MINNESOTA SEA GRANT COLLEGE PROGRAM

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Research Report 19

Estimating Tourism/Recreation Linkages in a Local Economy for Regional Resource Management

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STAFF PAPER P85-21 MAY 1985

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Introduction

Tourism is widely recognized as a component of the basic sector of local economies. Although many of the participants in recreation activities within a region are residents of that region, a significant portion come as visitors from outside the region. Hence, visitors provide a source of income for the regional economy; directly through their own purchases and indirectly through the impact of subsequent purchases attributable to their initial outlays. For this reason, both private and public decision makers seek valid information on the tourism/recreation industry, particularly in their efforts to improve the quality of their investment decisions.

A comprehensive tourism/recreation model is described in this paper. The model will provide useful information to decision makers that will aid them making judicious investment decisions. A discussion of the background and development of such a model, its potential application to a specific region, in this case Northeast Minnesota, will be the focus of our paper.

Northeast Minnesota encompasses the seven counties that form Minnesota's Arrowhead Region: Cook, Lake, St. Louis, Carlton, Aitkin, Itasca and Koochichiching counties. It is an area of outstanding natural beauty with a tourism/recreation superstructure that provides for the utilization of numerous recreation activities and sites. Public recreation areas include Superior National Forest, Voyagers National Park, The Boundary Waters Canoe Area, and multiple state parks and waysides. Public and private facilities and services to support a tourism/recreation industry have gradually increased, but making further improvements in this sector of the region's economy has been recognized as a development goal.

Historically, the economy of Northeast Minnesota has depended on its natural resource base as the mainstay of economic activity with mining and timber related industries providing both employment and high average annual earnings to area residents. Recently, these sectors have suffered from the nationwide recession. Unemployment rates for the region have been double the national average. In general, the economy of Northeast Minnesota can be described as being in a transitional state. Under these conditions, an objective analysis of investment opportunities in the tourism/recreation sector provides an important service to potential and current investors in the region's overall economy (Willis, 1977).

Problem Statement

Economic analysis of recreation resources is essential as these resources become scarce relative to recreation demands. Many communities are constrained in the provision of essential recreation services over a planning period. At the same time, new opportunities for development of the tourism/recreation industry depend upon an adequate supply of recreation facilities and services. In addition, many communities are facing the problem of prioritizing investment options in the economy.

Most recreation studies in the past have shown that communities have been unable to plan for adequate capacity to meet recreation demand since present methods applied to recreation planning are limited in scope, concentrating on either a single aspect of recreation, such as visitor demand; a single sector, such as public parks; or a single cost, such as travel cost. As a result, many communities must adjust recreation capacity after relatively short periods of operation.

Objectives

The purpose of this paper is to develop a holistic model of the tourism/recreation industry within a region and to provide information for its use. The primary objective is to present a tourism/recreation model that incorporates recreation demand and supply and identifies factors that influence them. Data derived from a road survey and a travel diary on recreation in Northeast Minnesota by the Minnesota Department of Natural Resources in 1978 were used as inputs in building this model. Specific objectives are:

To delineate the components of a tourism/recreation model;

To delineate and quantify the linkages between these components;

To delineate and quantify the linkages between the tourism/recreation model components and the rest of the local economy.

Working Hypotheses

The attainment of the objectives is guided by three working hypotheses which are listed as follows:

1. Recreation facility and site attributes affect participation in recreaction activities and activity-oriented expenditures and, hence, the demand for particular recreation facilities.

2. The demand for recreation facilities affects facility-oriented expenditures and, hence, the demand for industry output.

3. The expenditure effects of recreational participation and facility and site improvements are a basis for prioritizing private investment options in recreational resources and, hence, investment is contingent on rates of existing facility utilization.

The Model

The model is used to estimate product and income flows originating from the current tourism/recreation facilities and activities to establish a baseline from which to make comparisons. The model also estimates flows that would be generated if additional facilities and services were available.

First the various components of the model and the linkages that connect these components will be defined. Then the basic framework and the relationships between the components will be described.

The model consists of three components, the focal area, the market area and the impact area. The focal area, or recreational area is used to estimate the extent of use of recreation resources by defining and delineating interactions between recreation participants, their activity preferences, their expenditures, and recreation facilities and their costs of construction, replacement, expansion, and operation and maintenance.

The market area estimates provide a measure of the potential number of participants attracted to a focal area, the variables affecting their recreational travel and the recreational expenditures and activity preferences of the potential participants. Recreational activity preferences are defined according to the set of perceived recreational activities in the focal area (Uel Blank et al., 1982).

The impact area estimates show the economic impacts of tourism and recreation by assessing the changes in industry output resulting from the effects of spending on recreation activities and facilities. The

total economic impact of tourism/recreation activities extends beyond the geographical limits of the focal area, due primarily to leakages from the local and/or regional economy. Expenditures on recreational activities and facilities provide the basis for linking the focal area and the economic area.

Transportation and communication are the linkages that connect the market with the recreational area (Ballman, 1983). Transportation is all modes and means of travel between a given market area and the focal area; it is what determines how accessible the recreation area is to visitors. The accessibility of an area is of great importance since it is one of the major factors that affect a decision to travel to an area. Accessibility is basically a measure of travel cost, not only the monetary cost of travel but other costs as well such as time costs, costs associated with choice (or lack of choice) in method of travel and in the pleasure or aggravation of travel (Clauson and Kretsch, 1966). For example, travel on a gravel road versus travel on a four lane highway inposes not only a cost of time but a cost of aggravation from dirt, bumps, etc. Three types of travel are available in some degree to Northeast Minnesota; highways/roads, railroad and air travel. Both railroad and air travel are limited to the city of Duluth. However, most travel to and within Northeast Minnesota is done on roads, usually in private vehicles.

