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MEASURING SUPPLY-SIDE ECONOMIC IMPACTS
ON TOURISM/RECREATION INDUSTRIES

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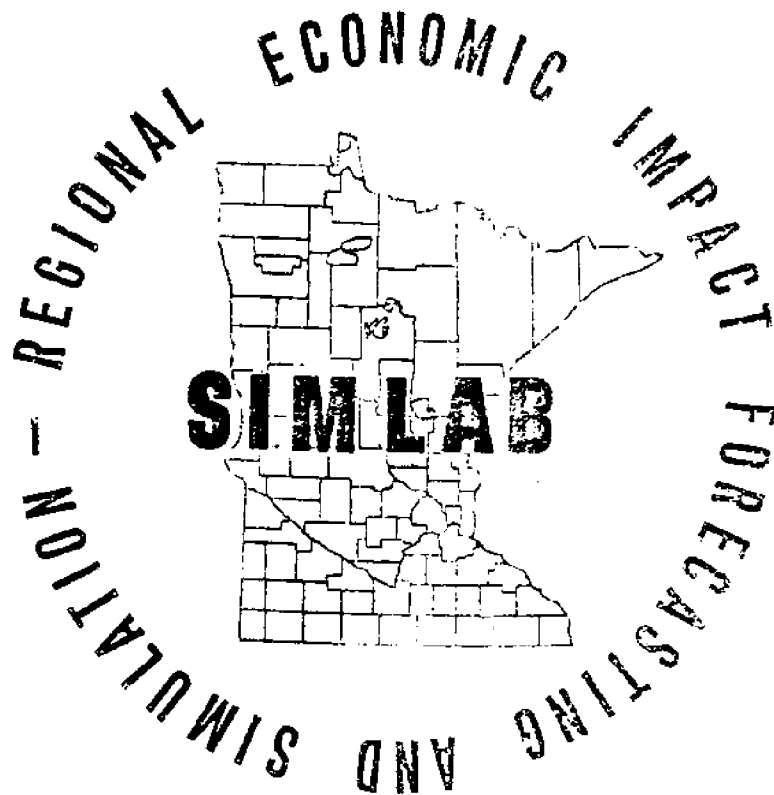
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Supply-side economic impacts pertain to changes in sales, work force, and earnings of the providers of tourism/recreation services, equipment, and facilities. Included among these providers are the manufacturers of recreational equipment, recreation vehicles, boats, and second homes.

Changes in service and facility requirements of tourism and recreation activities contribute to period-to-period changes in the level and type of sales among recreation equipment and facility providers. The central purpose of this paper is to address the measurement of these period-to-period changes and the corresponding changes in tourism/recreation activities.

Study Objectives and Tasks. This paper addresses a series of study objectives, starting with (1) the delineation of tourism/recreation activities and providers, (2) the identification of appropriate indicators for measuring economic impact, and (3) the preparation of alternate analytical frameworks for assessing national, regional, and local implications of supply-side economic impacts of tourism/recreation activities. Included, also, among these objectives is (4) the specification of the essential attributes of a public information system for servicing the decision information needs of recreation resource managers.

The study objectives relate to corresponding tasks in their implementation. Hence, the first study task is the search of the literature on the measurement of tourism/recreation activities and their effects on the economic condition of individual communities and industries. Much of the literature search was completed in a related study on targeting public and private investment in tourism/recreation facilities in Northeast Minnesota (3). The additional literature review in this study is focused on the supply-side effects of tourism/recreation facility development by public agencies, like the U.S. Corps. of Engineers or the U.S. Forest Service.

The second study task is the review of alternate economic indicators for measuring personal participation in various social and economic activities (5). The two variables of critical importance in economic measurement are time and

money. The quality and intensity of personal participation in activities like boating, swimming, and hiking, are measured by the amount of time and money allotted to each activity. These two variables, in turn, may serve as bases for public and private investment in activity-specific tourism/recreation facilities.

The third study task is the review and selection of one or more alternate analytical frameworks for assessing the extent and importance of supply-side changes which are directly and/or indirectly associated with changes in area-specific tourism/recreation activities. In this task, the criteria of timeliness, accessibility, and cost, as well as analytical adequacy, are relevant in the selection process. So-called "quick-and-dirty" methods are considered, along with complex and sophisticated computer simulation models of a regional economy in which recreation facility developments and their economic impacts are the focus of study.

