are interested in evaluating the impacts of **government spending**, or more generally the spending of organizations other than households. A typical example would be to evaluate the impacts of federal or state government expenses in a local area to maintain and operate a park or recreation area. Most of the economic activity directly associated with operating a park is not included in an analysis of the impacts of visitor spending. This is particularly the case for parks with minimal fees and charges. One must generally evaluate the impacts of government spending for parks separately from the impacts of visitor spending.

The MI-REC system is aimed principally at examining the impacts of trip and durable goods spending. The economic impacts of government spending in an area can be readily estimated with Micro-IMPLAN, if you can obtain carefully itemized accounts of the organization's expenditures, including the portion accruing to the local region. The MI-REC system includes recreation trip and durable goods spending data files designed to help estimate spending for particular applications. Durable goods spending estimates should be interpreted as spending "associated" with trips to recreation areas, versus spending that would necessarily be lost if a single site or system of sites were unavailable. Table 3-1 shows the trip and durable goods spending categories used by MI-REC.
CHAPTER 3. THE MI-REC SYSTEM MODEL

In this chapter we present a conceptual overview of the MI-REC system, including the principal elements of the system and the basic equations for estimating spending and economic impacts. More specific procedures for using the MI-REC system are covered in the software section of the manual (PART II).

There are four principal steps in an economic impact analysis:

1. Define the problem
2. Estimate the change in final demand (in this case, recreation and tourism spending).
3. Estimate the regional economic effects of this change
4. Interpret, apply, and communicate the results

The Four Step Process

Step 1 -- Define the problem. Define the action, policy, or development to be evaluated. This step requires filling in the blank in the phrase "economic impact of ______?_______. It is particularly helpful if the problem definition covers who will be using the results and in what way. The action or proposal must be sufficiently clear to specify the following six problem parameters (see Chapter 4 for further details):

a. Determine the number and kinds of visitors affected by the action. The problem definition should provide a basis for defining the key visitor segments that will be affected and for estimating the size of each group in terms of numbers of trips.
b. Determine what portion of visitor spending should be included, and within which spending categories.
c. Define the primary region or regions of concern, i.e., the completion of the phrase, "economic impact of the action ON ______?_______.
d. Define the most important economic sectors for the analysis and the degree of sectoral aggregation that may be desired.
e. Determine the most relevant measures of economic impact: sales, jobs, income, multipliers, etc.
f. Determine tolerable levels of accuracy in the estimates of spending and economic impacts.

Step 2 -- Estimate the Change in Spending (Final Demand).

For recreation and tourism applications, this step usually involves estimating current visitor expenditures or the projected changes in the amount spent by visitors affected by a given or proposed action. The definition of the problem in step one identifies the relevant market segments for which spending estimates are needed and defines the region for which a model must be estimated.

Given a set of \( m \) recreation or tourism market segments, spending profiles for each segment, and estimates of the number of visitors by segment, spending can be estimated as a simple weighted average, as follows:
\[ S_j = N \sum_{i=1}^{m} M_i \cdot s_{ij} \quad (1) \]

where

- \( S_j \) = total spending in category \( j \), \( j = 1, \ldots, J \)
- \( N \) = total number of visitors
- \( m \) = number of segments
- \( M_i \) = segment \( i \)'s share of total visits, \( i = 1, \ldots, m \).
- \( s_{ij} \) = 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, \( j \).

**Step 3 -- Estimate the regional economic effects of this change.**

The economic impact of this spending is obtained by applying the (final demand) vector of spending \( (S_j, j = 1, \ldots, J) \) to a model of the regional economy. There are three steps to complete this analysis.

1. **Estimate a model of the regional economy.** The regional economy may be represented by a set of multipliers or an input-output model. Micro-IMPLAN can estimate input-output models for any region defined by a set of counties.

2. **Bridge the recreation spending categories into the sectors, as defined in the regional economic model.** The spending vector \( (S_j) \) must be transformed into a final demand vector \( (FD_k) \), consistent with the sectors and assumptions of the input-output model. Most of the categories in which recreation spending is typically reported do not exist as economic sectors. The majority of recreation spending accrues to retail establishments. To apply this retail spending to an input-output model, retail, wholesale, and transportation margins must be determined for each spending category and the remaining cost of retail items assigned to the manufacturing sectors which produce the item (See Appendix D). This process of bridging and margining is handled by a bridge table, \( B_{jk} \), which transforms the spending vector \( S_j \) to a final demand vector, \( FD_k \). This step translates spending from a set of categories \( (j) \) to a set of economic sectors \( (k) \).

\[ FD_k = S_j \cdot B_{jk} \quad (2) \]

3. **Apply the final demand vector to the regional model.** Impacts are estimated by multiplying the final demand vector by a set of multipliers \( R \),

\[ I = R \cdot FD_k \quad (3) \]

where

- \( FD_k \) = a final demand vector of spending changes
- \( B_{jk} \) = a bridge table to convert from spending categories \( j \) to sectors \( k \)
- \( R \) = a set of sector specific multipliers.
- \( I \) = impacts, expressed as changes in output, income, or employment resulting from the change in final demand.
In MI-REC, we will be using an input-output model of the regional economy to generate the multipliers. Impacts of a change in final demand are estimated by multiplying the final demand vector by the Leontief inverse or total requirements matrix of the input-output model \( (R=(I-A)^{-1}) \), where \( A \) is the technical coefficient or direct requirements matrix (See Appendix G of IMPLAN manual). If detailed estimates of effects by sector are not needed, a set of suitable multipliers may also be used to estimate impacts.