The second link between recreation areas and market areas is communication. Communication encompasses all modes and means of conveying information pertinent to the recreation industry between the two areas. The flow of information must be two ways so that both potential visitors/participants from the market area and recreation providers from the focal area can optimize their recreation decision making. Communication flowing to the market provides information on the recreation opportunities available at the focal area, while communication flowing to the recreation focal area provides information on the wants and needs of potential participants. The two basic types of communication are written and verbal and both types occur in the flow from market to recreation area and from recreation to market area. The means by which information flows from the market area to the recreation area include market surveys and feedback from focal area visitors. Information flows from the recreation to the market area include word of mouth advertising, information from travel agencies and all types of paid advertising, such as television, newspaper ads and mailed brochures. A number of projects focusing on upgrading or expanding tourism

advertising and measuring it's results have been done recently in Northeast Minnesota. A overall tourism/recreation model is illustrated in the appendix, Figure 1.

A. Focal area

Focal areas are defined geographically and represent destination areas for current and potential tourism/recreation participants. The size of a focal area can vary from a single site to an entire region. Regardless of size however, a focal area contains the attractors that draw participants to the area for recreation. These attractors consist, in part, of the recreation activities available to participants and the facilities and services to support the activities. Therefore, a focal area represents the source of tourism/recreation supply that is linked to the market or source of demand through a transportation network and communication channels.

Northeast Minnesota is defined as both the impact area and the recreational focal area of interest for this paper. We recognized that within the region there are numerous subareas that fulfill the definitional requirements of a focal area. Conceptually, the scope of a study could be refined to evaluate more localized areas.

As a focal area, Northeast Minnesota offers recreationists opportunities to participate in a range of activities in a variety of settings. The natural and developmental characteristics of a focal area establish both the type of tourism/recreation activities that can potentially occur within the area and the opportunities for area development. Focal area constraints on activities and development are of at least three forms: legal/policy constraints, resource constraints and capacity constraints. The first two are most important in Northeast Minnesota. State and federal policy determines what types of tourism/recreation activities can occur within many locations of the region. For example, motor boating is banned from much of the BWCA. Similarly, the areas natural resources, including weather, place limits on the activity offerings of the region.

The extent and nature of recreation participation is a function of the three attributes of a recreation focal area: the opportunity for specific activities, access to specific activities and adequate services to

support these activities.

Supporting facilities are required for the translation of a personal experience into a recreation experience and into an economic exchange. The quality and capacity of the facilities have an impact on both the participation rate for each activity and on the duration of participation in each activity. When dealing with a seven county area such as Northeast Minnesota, the aggregation of facilities to a manageable number of facility types precludes a breakdown of facilities by quality type. However, the use of a smaller focal area would allow stratification of facilities by quality.

The focal area component of the model is composed of three basic data sets: (1) recreational activities; (2) recreational facilities, and (3) recreational expenditures.

I. Recreational activities

The structure of the recreational area is based upon the interdependence between facilities and activities. In the model the recreation activity classes are defined according to the recreation facility types (Maki, 1982) that are needed for the performance of the activities. Simultaneously, the facilities are defined with reference to the recreational activity classes. The classification that relates activities to facilities and services is presented in the appendix, Table 1. The relative importance of recreation demand is measured by the number of activity occasions by activity class, where an activity occasion is a measure of continuous participation in a specific recreation activity. Actual and potential recreation demand data are provided by the participant and market surveys.

The relationship between activities and facilities is represented by total activity occasions for each of the activity classes that are distributed among facility classes needed for participation in tourism/recreation activities. An illustrative example is presented in the appendix, Table 2. Total activity occasions for each of the activity classes could be calculated on either a weekly, monthly or a seasonal basis depending on the level of aggregation of the available data.

II. Recreational facilities

The recreational attributes of the focal area consist of its natural beauties and of the facilities and services complementing them and supporting the activities. In the model, it is assumed that the facilities are fully staffed and equipped. Within the model, tourism/recreation facilities are a proxy for other variables that are difficult to measure such as quality. The combination of all factors, quantifiable and nonquantifiable, determine the attractiveness of the focal area.

Facility-capacity data are derived based on the number of facilities existing in the focal area and their physical capacities. This information is provided by the business and government surveys. The data indicate the number of tourism/recreation activity occasions for all of the activity classes that occur simultaneously within a facility class. Each facility class could be sub-divided into private and public facilities depending on the available data.

A measure of utilization of facilities from these tourism/recreation activities must be derived based on total activity occasions for each of the activity classes, distribution of activity occasion for each activity class among facility classes, and facility-capacity data. As a result, the degree of utilization of a facility class by the activity occasions for each activity class can be determined. The utilization analysis can be derived from duration of participation for each of the activity classes. In this case physical capacity of the facilities must be transformed into a time capacity index.

The focus of the utilization analysis is to identify capacity constraints, which need to be changed for recreational expansion to occur. The analytical emphasis is on estimating the difference between actual (and/or potential) tourism/recreation activities and the actual (and/or potential) supply of recreation facilities and services.

The capacity of the facilities imposes a limit to satisfying the demand for recreation activities. An adequate supply of facilities and services will be reflected in the recreation experience of the participants. The satisfaction level of participants and the anticipated satisfaction of potential participants will be translated into their participation rates and the duration of their participation. Any change in the level and duration of participation by activity will affect the flow of expenditures to the economy.

III. Recreational expenditures

Tourism/recreation oriented expenditures are incurred by participants and by the public and private sectors that provide facilities and services. Activity related expenditures are incurred by participants in recreation activities. A classification of recreation activity-oriented expenditures is presented in the appendix, Table 3. Facility related expenditures are incurred by private and public sectors in construction, replacement, expansion, and maintenance and operation of tourism/recreation facilities. Activity related and facility related expenditures are provided by the participant and market surveys and by the business and government surveys respectively.