The fourth study task is the review of management information systems which may have a bearing on the construction of a comparable system for recreation resource management. Existing information systems, like IMPLAN, will be examined as potentially integral parts of a locally accessible data base or information system for investment targeting and economic impact assessments (1).

Plan Of Approach. The four study tasks and their anticipated contributions are discussed under three principal headings, namely, analytical framework, tourism/recreation facilities, and tourism/recreation expenditures. Analytical framework, for example, refers to the central purpose of this study, which is the review, identification, and specification of alternate analytical approaches for assessing supply-side economic impacts of tourism/recreation activities. Tourism/recreation facilities refer to the measurement of tourism/recreation activities and their related facility requirements, while tourism/recreation expenditures refer to user and provider expenditures associated with the tourism/recreation activities.

Individual tourism/recreation facilities are related to the level and type of tourism/recreation activities supported, or made possible, by these facilities. Thus, the availability of appropriate facilities is viewed as a necessary, but not a sufficient, condition for the tourism/recreation

activities. Scenic, cultural, historical, and environmental attractors, which are advantageously located with reference to their market areas, are, of course, essential requirements of viable recreation focal areas.

Finally, tourism/recreation expenditures relate to the various tourism/recreation activities, firstly, in the construction and maintenance of related facilities and, secondly, in the participation of visitors and residents in these activities. Tourism/recreation expenditures are usually specified with reference to total personal income. They also may be specified with reference to total time spent away from home as a visitor (in away-from-home behavioral settings). Indeed, tourism/recreation activities take place in alternate behavioral settings, which prescribe participant roles that intentionally differ from those prescribed for non-recreating local residents (9).

ANALYTICAL FRAMEWORK

The analytical framework for assessing supply-side economic impacts on tourism/recreation industries presented here addresses several questions posed by developers of tourism/recreation facilities. These questions deal with economic value of particular facilities as represented by alternate measures of personal participation and business profitability. These questions have, moreover, a decision focus: they pertain to specific information needs for economically-sound public and private tourism/recreation facility development (:).

Decision Focus. The question of economic impact--its magnitude and incidence--arises in virtually every instance of public facility construction, particularly when the facility provides for large increases in traffic. For some local residents, the expected traffic growth means greater sales and income; for others, it translates into increases in noise, congestion, and reduced property values. Indeed, much, if not most, public facility development affects largely the incidence, rather than the overall magnitude, of regional and/or national economic activity.

Public facility development refers to the construction, maintenance, and operation of dams, docks, parks, campsites, trails and other recreation-related facilities by federal, state, or local government agencies. For study purposes, this development occurs within a recreation focal area, like Lake

Superior's North Shore in Northeast Minnesota--a narrow coastal zone extending from near Duluth northeastward to Grand Portage. Duluth is distinguished as a separate recreation focal area because of its primarily urban, rather than rural, orientation (2).

An economically-sound proposal for targeting public investment in tourism/recreation facilities in a particular area will require information on resident and non-resident participation in various tourism/recreation activities. Each activity depends on one or more types of facilities at a particular site and each facility restricts activity levels by day, week, and season. Thus, each activity is restricted by the capacities of the related facilities. These capacities are measured by full-time equivalent participant days of facility use. Actual use is, of course, less intensive than full-time equivalent use and, hence, practical capacity levels are inherently lower than full-time equivalent capacity levels. Indeed, the efficient management of facility use depends on the timely application of various incentives and penalties for shifting participation from peak to off-peak periods of the day, week, or year. Thus, optimal public facility development requires accurate and timely information on facility use patterns and alternate strategies for increasing long-term facility use by shifting day-to-day participation from peak to off-peak periods.

Accurate and timely measurement of facility development impacts depends on an economic model of interindustry and interarea transactions. For a small, sparsely populated area with low internal, but high external, linkages a minimally-adequate economic model can be extremely simple and rudimentary in its representation of (a) the basic, or export-producing, sectors and (b) the non-basic, or residentiary, sectors. For a large, densely-populated area with internal, and low, but, nonetheless, critically important, external, linkages, a minimally-adequate economic model must provide a highly differentiated representation of all sectors, both export-producing and residentiary, including final demand sectors.