Impacts can be reported in terms of output (sales), income, value added, or employment in total or for individual sectors. Impacts can also be separated into direct, indirect and induced effects. A variety of multipliers may be calculated to express the regional economic structure or capture the magnitude of indirect and induced effects. See Appendix E for a discussion of multipliers.

Notice that since spending is estimated for a set of visitor segments, impacts can also be estimated separately for each segment by bridging and applying the spending vectors \( S_{ij} \), one at a time for each segment \( i \). Strang (1971) is a good example of a segmented approach to economic impact analysis of recreation activity.

**Step 4 -- Generate Reports and Interpret Results**

There still remains the task of interpreting, evaluating, applying, and communicating the results of the analysis. A complete input-output analysis generates a tremendous amount of information about the regional economic structure and the impacts of the specific proposed actions. The analyst must decide which reports to generate, which pieces of particular reports to use, and in general how to communicate the results most effectively for a given audience. Guidance in interpreting the results of an impact analysis and communicating them in a written report is provided in Chapter 5.

**Data Requirements**

The three equations above identify five basic information requirements for a system to estimate the economic impacts of recreation and tourism:

1. An estimate of total visits or visitors (\( N \)) affected by an action.
2. A set of market segments and the percentages (\( M_i = \) market shares) of visitors within each segment.
3. Spending profiles (\( S_{ij} \)) giving the average spending within an appropriate set of spending categories \( j \) for each segment \( i \).
4. A bridge table (\( B_{jk} \)) to convert spending from categories \( j \) to a final demand vector by economic sectors \( k \).
5. An input-output model for the region or set of multipliers \( R \).

The first three items are needed to estimate spending, the last two to estimate secondary effects of this spending and identify the impacted sectors. Of these five information requirements, obtaining spending estimates and a suitable regional economic model has accounted for the majority of time and cost in conducting tourism impact assessments. Improvements in micro-computer based input-output modeling systems, like MI, make the estimation of local input-output models relatively quick and easy. The MI-REC system is therefore grounded in the Micro-IMPLAN (MI) system. MI permits the estimation of customized input-output models for any county or grouping of counties in the United States. Micro-Implan also includes a basic framework and software for carrying out impact analyses with the model (Taylor et al. 1993).

We build on the Micro-Implan system primarily by reducing the costs of assembling spending estimates and bridging these to models estimated within MI. In the simplest of applications of the MI-REC system, the analyst identifies a set of visitor segments affected by a given action. Existing spending profiles for these segments are examined on a spreadsheet and adapted or adjusted as necessary. The analyst estimates the number of visitors affected by the action within each segment. Segment shares are multiplied by the spending profiles for each segment and summed to obtain total
spending by sector, as in equation (1). A bridge table converts this spending to a final demand vector, as in equation (2). The analyst estimates an input-output model for the local region using MI, imports the final demand vector, and uses MI's impact analysis module to estimate impacts. The MI impact analysis routines carry out equation (3).

The key user input is an estimate of the number of different types of visitors that are affected. Based on the situation or project to be evaluated, the user must estimate how many visitors are affected and must be able to estimate the proportions of these visitors represented by the principal market segments. Some judgment is also required in selecting and/or adjusting the spending profiles, defining the study region, and estimating the input-output model. The number and types of technical adjustments and application of the system will vary with the nature of the problem and the skills of the analyst.

**MI-REC's Five Basic Elements**

**Market segments.** MI-REC identifies various sets of recreation and tourism market segments and provides a framework for estimating spending and impacts of particular segments. To be appropriate for economic impact analysis, the segments should be easily identified, reasonably homogeneous in their spending patterns, and relevant to the kinds of management, planning and marketing decisions to be evaluated. While suitable segments may vary from one situation to another, most situations require that local visitors be distinguished from non-locals and that overnight visitors be distinguished from day users. Separating visitors based on lodging type (campers vs. motel users) and transportation mode (auto vs air) is also recommended, as these usually imply distinct spending patterns. Many applications suggest various recreation activity segments, such as boaters, anglers, sightseers, downhill skiers, and the like, although we urge that activity segmentations be combined with some of the above segmentation variables in order to better capture spending variations within activities.

**Spending profiles.** Spending profiles have been empirically estimated for particular recreation segments. A spending profile is a vector of the amount spent by a typical visitor (from a given segment) across a set of spending categories. MI-REC establishes some consistency in spending categories and a system that will hopefully encourage the development of improved recreation spending information that is tailored to the requirements of regional economic models. Spending gathered in previous studies may be updated to a recent year (or the year of an IMPLAN model) using Bureau of Labor Statistics price indices.

**Margin and bridge tables.** A set of recommended margin and bridge tables is provided to assist in matching recreation and tourism spending data with standard economic sectors, in this case MI's 528 sectors. The formal procedures in MI-REC involve choosing spending categories from a Micro-Implan database file and entering the amount of total spending within each category. By simplifying and automating the bridging and margining process, we hope to reduce errors that are commonly made at this step. For example, many recreation and tourism impact assessments have neglected the necessary margining of tourist retail spending and applied multipliers directly to total spending. As many goods that are purchased by tourists are not produced in the local area, impact estimates can be significantly inflated if multipliers are applied to total spending rather than appropriate local margins.