B. Market areas

Market areas are geographically defined sources of demand for tourism/recreation activities. Total demand from all market areas sets an upper bound on the amount of development that is economically feasible within a focal area. The market area component of the model is composed of two basic data sets: (1) recreation activities and (2) recreation expenditures.

Northeast Minnesota is a user area for residents of the region who frequently engage in area activities. The region is an intermediate destination for somewhat more distant markets. The principal intermediate market is the Twin Cities metropolitan area whose residents tend to take weekend or other short-stay trips to Northeast Minnesota. Finally, Northeast Minnesota is a resource destination for the remainder of the Upper Midwest, the rest of the nation and the rest of the world. Visitors from these area either stay in the region for an extended period of time or pass through the region on the way to their final destinations.

In general, demand for the tourism/recreation activities of Northeast Minnesota, within any given market area, is a function of distance, socio-economic characteristics of the market area, such as population and personal income, and the market area's level of awareness about Northeast Minnesota as a potential tourism/recreation destination.

The recreational demand of the potential tourism/recreation participants are a function of their

preferences, their socio-economic characteristics and their awareness of the focal area characteristics. The activity preferences of the potential participants differ among and within market areas. The communication linkage of the tourism/recreation system informs the potential participants of the recreation opportunities at the focal area.

More specifically, in this model, the market area is defined by the geographic location of potential tourism/recreation participants and their recreational activity preferences. The potential number of participants is an indication of the potential use of existing recreation resources in the focal area. The total number of potential participants from the market area is estimated from earlier market studies. The market survey will also indicate the activity preferences of the potential participants, their participation rates and their perceived expenditures on recreation activities. The potential tourism/recreation activity expenditures indicate the future economic impacts of attracting participants to the focal area.

C. Impact area

The impact area or economic area is defined by the basic industries, part of which is the tourism/recreation industry and the non-basic industries that support and implement the basic industries. A measure of economic impacts from the tourism/recreation industry is derived from the summation of industry purchases due to participation in tourism/recreation activities and purchases to provide and maintain tourism/recreation facilities.

Formulation of the Model

The objective of model formulation is to link purchases originating from activity-related personal expenditures to facility-related construction, operation and maintenance expenditures. The methodology of the model is illustrated in the appendix, Figure 2.

The formulation and implementation of the recreation model described above is expressed in matrix notation as follows:

$$X = I_1 * E_1 * B_1$$

$$Y = I_2 * E_2 * B_2$$

$$I_1 = C * D_1$$

$$I_2 = C * D_2$$

$$G_1 = (I-A) * X$$

$$G_2 = (I-A) * Y$$

$$R_1 = T * X$$

$$R_2 = T * Y$$

$$P_1 = S * X$$

$$P_2 = S * Y$$

$$K = L * M * N$$

where

X is an NISxNACT matrix of NIS sector industry purchases due to activity-related expenditures on NACT recreational activity classes.

Y is an NISxNFAC matrix of NIS sector of industry purchases due to facility-related expenditures on NFAC recreational facility classes.

I_1 is an NISxNPCE matrix of coefficients indicating the allocation of NPCE activity-oriented expenditure classes among NIS industries.

I_2 is an NISxNFCE matrix of coefficients indicating the allocation of NFCE facilities-oriented expenditure classes among NIS industries.

E_1 is an NPCExNPCE diagonal matrix of actual spending of recreational participants on NPCE activity-oriented expenditure classes.

E_2 is an NFCExNFCE diagonal matrix of actual spending of facility suppliers on NFCE facility-oriented expenditure classes.

B_1 is an NPCExNACT matrix of coefficients indicating the allocation of NPCE activity-oriented expenditure classes among NACT activity classes.

B_2 is an NFCExNFAC matrix of coefficients indicating the allocation of NFCE facility-oriented

expenditure classes among NFAC facility classes.

C is an NISxNCO matrix of coefficients indicating the allocation of NCO commodity types among NIS producing industries.

D_1 is an NCOxNPCE matrix of coefficients indicating the allocation of NPCE activity-oriented expenditure classes among NCO commodity types.

D_2 is an NCOxNFCE matrix of coefficients indicating the allocation of NFCE facility-oriented expenditure classes among NCO commodity types.

G_1 is an NISxNACT vector of sector gross outputs imposed by NPCE activity-related expenditures on NACT activity classes.

G_2 is an NISxNFAC vector of sector gross outputs imposed by NFCE facility-related expenditures on NFAC facility classes.

I is an NISxNIS identity matrix.

A is an NISxNIS matrix of coefficients of direct requirements per dollar of output.

R_1 is an NISxNACT matrix of sector earnings imposed by NPCE activity-related expenditures on NACT activity classes.

R_2 is an NISxNFAC matrix of sector earnings imposed by NFCE facility-related expenditures on NFAC facility classes.

P_1 is an NISxNACT matrix of sector employment imposed by NPCE activity-related expenditures on NACT activity classes.

P_2 is an NISxNFAC matrix of sector employment imposed by NFCE facility-related expenditures on NFAC facility classes.

S is an NISxNIS diagonal matrix of sectoral earnings.

T is an NISxNIS diagonal matrix of sectoral employment.

K is an NACTxNFAC matrix indicating utilization of NFAC facility classes by activity occasions on NACT activity classes.

L is an NACTxNACT diagonal matrix indicating actual demand on activity occasions for NACT

recreational activity classes.

M is an NACTxNFAC matrix of coefficients indicating allocation of recreational activities on NACT activity classes among NFAC facility classes.

N is an NFACxNFAC diagonal matrix indicating capacity on activity occasions of NFAC facility classes.