For both small, sparsely-populated and large, densely-populated areas, the measurement of economic impact is burdened by its two-fold task of accounting for supply-side changes in both overall magnitude and spatial-economic incidence. While much economic analysis focuses on supply-side effects as measured by changes in net value added, political decisions are importantly influenced by the distribution of gross changes in value added by

all economic activity.

A critical economic question is the importance of redistributive gains and losses. Even though felt needs and financial resources of individuals of varying socio-economic status are likely to differ greatly, and these differences are extremely difficult, if not impossible, to measure, the role of economic analysis must include so-called opportunity costs of public facility development. Critically important, therefore, in supply-side impact analyses are the values assigned to benefits and costs of facility development for various socio-economic groups in (a) the local community, (b) the development impact region, and (c) the nation.

Very little, if any, economic research on the tourism/recreation industry has dealt specifically with the socio-economic status of the beneficiaries of public facility development as compared with the tax-paying population. Yet, both groups--the beneficiaries of public facility development and the general-tax-paying population and its advocates--resort to the use of economic statistics in supporting their respective viewpoints. The preparation of accurate and timely regional economic analysis would relate, therefore, to the economic interests of both the gainers and the losers in regional resource development.

Economic Models. The alternate economic models presented here focus on the relation of changes in tourism/recreation facility development to changes in tourism/recreation industries. Hence, each economic model, when it performs its assigned tasks, differentiates producing sectors, by type of industry, and consuming sectors, by type of household. Each model also differentiates industries and households by geographic location.

The principal components of a regional economic model for assessing tourism/recreation industry impacts are illustrated by a recently-developed computer simulation model of Northeast Minnesota (6). Earlier versions of this model were used in studies of copper-nickel, taconite, and peatland development in Northeast Minnesota. This current model has specially-constructed tourism/recreation, government, and household modules for measuring supply-side effects of tourism/recreation development. These modules were constructed for the purpose of addressing one or more dimensions of the several topics listed in Figure 1.

The core module in the illustrative model links recreation focal area changes to corresponding industry changes in the multi-county impact area. Demand-side changes in the multi-state tourism/recreation market areas are introduced via the market and the tourism/recreation modules.

The minimal economic framework for supply-side impact assessments presented here includes the specification and estimation of (1) recreation demand multipliers, (2) total expenditures per recreation visitor day, (3) total recreation visitor days, and (4) total economic impact. This minimal capability is extended for increasingly differentiated and comprehensive impact assessments.

The specification and estimation of recreation demand multipliers is included in the economic model presented earlier. These multipliers range from the highly aggregated ratios in the economic base version to the highly differentiated, industry-specific ratios in the interindustry transactions tables. Because of relative ease of compiling highly disaggregated interindustry transactions tables for small areas, short-cut methods for computing the aggregate ratios are hardly worth the loss of information on industry-specific direct and indirect effects.

Supply-side development effects in tourism/recreation industries are computed with the help of the recreation demand multipliers, once the recreation-related spending is linked to individual input-supplying industries in the economic impact region and the rest-of-nation. Several steps are involved, however, in linking recreation-related business, government, and household spending to local industries, starting with public spending on tourism/recreation facilities. Data requirements for implementing this task are illustrated by the distribution of tourism/recreation activities and facilities. The relative importance of a tourism/recreation activity is represented by the number of recreation occasions, that is, the total person-days of participation in each activity class (7).

All tourism/recreation occasions are summarized under 10 activity classes, which relate, in turn, to corresponding facility classes. Construction, operating and maintenance expenditures are summarized, also, for each facility class and allocated to specific activities according to activity participation and utilization of each type of facility.

Another critical step in deriving recreation demand multipliers is estimation of recreation-related spending in each activity class. A summary

of spending for personal consumption in the North Shore recreation focal area illustrates the results of this step of the estimation procedures in Table 1. Personal expenditure profiles for each activity class were derived from a 1981 North Shore visitor survey.

A third step in data preparation is the estimation of specific industry output requirements in each personal expenditures category, as shown in Table 2. Each personal expenditure item includes one or more industry outputs, including various marketing margins. While industry output is represented in producers' prices, personal spending is, thus, represented in purchasers' prices.