**Local input-output models.** The Micro-IMPLAN system is adopted here as the system for generating input-output models for a local region. MI is a flexible system for estimating customized models for any county or grouping of counties in the United States. While the system is broadly applicable, it has been developed specifically to evaluate the impacts of resource management and policy questions (Alward and Palmer 1983). Improvements in the MI software along with the MI-REC interface for recreation spending data should make this powerful tool accessible to most recreation and tourism analysts.
Impact estimation procedures. The Micro-IMPLAN system also includes software for estimating impacts of alternative management activities. This basically involves applying a vector representing the final demand change associated with an action to the regional input-output model. In a typical tourism application, the final demand vector is the change in visitor spending in the local region. MI-REC provides procedures to create scenarios for use in IMPLAN's impact modules and recommended sectoral aggregation templates to aggregate MI impact reports to highlight sectors most directly affected by recreation and tourism activity.

Visitor Segments & Generalizing Spending Across Applications

As the segmented approach is quite central to the MI-REC system, we elaborate a bit on three roles that segments play in the system. First, segments are the means by which an analyst identifies who is affected by a particular action. The more precisely a user can identify impacted market segments, the more the economic impact estimates can be tailored to the particular situation. Secondly, segments are the principal vehicle for explaining differences in spending of distinct recreation and tourism subgroups. By forming segments that are relatively homogeneous in their spending patterns, we help to reduce variation and sampling errors in survey-based estimates of spending. It is not uncommon in recreation and travel spending studies for sampling errors to approach and even exceed one hundred percent of the mean. Given extremely wide variation in spending patterns across distinct types of tourists, there are significant efficiencies in estimating spending within more homogeneous subgroups of visitors. Finally, segments are the primary vehicle for explaining why one site or region may generate a different pattern of spending and impacts than another. Total spending will depend on both the number and types of visitors that are affected. The differences in the spending impacts of a day use area, campground or resort development can largely be explained by the kinds of visitors that will be attracted. Thus, segments are used to help generalize spending profiles from one site or application to another.

One of our assumptions is that the segment spending profiles will be more generalizable across regions, sites, and applications than will the numbers and types of visitors that are affected by an action. The latter must be estimated in each specific instance by someone knowledgeable with the study area and the proposed action. The MI-REC system helps to redirect some attention in recreation economic impact studies from the technical issues surrounding estimates of spending and I/O models, to the more fundamental questions of how many people are affected and who they are.

The degree to which spending profiles are generalizable across applications hinges a great deal on how the segments are defined. The basic requirements for a household to produce a recreation visit suggest some of the key variables for defining segments. Visitors generally require transportation, food, and lodging (if overnight). Expenses in these categories will depend on party size, length of stay, and the mode or type of transportation, food service, and lodging.

Expenses are also incurred for recreation, entertainment and souvenirs. These expenses will vary across recreation activity groups. Parties making trips for particular activities like boating, fishing, and downhill skiing will incur expenses that are specific to these activities. In short, much of the systematic variation in spending can be explained by length of stay in the area, party size, lodging type, transportation mode, distance traveled, and primary activities. Variation in spending due to party size and length of stay can be handled partially by the choice of the units of analysis (e.g., visitor day, visit, or party trip). The remaining variables form the basis for defining segments with similar within-segment spending patterns.

No single set of segments will be applicable everywhere. The applications in Part III of this manual illustrate a range of segmentations that were developed for specific applications. As more spending profiles are assembled in a consistent manner for distinct visitor segments and regions, users will be able to selectively choose and adjust a set of profiles to fit a particular application. Where more reliable local spending estimates are required, spending surveys may be conducted. It is, however, our belief, that adjusting or adapting existing profiles that have been carefully constructed will often be preferred to attempting to survey visitors with inadequate time or resources for the job. This is particularly the case when the applications of an impact analysis do not require much more than rough estimates of total spending or jobs.
Spending Categories

Spending categories have been developed to permit flexibility in the level of aggregation, while also facilitating the process of bridging tourist spending data to IMPLAN sectors. For example, food purchased for off-site consumption is measured separately from on-site restaurant spending, as these items must be bridged to distinct IMPLAN sectors.

The basic survey instrument we have developed for the U.S. Army Corps of Engineers, measures trip spending in 33 detailed categories and durable goods spending within 32 categories. These are grouped into 8 major trip categories and 5 durable goods categories (See Table 2-1). Both trip and durable goods spending are estimated on a party-trip basis, so that total spending for a given year can be estimated by multiplying these averages by the number of party trips to an area. Calculations within MI-REC are normally carried out using the average spending of specific visitor segments.

Bridge tables have been developed for converting these trip and durable spending categories to IMPLAN's 528 sectors. As part of the bridging process durable goods purchases are divided between items purchased new, items bought used from a dealer, and items bought used from individuals. In assessing economic impacts of new purchases, margins are taken and the remainder of costs are bridged to manufacturing sectors. Only the margins are included for used goods bought from dealers, and used goods bought from households are allocated to household income. The MI-REC bridge tables are presented in Appendix D.