The link between industry purchases and tourism/recreation oriented expenditures requires several computational steps. First, the activity-oriented expenditures on recreation activities participation are classified into personal consumption expenditures by type of expenditure; that is, B_1 (National Income and Product Account Tables, Survey of Current Busines, July, 1983). The facility-oriented expenditures on supplying recreation facilities are classified into producers durable equipment expenditures and producers new construction expenditures, and producers operation and maintenance expenditures; that is, B_2 (Survey of Current Business, July, 1980). The objective of this computational step is to distribute the activity-oriented and facility-oriented expenditures among expenditure types. An illustrative example of an activity class-expenditure class matrix of North Shore, Northeast Minnesota is presented in the appendix, Table 4.

In the next step, each type of activity-oriented expenditure is separated into several commodities based upon the input-output structure of the U.S. economy, 1972; that is, D_1(Survey of Current Business, Feb., 1979). Each type of facility-oriented expenditure is divided into the input-output commodity groups; that is, D_2 (Survey of Current Business, July, 1980). In this computational step activity-oriented and facility-oriented expenditure types are distributed among their commodity types respectively.

Finally, each commodity type is distributed among the producing industries using the input-output structure of the U.S. economy, 1972; that is, C (Survey of Current Business, February, 1979 and July, 1980).

One additional step is required to link tourism/recreation oriented expenditures and industry purchases. Two tables are derived from the last two computational steps described above. These tables distribute activity-related and facility-related expenditure types among the industries that are needed to produce the

commodity types include in each of expenditure type; that is, I_1 and I_2 (Maki, 1982).

Industry purchases matrix expected from activity-related expenditures, X, distributes the activity-related purchases among producing industries and expenditure types. The matrix will depict the economic impacts of activity-related expenditures. An illustrative example for Northeast Minnesota is presented in the appendix, Table 5. The table also shows gross output (G_1), personal earnings (R_1) and employment (P_1) required to produce industry output requirements imposed by activity-oriented expenditures. The industry purchases matrix due to facility-related expenditures, Y, will show the economic impacts of facility-related expenditures.

The computational procedures mentioned above enable us to carry out several forms of analysis. First, tourism/recreation expenditures are linked to the regional/local economies by industry purchases indicating total direct impacts of tourism/recreation activities and facilities on the regional/local economy. Thus, a change in the use of recreational resources and/or in the supply of facilities and services is shown first in purchases by expenditure types and activity classes and /or facility classes and finally in the distribution of purchases by industry and expenditure types.

From the government and business survey a marginal cost and marginal revenue from providing facilities and services will be estimated. This marginal analysis of costs and revenues, in conjuction with the capacity index (N) and a measure of facility utilization (K), would indicate possibilities for investment. An estimate of these marginal costs and revenues is based on facility-related expenditures and facility-related revenues (or activity-related expenditures for each of the facility classes) respectively and total activities for each of the activity classes distributed among facility classes; that is, L*M.

The possibilities for investment analysis addresses the decision process for the tourism/recreation industry. The decision process involves determining and supplying an adequate number and mix of facilities and services in order to meet actual and/or potential demand for tourism/recreation activities in the focal area. According to the availability of data and their level of aggregation, the seasonality of recreation activities could be considered within the model.

Data Needs

The third section of the paper deals with model data needs. Most of the data would be derived from three types of surveys: a participant survey, market surveys and business and goverment surveys. The design of these surveys will also be covered in this section.

A. Market survey

In total number, market studies have been the most prevalent type of tourism research. They have varied widely in the type of organization sponsoring the research, market and destination areas covered by the research, the type and form of the information collected, the characteristics of the population surveyed and study timing and method of data collection. The scope of this paper permits but a brief overview of some research that has been done in this area and its usefulness for model development.

Several ongoing market research projects are nation wide for the purpose of identifying travel preferences throughout the United States. Among thse studies, procedures vary widely. For example, the National Travel Data Center surveys government agencies in the fifty states. Other surveys are sponsored by magazines and rely on readership surveys to establish family travel preferences. On the state level, Minnesota conducts a seasonal market study of persons requesting tourism information. The purpose of the study is to evaluate the effectiveness of state sponsored advertising campaigns by following-up information request with a time lagged random survey (Tourism Division, Minnesota Department of Energy and Economic Development). More extensive and rigorous market studies have been done for specific subregions within the state and a few for the state as a whole (von Kuster, 1979; Knopp and Blank, 1983). These have been sponsored by agencies of state government or by the academic community.

For the purposes of model development, all of the existing research has limitations. National studies do not collect detailed activity preference information for a given region, Minnesota's seasonal studies concentrate on a special population, contain limited expenditure and activity information and cannot be interpreted at a regional level. The specialized research that has been done in the past, has been done for a range of geographic areas, some of which are contained within Northeast Minnesota. These provide

reasonable definitions of the market areas of interest.

As discussed earlier, market areas are not assumed to be homogenous. Activity preferences vary between market areas and within market areas by resident subpopulations. In order to determine the level and type of activity demands emanating from markets, a market survey, stratified according to results of existing research will collect information on activity preferences. The market survey will provide the number of potential participants to the focal area and the recreation travel cost. The number of participants regressed against travel cost using socio-economic characteristics of the market area as weighting factors will provide a regression equation. The equation will be used for the estimation of the number of participants.

B. Participant survey

To ignore the market is to limit the analysis to the group that is aware of tourism/recreation opportunities in Northeast Minnesota and have chosen to participate in the activities, thus limiting the information. However, current participants establish the economic impact of tourism/recreation on the regional economy.

The economic impact of a recreation participant will vary considerably by activity. Clearly, controlling for time, a camping participant will have less impact on the local economy that a participant who stays in hotels or resorts (Lichty et al., 1979). The amount of equipment required for an activity in conjunction with the amount of equipment supplied by the participant also affects the level of economic impact. The camper that rents equipment in the area could have more of an impact than a hotel guest. Time spent in a given activity also affects the amount of economic impact associated with the activity. Time and capacity are closely related. Activities with minimal capacity could generate economic impacts if the activity duration period is short.