A further complication in measuring expenditures is identifying the location of spending relative to visitor origin in order to identify the impacted region. Recreation and tourism spending is normally divided between (1) spending at home, (2) spending en route, and (3) spending at the destination. The MI-REC trip spending profiles divide spending by category between spending within 30 miles of the recreation/tourism site or destination and spending elsewhere on the trip. A 30-mile radius of a site was selected to capture the spending at the destination. In many parts of the country, this roughly corresponds to a county or perhaps two counties if the recreation site is near the county border. Where this is the case, the measure of where spending occurs can be made to correspond with the region for which impacts are being estimated. In estimating impacts for larger regions, some portion of the "beyond 30 mile" spending can be included.

Trip spending can be aggregated into as few as 5 categories if desired. For example, a typical spending profile from a travel spending survey might only include lodging, food and beverages, transportation, recreation and miscellaneous expenses. Some studies separate auto from other travel expenses, restaurant meals from groceries, and motel expenses from camping. We do not recommend measuring spending in every study in as detailed categories as we report here. It will generally be more efficient to measure spending in broader categories and, if desired, use more detailed profiles, like ours, to apportion amounts within subcategories according to the percentages we have reported. For example, the portions of food and beverage expenses that we report going for groceries vs. restaurant meals, can be used to further disaggregate a survey estimate that only included the category "food and beverages." These allocations, of course, rest on assumptions that the percentages we report generalize, at least within subcategories, to the intended applications. The more precise spending categories reduce aggregation errors in applying the I/O model and are necessary to estimate impacts within more narrowly defined local economic sectors. For example, buying meals in restaurants will have quite different local impacts than purchasing groceries.
Table 3-1. Trip and Durable Goods Spending Categories

<table>
<thead>
<tr>
<th>Trip Spending Categories</th>
<th>Durable Spending Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LODGING</strong></td>
<td><strong>BOAT</strong></td>
</tr>
<tr>
<td>Hotel/motel</td>
<td>Boats</td>
</tr>
<tr>
<td>Camping fees</td>
<td>Boat engines</td>
</tr>
<tr>
<td><strong>FOOD</strong></td>
<td>Boat trailers</td>
</tr>
<tr>
<td>Grocery</td>
<td>Waterski equipment</td>
</tr>
<tr>
<td>Restaurant</td>
<td>Boat accessories</td>
</tr>
<tr>
<td><strong>AUTO</strong></td>
<td><strong>FISH</strong></td>
</tr>
<tr>
<td>Auto gas &amp; oil</td>
<td>Rods &amp; reels</td>
</tr>
<tr>
<td>Auto rental</td>
<td>Nets, traps</td>
</tr>
<tr>
<td>Auto repair</td>
<td>Depth finders</td>
</tr>
<tr>
<td>tires</td>
<td>Fishing clothing</td>
</tr>
<tr>
<td>Auto parts</td>
<td>Boots &amp; waders</td>
</tr>
<tr>
<td>parking &amp; tolls</td>
<td>Trolling motors</td>
</tr>
<tr>
<td><strong>BOAT</strong></td>
<td><strong>HUNT</strong></td>
</tr>
<tr>
<td>Boat gas</td>
<td>Rifles</td>
</tr>
<tr>
<td>Boat rental</td>
<td>Other hunting equipment</td>
</tr>
<tr>
<td>Boat repair</td>
<td>Hunting boots</td>
</tr>
<tr>
<td>Boat parts</td>
<td>Hunting clothing</td>
</tr>
<tr>
<td>launch/slip fees</td>
<td><strong>CAMP</strong></td>
</tr>
<tr>
<td>Boat fares</td>
<td>Motorhomes</td>
</tr>
<tr>
<td></td>
<td>Other camping vehicles</td>
</tr>
<tr>
<td><strong>FISH</strong></td>
<td>Tents &amp; camping equip.</td>
</tr>
<tr>
<td>Fish license</td>
<td><strong>OTHER DURABLES</strong></td>
</tr>
<tr>
<td>charter fee</td>
<td>Bikes and ORV’s</td>
</tr>
<tr>
<td>Fish bait</td>
<td>Other equip</td>
</tr>
<tr>
<td><strong>HUNT</strong></td>
<td></td>
</tr>
<tr>
<td>Hunt license</td>
<td></td>
</tr>
<tr>
<td>Ammunition</td>
<td></td>
</tr>
<tr>
<td><strong>RECREATION</strong></td>
<td></td>
</tr>
<tr>
<td>Equipment rental</td>
<td></td>
</tr>
<tr>
<td>Guide fees</td>
<td></td>
</tr>
<tr>
<td>Sports admissions</td>
<td></td>
</tr>
<tr>
<td>Tourist attractions</td>
<td></td>
</tr>
<tr>
<td>Recreation fees</td>
<td></td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
</tr>
<tr>
<td>Film purchase</td>
<td></td>
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<tr>
<td>Film developing</td>
<td></td>
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<tr>
<td>Souvenirs</td>
<td></td>
</tr>
<tr>
<td>Footwear</td>
<td></td>
</tr>
<tr>
<td>Men’s clothing</td>
<td></td>
</tr>
<tr>
<td>Women’s clothing</td>
<td></td>
</tr>
<tr>
<td>All other</td>
<td></td>
</tr>
</tbody>
</table>
Comparable Estimates of Visitor Spending and Economic Impacts

An important motivation for the system we have developed is to facilitate and encourage more standardized and comparable estimates of spending and economic impacts. A standard survey instrument, data gathering method, and analysis package has been developed for generating visitor spending profiles and estimates within designated market segments. We briefly summarize that system here.

Our spending data collection system relies on a short on-site interview followed by a mailback questionnaire to measure trip spending. The instrument and approach are a refinement to procedures developed initially for the PARVS study (Cordell, Bergstrom and Watson 1987). Although other units of analysis are possible, we measure and estimate spending on a party-trip basis. Spending on durable goods, if desired, is gathered in the on-site part of the survey, to avoid confusion with trip spending. The on-site survey also provides the basic information to form segments and serves to check for and adjust for potential non-response biases in the mailback instruments.

The procedures have been used at 12 Corps of Engineers projects across the country (Propst et al. 1991) and at 150 sites along the Upper Mississippi River System (Propst et. al. 1992). Other applications of the measurement procedures are in progress. Across the two major applications to date, over 4,500 visitors have been sampled and comparable detailed trip spending data have been gathered for over 3,000 visitor parties. Trip spending profiles can be estimated within less than 10% sampling error for primary visitor segments. Segments with higher sampling errors can be targeted for future surveys and by combining data sets across sites, sufficient samples can be built over time to estimate spending for more narrowly defined user groups.

The comparability of data across different sites permits the testing of models to explain variations in spending profiles of particular segments across sites and regions. For example, it is clear that visitor spending depends on the availability of places to spend money in the local area. The regional economic structure will therefore influence direct spending as well as the secondary (indirect and induced) effects of this spending. Simple spending shifters based upon rough indices of places to spend money and local price indices is one approach we are pursuing. Having reasonably comparable data across a range of sites and regions is a necessary prerequisite to these efforts.
CHAPTER 4. DEFINING THE PROBLEM

The first step in carrying out an economic impact analysis is to clarify the nature of the problem being addressed. This will include identifying the intended uses and users of the results. In this chapter we review the basic elements for defining a problem for a regional economic impact analysis. The first question to raise is whether an economic impact analysis or some other type of analysis is needed.

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. Many local recreation programs are designed to provide benefits to local residents rather than to stimulate the local economy. In these situations, an economic impact analysis is probably not what is needed. Instead, a demand study, valuation study, needs analysis, or cost-effectiveness analysis would probably be more appropriate. While economic development is a high priority in many communities, not all programs should be evaluated for their contribution to this goal. Local recreation programs may be a factor in business location decisions, but this "economic impact" isn't captured by the regional economic tools we present here.

Before launching an economic impact analysis, 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, e.g. 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, tax collections, 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, evaluating a program, or understanding your problem better.

Defining The Problem -- Seven Considerations

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 seven basic factors that should be specified as part of defining a problem for an economic impact assessment.

1. Define the action to be evaluated. Begin by clarifying the action or actions involved in the problem. IMPLAN can be used to evaluate the economic impacts of virtually any action that can be translated into changes in economic activity. The MI-REC system is designed more narrowly to evaluate actions that alter economic activity in an area through changes in recreation and tourism activity. For example, the construction phase of a new park can be evaluated with IMPLAN irrespective of any use (i.e. a change in recreation activity) the facility might receive in the future. Changes in the regional economy resulting from use of the park can be evaluated using the MI-REC tools. Typical actions for which recreation/tourism impacts are estimated include:
a. Opening or closing a park, recreation area, hotel, 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. Changes in government activity in an area such as opening or closing an office or increasing or decreasing government spending.
d. 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.
e. Any other action that would affect the amount or types of recreation/tourism activity in an area.

2. Identify the change in the amount and kinds of recreation/tourism activity resulting from the action. The action must be defined precisely enough in step one 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.

As a general rule, the analysis should be with vs without the action rather than before vs after. Thus, if tourism has been growing by 5% per year and a new promotional program increases this to 10% this year, only half of the 10% growth can likely be attributed to the promotional program.

In evaluating a change, always be clear about what the alternative situations would be and evaluate the net change in activity between the action and its alternative. For example, if a new hotel is built and serves 200,000 guests in its first year, should all of its customers be treated as new visitors to the area? Probably not. Occupancies may have been reduced at competing establishments in the area and the net gain in new visitors to the area may be much less than 200,000. The number of new visitors attracted to the area by the hotel could also be more than 200,000, if the hotel's facilities, conventions, promotion or events attract new visitors who stay elsewhere in the area. Identifying the net changes in activity that are attributable to an action can be a complex and difficult task. Your assessments of economic impact, however, rest firmly on these estimates, so attention to these details is very important. In situations of some uncertainty, we recommend evaluating impacts using a range of estimates in order to establish some rough confidence intervals around your estimates. Evaluating a range of alternatives also helps to evaluate the sensitivity of your results to your initial estimates of changes in activity levels.

3. Identify the kinds of spending to be included. Should the analysis include trip spending or durable goods purchases? Which specific kinds of spending should be included? The answers to these questions depend on how the problem is defined, and again, on attributing given spending changes to the proposed action. If a visitor to a new campground has recently purchased a new $100,000 camping vehicle, should this be included as an impact of this new campground? Probably not. The appropriate question is again a with vs without one-- "Would the purchase have been made if the new campground were not built?" Durable goods purchases can rarely be tied to changes in individual sites. An exception might be a large boat that would not be purchased if there did not exist an available marina slip where it could be stored in the water. Most recreation impact assessments therefore focus on trip spending. Here too, there are subtle with vs without questions. Consider a local resident who, while on a trip to a nearby park, stops and buys groceries. Should the grocery purchase be included in the trip expenses? The answer is probably no, as these groceries would probably have been purchased anyway in the local area and therefore do not constitute "new" spending resulting from the park.