An example of the type of survey needed to measure the economic impact of activities is the one that was done for the Minnesota Department of Natural Resources in 1978. The study consisted of two parts, a road survey and a travel diary. The road survey stopped cars entering the state with license plates from

outside Minnesota. Vehicle occupants were surveyed for information about their party size, length of stay, etc. A travel diary was distributed which allowed for the collection of detailed information on recreation activities including duration and frequency of activity and expenditures. There is only one major limitation to this study for the purpose of model development; no information is available on the expenditures of participants from one of the major market areas for Northeast Minnesota, the focal area itself.

To date, no study has measured all of the interrelationships of activity, time, equipment, turnover, etc. The goal, therefore, of the participant survey is to quantify these relationships so that they are expressed as measures consistent with the Product and Income Accounts. This will entail surveying participants at the point of activity.

C. Business and government surveys

There are two basic types of recreation facility providers, the private sector and the public sector. The private sector includes industry whose primary purpose and source of revenues is recreation such as resorts or ski areas and complimentary industries who derive only part of their revenue from tourism/recreation such as grocery stores and retail shopes. The public sector recreation facility providers include all types of government, federal, state and local who provide parks, nature preserves, roads, or other facilities necessary for recreation activities. Although these two sectors are separate, the provision of recreation facilities by either the private or public sector impacts the regional economy in basically the same way, directly through jobs and income, indirectly through the effects of purchases from other sectors of the economy. These impacts vary during two stages of facility provision, the construction period and the operation period. Hence, any measure of the impacts of recreation facilities on the region must differentiate between these periods.

Most studies on tourism/recreation have essentially ignored the facility provider side of recreation and have concentrated on the visitor and market components. The few studies which have dealt with the facility component have done so in limited ways with limited applications. The most common type of facility study has been an inventory study which attempts to quantify and perhaps attach a quality measure to

existing facilities. The inventory component of the Minnesota Statewide Comprehensive Outdoor Recreation Plan (SCORP) is an example of such a study. There are two major problems with studies of this nature: many cover a single facility type (resorts) or a single sector (public facilities) and the impact of expenditure flows from facility providers on the regional economy is ignored. Some studies, such as the Manitoba Study by Craven et al. (1975), have attempted to relate economic flows from facilities to the rest of the economy; however, these studies do not measure all the economic flows. The concentration has been on the impact of the construction period of a facility only. A limited number of studies mention the direct number of jobs associated with the operation of a recreation facility, but the economic flows caused by purchases from other sectors of the economy during this period is not measured.

The type of information that must be collected from business and government recreation providers is similar to the data collected in business surveys done for Inpu-Output Studies or Regional Development Studies. There are two basic parts to these surveys. The first records what products a company produces, in what quantity, at what price the products are sold and to whom the products are sold. The second part measures what inputs, by standard industrial classification, go into production of these goods, and whether the inputs are obtained inside or outside the region. The survey of private and public recreation providers will follow the same format as above; except the products will be the facilities needed for recreation and quantity will be measured by the facility's potential capacity.

Policy Implications

Finally, we will conclude with the policy implications of model use. The model findings focus on the three basic types of investment in tourism/recreation facilities, namely: those for facilities/services, communications and transportation. The impact of investment for any of these alternatives will depend on several criteria; the desires of participants, the number of participants, utilization rates of available facilities, unmet market potential and constraints imposed by the focal area. Therefore, a holistic recreation model is needed to account for the interaction of all these factors.

The model for tourism/recreation as described here has two basic applications; the first is to assess the

current tourism/recreation industry and its impacts on the regional economy; the second is to identify areas of investment potential in the industry. This latter purpose can be realized by measuring the rates of over or under utilization for the various recreation facilities and the reasons for these rates as indicated by the discrepancies between the current or realized recreation industry compared ot its maximum potential. Thus, the first application, assessment of the current recreation industry is necessary to accomplish the second purpose.

Recreation industry assessment can be divided into two parts, measurement of the model components and measurement of economic flows. Component measurement includes a current inventory of recreation facilities along with their potential capacity, the measurement of potential participants from the markets along with activity preferences and transportation costs associated with those markets and the actual number of visitors to the recreation focal area along with a measure of their activity preferences. The current economic flows caused by recreation are measured as two effects, primary and secondary. The primary effects are the jobs and income generated directly through the expenditures of recreation participants and recreation providers while the secondary effects are the jobs and income that are generated by the ripple effects of these initial expenditures on the rest of the regional economy as measured by input-output flows. Combining the primary and secondary effects gives the total impact of the torism/recreation area on the region's economy. This information is needed as a background to understand the importance and the structure of the regional economy and it makes possible an examination of areas of potential investment within the tourism/recreation industry.

In addition to the three major areas of recreation investment--facilities/services, communications and transportation, the option exists of no investment at all in this industry. The returns on any of these options depend on the degree of utilization of facilities that are currently available in the focal area, the potential and realized amount of activity occasions from the market areas and the underlying causes for both factors.

The level of facility utilization is the basis for any investment analysis since over-utilization and under-utilization are caused by deficiencies in different components of the recreation model.

Under-utilization of recreation is defined as a situation in which the realized capacity of facilities is less than the actual capacity. There are three possible explanations under-utilization; insufficient information getting to market areas, prohibitive transportation costs from the market areas to the focal area, or the existing activities and facilities that do not meet the needs of users. The first situation is probable if the actual number of visitors is substantially less than the potential number of visitors, indicating a need for better information flows to the market (communications). On the other hand, if a comparison of activity preferences of the market areas and the activity mix available at the focal area are substantially different, a problem exists with the types of facilities that are being provided. If the preferences of potential recreation participants are comparable to the recreation activities available in the focal area and under utilization of facilities is still occurring, it could indicate a problem with prohibitive transportation costs between the markets and the reecreation focal area.

Over-utilization of facilities, as measured by full use of existing facilities and other indicators of over crowding (long waaiting lines, etc.), indicates a need for capital investment in recreation facilities. Choosing between investment alternatives could be accomplished through an examination of both the preferences for various facilities as measured by participant activity preferences and the relative payoff of these facilities as measured by the economic flows that they generate. The usefulness of the information for this type of decision depends on the level of aggregation of facilities in the model. The more disaggregation that exists within facility types, the more detailed and useful will be the information that the model provides about investment alternatives.

To sumarize briefly, this tourism/recreation model would be useful for analyzing investment decisions in the tourism/recreation industry by providing information on the utilization rates of the existing recreation superstructure. In addition, it would be helpful in establishing the underlying reasons for the current utilization rates and therefore identify potential areas of investment. Finally, by measuring the economic flows attributable to the tourism/recreation industry, the model allows for projections of potential returns to investments in recreation.

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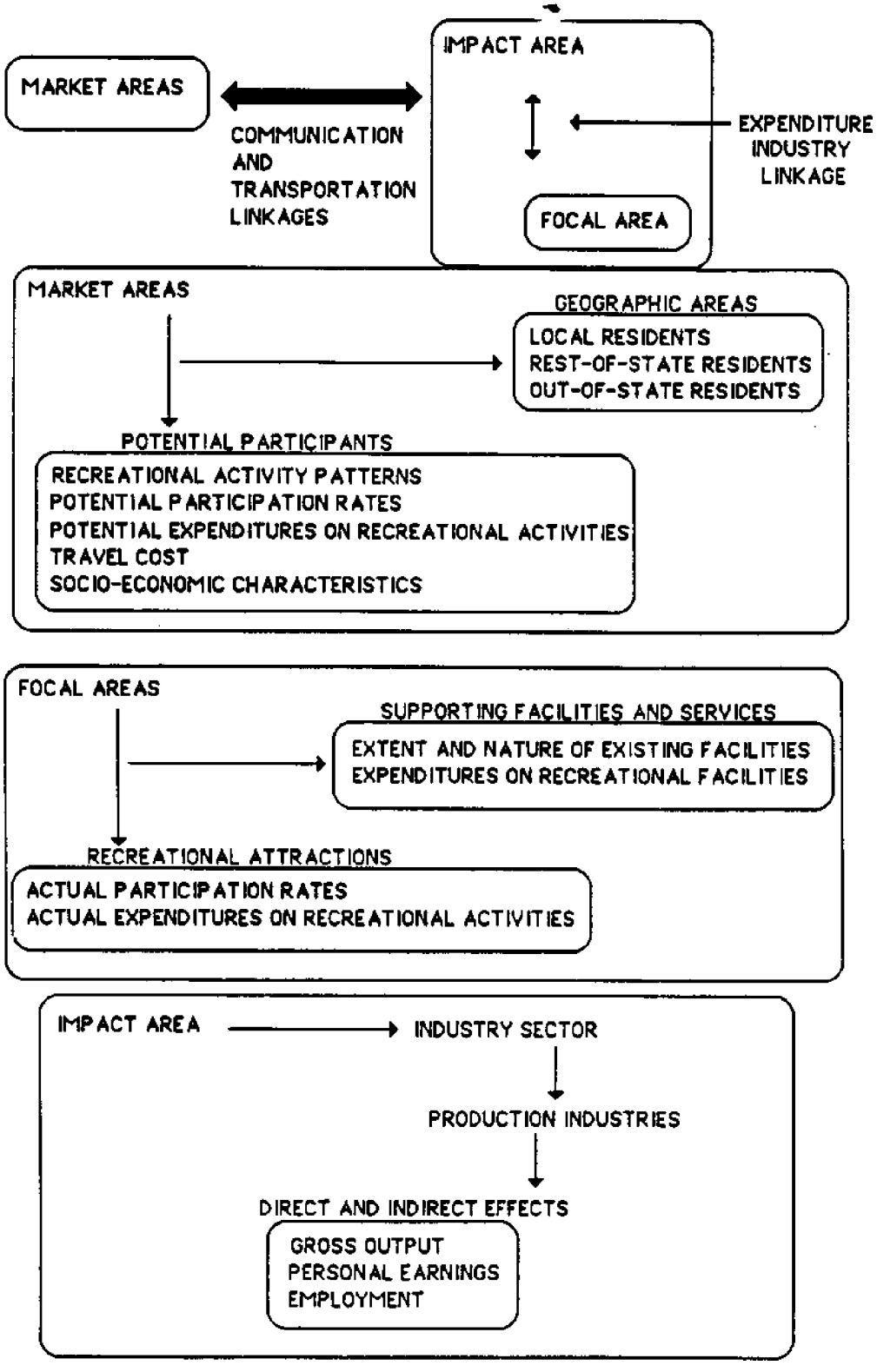
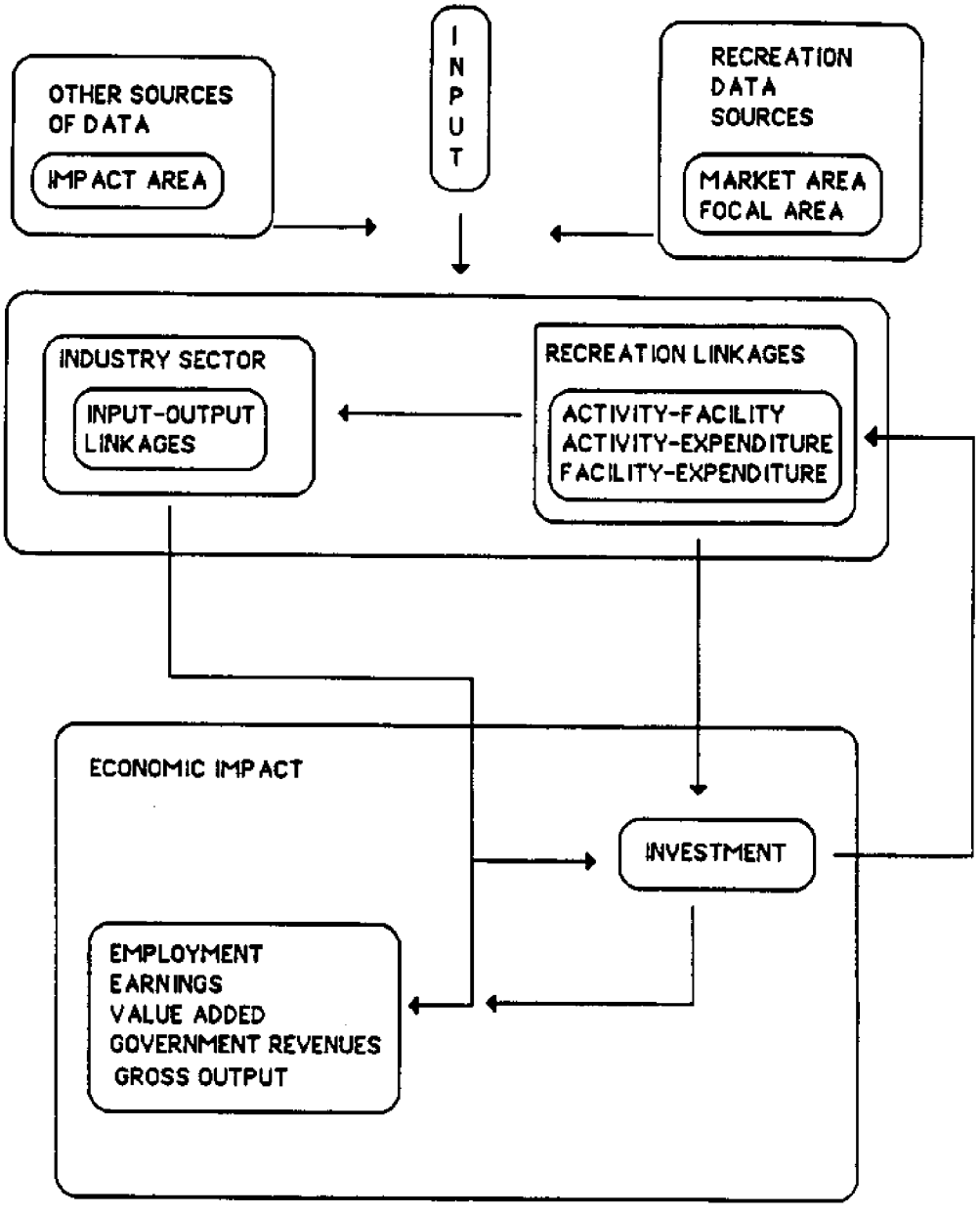
Appendix Figure 1