Recreation impact analyses often do not include spending on items such as hunting and fishing licenses, park entrance fees, or typically any other spending that accrues to a public park or agency rather than to businesses in the area. License and park receipts may be collected in the local region, but may accrue to a state or federal government office outside the area. Such revenues may not be directly associated with the operational expenses of running the park. The operational expenses of a park or governmental agency could be evaluated independently of the impacts of visitor spending, but if park receipts were included in both visitor and agency spending, this spending would be double counted. When estimating impacts of a public recreation organization, we recommend analyzing visitor spending
impacts separately from the local economic impacts of park operations. Visitor spending that represents receipts of the park should not be included in the visitor spending analysis and operating costs rather than receipts should be used in evaluating the impacts of the governmental operation itself. This approach avoids potential double counting of park fees paid by visitors, while also including any government subsidy in assessing impacts of park operations.

4. 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 enroute 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. When a tourist purchases a souvenir that is made outside the local region, only the retail margin (and perhaps a wholesale and transportation margin) associated with the purchase accrues to the region. The economic activity associated with the manufacturing of the item accrues to some other region if the good is imported. Hence, the definition of the region influences what direct visitor spending should be included in the analysis, as well as what indirect and induced effects will be counted.

The regional boundary is also critical in distinguishing which visitor’s spending is included in an impact vs significance analysis. Only the spending by nonresidents of the region are treated as "new" dollars to the regional economy in an impact analysis.

IMPLAN allows you to define 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
(2). Residential location of the labor force
(3). Travel corridors
(4). Locations of recreation/tourism facilities & businesses
(5). Locations of supporting and service industries

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.
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.

Many of the MI-REC spending databases define "local" spending to be within 30 miles of a destination site. A region extending roughly 30 miles from a site would therefore correspond with these data sets. For sites in the middle of a county, this might be a single county. For sites near a county border or junction of more counties, all of the adjacent counties might form a region of roughly 30 miles. The MI-REC software also permits you to estimate spending within a customized region of any given size so that the nature of the spending data needn't constrain the definition of a study region.

It should be noted that the region need not correspond exactly with the 30 mile radius or any other limit on where spending occurs. The impacted region should, however, be larger than the region of spending coverage. One can, for example, examine the impacts that spending within a particular county might have on an entire state or the impacts of spending in a particular tourist community on the county in which it is located. These are quite realistic situations as spending at a given facility or group of facilities will generate impacts in a surrounding region of somewhat larger size.

Your analysis may require consideration of more than one region. For example, in assessing the economic impacts of Lake Shelbyville, Jackson et. al. (1992) examine impacts at local, state, and national levels. Immediate effects of the project are most evident in a local area around the reservoir. The region for assessing local impacts included the two counties falling within a 30 mile radius of Lake Shelbyville: Shelby and Moultrie counties in Illinois. In assessing the impacts of durable goods
purchases, a larger region is generally in order, as durable goods used at the reservoir are often bought outside the local area. Even if purchased locally, durable goods are usually not manufactured locally. By defining a broader region, as either the state of Illinois or the entire United States, the full effects of durable goods purchases may be captured.

The larger the region, the more economic activity that will be captured within the model. Thus, the absolute impacts of recreation and tourism projects 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 recreation and tourism project declines significantly, as the impacts are diluted by all sorts of other economic activity.

In the Shelbyville study, Jackson et. al. found that the spending of all visitors to the project generated a total effect of 860 jobs in the two county area. This constituted 9.5% of all employment in this largely rural area. If one uses the state of Illinois as the “impacted region”, total employment effects grow to about 1,200 jobs, but this is now a very small percentage of all jobs in Illinois.

5. **Identify key economic sectors and desired sectoral detail.** The proposed action and anticipated uses/users of the results should suggest the key sectors that will be impacted. Recreation and tourism activity typically impact the lodging, restaurant, amusements, retail, transportation and government sectors most directly. In the problem definition stage consideration of impacted sectors helps to identify relevant categories of spending. The desired sectoral detail plays an important role in structuring the presentation of results. In some cases only an aggregate measure of impacts may be desired. In other cases, clients may be interested in which particular sectors are most heavily affected and will want estimates of sales and jobs broken down by sector. MI-REC aggregation templates provide some sample schemes to highlight recreation and tourism sectors while summarizing manufacturing and other sectors in broad terms. You may customize your own aggregation templates within IMPLAN to highlight particular sectors or industry groupings in a particular analysis. In those situations where a client is interested in impacts on one or more particular sectors, you should take advantage of IMPLAN’s ability to produce estimates for individual sectors.

6. **Identify the most important measures of economic activity.** IMPLAN produces estimates of impacts in terms of direct sales, total industrial output, employee compensation, proprietors income, value added, and employment. Consider which of these measures or combination of measures will be most useful.

   Each of these impact measures can be divided into direct, indirect, and induced effects and could be reported in absolute or relative terms. That is, one can report an increase of 1,000 jobs, or in an economy with 5,000 jobs, that jobs would grow by 20%. In evaluating the economic effects of existing activity (say current visitors to a park), one may be interested in what portion of total jobs or jobs in a particular sector are accounted for by the spending of current park visitors.

7. **Identify the tolerable levels of error in the results.** Although confidence intervals and estimates of error are rare in economic impact studies, this doesn't mean they are not important. You should have at least a ballpark idea of how much error you can tolerate in the analysis as this will dictate how much effort and expense you must put into it. The more accuracy you demand, the greater the requirements to gather up-to-date local data on visitation, spending and economic activity. These data allow you to fine tune the spending estimates and regional input-output model by adjusting default values within MI-REC and Micro-IMPLAN. Such fine tuning will require time, knowledge, and money that must be weighed against the benefits of the improved estimates.

   Estimates of impacts are based on three components: visits, spending, and multipliers. You should try to balance the errors across these components. If your estimates of the changes in use may be off by 50%, it is wasteful to worry about errors of 10 or 20% in the other two components - devote more effort to improving the use estimates. Carefully gathered spending data will generally have errors of at least 10% due either to small samples (sampling error), nonresponse error, or measurement error. Less carefully gathered data may have errors over 50%. In most cases, you will be generalizing spending
data gathered at a particular time for a particular population to a new situation. This introduces additional errors if your situation is somewhat different than that of when and where the data were originally gathered. You will probably need to resort to judgment to assess how much error you may be making in generalizing from secondary data or from a statewide sample to a particular site. With good judgment these errors should be within 10-20%, and if independent of the errors in the original data, they may be just as likely to cancel each other as to add up.

Errors in the multipliers stem from the degree to which the estimated input-output model has captured the given regional economy. Reducing model errors requires the estimation of a customized input-output model within IMPLAN, e.g. adjusting the IMPLAN data bases and model coefficients (in particular IMPLAN's estimates of regional purchase coefficients - RPC's). Model adjustments require a good knowledge of input-output models.

The specific procedures for estimating spending and regional economic impacts are presented in the software section of this manual (Part II). We conclude the conceptual part of the manual with some guidance on interpreting and reporting the results in Chapter 5. Chapter 5 will be more meaningful after you have completed an analysis. You may skim Chapter 5 now to get a preview, but should return to it after completing an impact analysis.
Chapter 5. Interpreting and Communicating the Results

An important final step in completing an economic impact assessment is the interpretation and communication of your results. The MI-REC and IMPLAN systems generate a wealth of reports and files. To summarize the results of an impact analysis, you must choose the appropriate pieces from various IMPLAN and MI-REC reports, and organize this information in a way that will most effectively communicate the results to a given audience. To avoid misinterpretation and misuse of the results, you should be particularly careful when summarizing economic impact information for a non-technical audience.

In this chapter we provide some guidelines for interpreting and communicating the results of an economic impact assessment. Much of this chapter will be more meaningful after you have completed an impact analysis, so you may want to skim the chapter at this time and return to it when you are ready to prepare a report.

RECAP OF REPORTS

Figure 5-1 summarizes the steps you have carried out to conduct an economic impact analysis using the MI-REC system. The column at the right of this figure indicates the reports that are generated at each step. We use MODEL to represent the name of a typical model and SCN to represent the name of a typical scenario in the figure and throughout the manual. Substitute your own model and scenario names where appropriate.

Step One. Problem Definition. At this step you should have produced a summary of the action being evaluated. For recreation and tourism applications you will have estimated changes in use and segment shares as part of the problem definition. Your report should include a map of the study region, as you have defined it.

Step Two. Estimate Changes in Spending. The spending estimation spreadsheets (e.g. TRIP.XLS and DRBL.XLS) produce five tables and give you the option of generating a series of graphs for summarizing segment shares and spending information. Many of these tables and graphs can be directly included in your reports or presentations of the results. Table 5 from the spending estimator is your record of the spending data entered into the input-output model.

Table 1. Spending profiles for spending in local area
Table 2. Spending profiles for total trip spending
Table 3. Summary of per unit spending profiles
Table 4. Summary of total spending
Table 5. Entries for IMPLAN

MI-REC Graphs

* see Appendix B for examples of tables & graphs
Figure 5-1 Full page Figure Here
Step Three. Estimate a model for the Region. Micro-IMPLAN provides options for generating a variety of reports to describe the regional economic model you have estimated.

- Base Year Information
- Social Accounts
- Input-Output Accounts
- Multiplier Reports

Many of the model reports would only be used in technical presentations or detailed study reports aimed at a technical audience. For a nontechnical audience, the following information is often useful:

* brief summary of base year information. Base year information is in the IMPLAN file MODEL.901. Aggregate this file and print out the result, MODEL.9A1. Use the 901 and 9A1 reports to summarize the sectors that are included in the model and the relative importance of key industries or industry groups in the region. The aggregated base year report may be imported into the Excel workbooks and printed from Excel.

* definition of the study region (Use PrintScreen to print out information in the Model Status section of the IMPLAN Model Construction routine). Present the study area on a map.

* structure of the regional economy. The multiplier reports (MODEL.601- MODEL.606) supplement the base year information by providing a summary of the degree of interindustry linkages by sector within the region. See Appendix E for information on how to properly interpret and use multipliers.

Step Four. Estimate Impacts of the Spending. The Micro-IMPLAN impact analysis routines produce four standard impact reports. These are stored in the model directory and named by scenario (we use SCN for a typical scenario name):

Disaggregated impact reports

<table>
<thead>
<tr>
<th>SCN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCN.903</td>
<td>Direct Effects</td>
</tr>
<tr>
<td>SCN.904</td>
<td>Indirect Effects</td>
</tr>
<tr>
<td>SCN.905</td>
<td>Induced Effects</td>
</tr>
<tr>
<td>SCN.906</td>
<td>Total Effects</td>
</tr>
</tbody>
</table>

Each report summarizes impacts in terms of 7 impact measures. See the Micro-IMPLAN manual or IMPLAN Companion Guide for details:

* Final Demand is the total sales to final consumers of goods and services. Final demand includes sales to households and government in the region, as well as capital formation and exports.