Appendix Figure 2



Appendix Table 1. Tourism/recreation facilities and related activities, Northeast Minnesota.

Activity class	Relation activity to facility	Facility class
Trail	bicycling, hiking, backpacking, horseback riding,cross country skiing, ski touring, snowmobiling.	Public or privately maintained trails, access to forest /wildernes areas.
Water	canoeing, motor boating, waterskiing, sailing, swimming.	Access to lake/rivers, docks and/or rental provisions and boat launching ramps.
Licensed	fishing, hunting.	Access to lake or rivers, docks and/or rental provisions and boat launching ramps.
Driving	driving for pleasure, sightseeing.	Publicly maintained streets and highways.
Resort	golf, tennis, swimming pool, sauna, downhill ski, lodging.	Community-owned recreation facilities or privately-owned facilities associated with a particular resort.
Park	developed and under-developed camping, wilderness camping, picnicking.	Public lands, such as state parks, state and federal forests, and private campgrounds.
Urban	movies, theaters, live entertainment, community events, dining for pleasure, shopping.	Commercial development and urban areas.
Educational	visit historic sites, visit interpretive centers, going on industry tours.	Complementary facilities; museums, gardens, zoos.
Personal	sunbathing, reading, jogging, observing nature, socializing, taking pictures.	Complemantary facilities; use facilities and services in conjunction with any or all of the other activities cited previously.
Other	lodging, transportation, and other recreational activities performed at intermediate destinations within focal area.	Lodging provisions, either wilderness or developed, public or private, complementary facilities.

Appendix Table 2. Total visitor activity occasions for activity class by facility class, Northeast Minnesota, 1978.[1]

Activity class	Facility							
	Trail	Water access	Wildlife management area	Streets and highways	Resort	Park	Urban	Complementary
Trail	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water	0.0	3.9	0.0	0.0	0.0	0.0	0.0	0.0
Licensed	0.0	4.5	0.5	0.0	0.0	0.0	0.0	0.0
Driving	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Resort	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Park	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0
Urban	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Educational	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
Personal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8
Others	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5
TOTAL	1.6	8.4	0.5	0.3	0.3	2.5	0.5	4.7

SOURCE: DNR, Department of Natural Resources, Minnesota

1. The figures are number of occasions (million) per activity class that took place at specific facilities from May 15th to Labor Day week in 1978, Northeast Minnesota.

Appendix Table 3. Recreation activity-oriented expenditure classes

Expenditure class	Recreation activity oriented expenditure classification
Transportation	Gasoline, maintenance and repair, public transportation, car rental, parking, air fare, water fare, taxi, tolls.
Food	Meals, groceries, liquor or beer, beverage (nonalchoholic), fruit.
Fees/license	Fees (entrance to zoo, museums), license for fishing, hunting, fees for private facilities.
Recreation equipment	Bait, tackle, boat/motor rental, equipment purchase (camping, boating, tennis rackets, etc.), boat fuel.
Lodging	Hotel, motel, reservations, camping, cabins/lake home/condominium, resort, trailer park.
Personal/miscellaneous	Necessities, souvenirs/gifts, services, (medical, etc.), camera supplies, household goods, drugs/medicine, laundry, phone calls, donations (church, etc.).
Shopping	Clothing, hardware, jewelry, furniture, plants, and flowers.
Entertainment	Reading material, tours, toys, movie and theater tickets.

Appendix Table 4. Visitor expenditures for specified consumer items per $1 total expenditures by type of tourism/recreation activity, North Shore, Northeast Minnesota, 1981.[1,2]

Expenditure		Destination activity									
No.	Title	Trail	Water	Licensed	Driving	Resort	Park	Urban	Educational	Personal	Other	TOTAL[3]
		(dollars)										
1.	Food and bev. off prem. cons.	.019	.019	.020	.020	.282	.501	.020	.000	.020	.099	2847
2.	Purch. meals and beverages.	.000	.000	.000	.100	.570	.020	.100	.000	.010	.200	8547
3.	Lodging	.000	.000	.049	.050	.500	.000	.100	.000	.000	.301	11029
4.	Repair, grease, rental	.000	.000	.000	.296	.000	.000	.000	.000	.000	.704	1149
5.	Gasoline and oil	.000	.000	.000	.300	.000	.000	.000	.000	.000	.700	3363
6.	Taxicab	.000	.000	.000	.000	.000	.000	1.000	.000	.000	.000	69
7.	Bus	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	45
8.	Airline	.000	.000	.000	.000	.000	.000	.000	.000	.000	1.000	373
9.	Books, magazines	.000	.000	.000	.013	.023	.007	.100	.501	.299	.057	471
10.	Nondurable sporting goods	.050	.050	.552	.052	.094	.052	.050	.000	.050	.050	1090
11.	Durable sporting goods	.288	.194	.298	.053	.027	.013	.025	.000	.051	.051	1250
12.	Admin. spect. amuse.	.000	.000	.000	.014	.106	.053	.664	.101	.021	.041	434
13.	Commercial part. amuse.	.000	.000	.000	.051	.113	.098	.245	.078	.392	.023	408
14.	Other	.007	.010	.016	.049	.112	.023	.556	.079	.059	.089	304
	TOTAL											31379

1. Based on Lake Superior North Shore 1981 total visitor expenditures, by item, as follows;

Item	Expenditure class	Total expenditure (dollars)
Food and beverage	1,2	11394
Lodging	3	11029
Transportation	4-8	4998
Recreation	9-13	3653
Other	14	305
TOTAL		31379

2. Northeast Minnesota tourism/recreation activity participation rates were used to allocate total expenditures, by expenditure class, to activity class.

3. Visitor expenditure classes conform with listing in The National Income and Product Accounts; U.S. data were used to allocate survey expenditure totals, by item, to expenditure classes.

Appendix Table 5. Direct and indirect effects of specified North Shore visitor expenditures on Northeast Minnesota gross output and related personal earnings and employment, 1981.

Industry No.	Title	North Shore visitor expenditures	Direct and Indirect effects gross output	personal earnings	employment
			(thousands)		(number)
1.	Dairy and Poultry Prod.	76	113	12	4.4
2.	Meat An. & Prod.	3	4	0	0.1
3.	Food, Feed Gr.	3	4	0	0.2
4.	Other Crops	46	71	12	4.8
5.	Forest., Fish. Prod.	47	61	21	0.9
6.	Agr., For., Fish. Serv.	7	10	3	0.2
15.	Ordnance	76	76	0	0.0
16.	Meat Products	669	1081	98	8.4
17.	Dairy Products	339	505	39	3.9
18.	Canned, Froz. Pres.	151	208	45	3.1
19.	Grain Mill. Prod.	9	12	2	0.0
20.	Bakery Prod.	222	272	77	3.4
21.	Alch. Bev., Soft Dr.	219	264	62	2.9
22.	Misc. Food, Tob.	159	187	34	1.6
24.	Apparel, Fab. Tex.	25	35	12	1.4
31.	Printing and Publ.	304	481	210	9.9
33.	Petr. Ref. and Prod.	1506	1790	93	3.3
44.	Other Non. Electr.	25	37	4	0.3
47.	Electrical Mach.	26	35	5	0.3
49.	Other Trans. Equip.	479	679	125	9.0
51.	Optical, Opth., Pho.	193	271	38	2.6
52.	Misc. Mfg.	552	846	116	9.0
53.	Railroad Trans.	237	327	127	6.1
54.	Local transit	144	180	40	4.0
55.	Truck Trans.	242	315	132	7.2
56.	Air Trans.	189	262	83	3.3
57.	Other Trans.	58	94	37	1.5
58.	Communications	24	29	11	0.5
62.	Wholesale Trade	798	987	385	22.6
63.	Retail Trade	2862	3478	1620	195.1
66.	Hotels, Pers., Rep.	11103	15253	5251	550.1
67.	Business Serv.	61	86	27	1.6
68.	Eat. and Drink. Places	8547	12813	2493	337.4
69.	Automobile Repair	1149	1474	354	25.4
70.	Motion Pic. and Recr.	809	1062	415	33.7
71.	Health Services	24	30	14	0.9
72.	Educ., Nonpr.	10	13	5	0.5
74.	State and local Enter.	14	23	6	0.4
	TOTAL	31378	43470	12007	1259.9