* Total Industrial Output (TIO) is the total output (sales) of each industry needed to satisfy final demand, including intermediate sales.

* Employee Compensation covers wages and salaries of employees.

* Property Income covers income of sole proprietors and other property income.

* Total Income is the sum of employee compensation and property income by place of work.

* Value Added is the sum of indirect business taxes and total income.
* Employment is the number of jobs necessary to produce the given total industrial output. The 1990 IMPLAN job estimates are NOT full time equivalents (1985 IMPLAN job estimates were FTE’s).

**Step Five. Summarize and Interpret Results.** Use the MI-REC aggregation templates (TRIP or DURABLE) to aggregate each of the impact reports. This will yield four shorter reports that are more easily viewed or printed. Note that the IMPLAN impact reports are ASCII files that may be read into a wordprocessor or printed directly. Each report is 132 columns wide, so set your printer to compressed mode before printing these reports. The Excel 5.0 version of MI-REC lets you import these reports into a spreadsheet for printing and further analysis.

Aggregated Impact Reports

<table>
<thead>
<tr>
<th>SCN.9A3</th>
<th>Direct Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCN.9A4</td>
<td>Indirect Effects</td>
</tr>
<tr>
<td>SCN.9A5</td>
<td>Induced Effects</td>
</tr>
<tr>
<td>SCN.9A6</td>
<td>Total Effects</td>
</tr>
</tbody>
</table>

**PUTTING AN IMPACT REPORT TOGETHER**

While the MI-REC and IMPLAN software can help you to generate a variety of tables and figures, it is up to you to identify the most meaningful information for your audience. The volume of reports produced in your MI-REC analyses is somewhat overwhelming and certainly so for any non-technical audience. Avoid simply dumping all possible IMPLAN reports and MI-REC tables in their original forms into a purported "report". Few of these tables are designed to go directly into a report, although some may be included in appendices. It will be up to you to help interpret and summarize the results.

For a basic report of an impact assessment using MI-REC, we suggest the following information:

1. Define the action

   - Describe the current situation and changes being evaluated
   - Summarize estimates of changes in use in total and by segment
   - Describe the segments that will be most affected
   - Identify the types of spending covered and sectors affected
   - Include a map of the study region or regions. (map the counties chosen in creating the I-O model)

2. Summarize changes in spending

   - Report per unit figures on which spending totals are based. (Tables 1 and 2 or 3 of the MI-REC spending estimator)
   - Report total spending or final demand changes. (Table 4 of MI-REC spending estimator or corresponding graphs)
   - Report inputs to the input-output model by spending category (Table 5 of MI-REC spending estimator)
   - Report final demand by sector in 1990 dollars (final demand column of IMPLAN report SCN.9A3). Note that total final demand in SCN.9A3 should be roughly equal to total spending in Table 4. Differences will be due to the deflating within IMPLAN of spending between the model base year and the year of the spending (MI-REC spending profiles are in...
1990 dollars), the application of LPC's less than one to the spending data, and purchases of commodities not produced in the region.

3. Summarize the region's economic structure
   * Use population and other data to characterize the region
   * Capture recent trends in the region's economy from secondary sources like REIS data, County Business Patterns etc.
   * Summarize the relative importance of different industries or sectors within the region.
     (IMPLAN base year report, disaggregated or aggregated - MODEL.901, MODEL.9A1)
   * Report selected multipliers or RPC's as indicators of interindustry linkages and the propensity to buy locally (IMPLAN multiplier reports, RPC's are reported in optional report MODEL.003).

4. Summarize impacts of spending on the region (the Summary page in the Excel workbooks provides a sample set of summary tables and figures).
   * Use aggregated impact reports to highlight the types of impacts and impact measures of most interest (SCN.9A3, SCN.9A4, SCN.9A5, SCN.9A6).
   * Start with totals at bottom of these tables to estimate overall impacts. Report detail by sector as necessary.
   * Select the output measures of most importance and construct tables for each output measure.
   * Calculate ratio multipliers from the impact reports by dividing total effects by direct effects (Type III) or direct + indirect by direct effects (Type I). Report these as indicators of the magnitude of secondary effects of the action being evaluated. Note that multipliers may be easily computed on the converted impact report files.
   * Compute response coefficients (Keynesian multipliers) for total income as the ratio of total income (direct + indirect + induced) to total visitor spending or total final demand. These ratios yield the change in income within the region associated with a one dollar change in visitor spending or final demand. You may compute similar multipliers for employment and value added. (See Appendix E for further clarification of multipliers).
   * Divide the predicted impacts by base year figures (in total or by sector) to indicate the relative impact on the region.
   * Present selected impact estimates graphically using the converted impact report files and your spreadsheet's graphing capabilities. (e.g. create a bar or pie chart of total employment effects by aggregated sectors).

4. Summarize the overall results.
   * Put highlights into an Executive Summary or concluding chapter.
   * Discuss limitations of your analysis and potential errors in the analysis (errors in estimates of use, spending, and regional model).
   * Discuss the implications of the results for the given audience.