Supply-side effects on regional industries changes in local recreation individual activities are represented, finally, in Table 3. Overall economy-wide effects are attributed to the industry output requirements of the recreation-related personal consumption expenditures summarized earlier.

The series of three tables and the facility-activity relationships cited earlier provide much of the essential data for deriving North Shore recreation demand multipliers. One approach is to use the data in conjunction with the multipliers derived from the Northeast Minnesota interindustry tables to show changes in industry-specific output, incomes and employment levels associated with given changes in tourism/recreation activity participation by (a) residents and (b) non-residents. In this exercise, the facility-activity relationships would link new facility development to greater activity participation, which would result in expenditure increases in each final demand sector, including increases in:

1. Recreation-related personal expenditures of residents;
2. Recreation-related personal expenditures of nonresidents;
3. Private gross capital formation in recreation-related businesses;
4. Recreation facility development expenditures of government agencies;
and
5. Recreation-related operating and maintenance expenditures of government agencies.

An alternative approach is based on the use of a new tourism/recreation module in the existing Northeast Minnesota computer simulation model. In this exercise, new facility development starts with its construction activity, which is manifested in an initial round of public and/or private spending and subsequent rounds of indirect and induced spending triggered by the direct

spending. Recreation-related operating and maintenance expenditures, along with the recreation-related personal spending, are introduced later, which also trigger repeated rounds of indirect and induced spending. Industry-specific effects, including supplying industries in the region (and, indeed, the nation, too) are presented in computer simulation results.

TOURISM/RECREATION FACILITIES

The private sector accounts for much of the tourism/recreation facility development in Northeast Minnesota. It provides the essential financial and personnel resources for new investment in the region's tourism/recreation economy. The public sector serves in a facilitating and supportive role as the principal landowner and provider of water and wilderness access services and facilities. The decision focus in tourism/recreation facility development is on new investment. In addition, some decisions deal with replacement or abandonment of existing facilities.

A tourism/recreation activity classification system for facility planning is presented in Table 4. The individual elements in the 10 activity classes cited earlier are listed according to their facility requirements. One activity, for example, canoeing, may require more than one facility. In most cases, however, a single activity is associated with a single facility.

Model Estimation. The tourism/recreation facility component of the regional economic model is fitted to facility survey data compiled by the Minnesota Department of Natural Resources (7). These data are summarized for nine facility classes, which correspond with the activity classes. The number of facility units in each facility class in Northeast Minnesota were reported for 1978, as follows:

<u>Facility</u>	<u>Number</u>
Trail	8690 40-acre parcels
Water Access	1322 water access facilities
Wildlife Management	931 40-acre parcels
Streets and Highways	16710 miles
Resort	4762 units, including 4622 rental
Park	10023 units, including 6718 campsites
Urban	500 units, including ice skating rinks, baseball fields and theatres

Thus, in a simple counting of individual facilities, public facilities far outnumber private facilities. Total private sector revenues, of course, far exceed total public service revenues.

The 1978 facility survey also shows the distribution of recreation occasions among the nine facilities, as follows:

<u>Facility</u>	<u>Resident</u>	<u>Non-Resident</u>
		(million)
Trail	8.5	1.6
Water Access		
Water Activity	4.1	3.9
Licensed Activity	3.3	4.5
Wildlife Management (Licensed)	0.4	0.5
Streets/Highways	0.7	0.3
Resort	1.3	0.3
Park	1.3	2.5
Urban	2.4	0.5
Complementary		
Educational	0.3	1.4
Personal	0.3	0.8
Lodging (enroute)	<u>0.0</u>	<u>2.5</u>
Total	22.6	18.8

Because several recreation occasions are typically reported for each day of activity participation, the total number of occasions is much larger than the total number of person-activity days. Residents accounted for a larger share of the total number of recreation occasions than nonresidents, although licensed (e.g., fishing, hunting), park, educational and personal activities were more popular with non-residents than residents. Clearly, the current procedures and definitions for reporting tourism/recreation activity participation lack the rigor and precision for useful quantitative analysis and comparison.

The next steps in model implementation involve the compilation of facility maintenance and development expenditures and the preparation of facility cost and use functions. Completion of these steps is likely to be delayed by the lack of appropriate economic accounts for sorting expenditures and revenue into functional categories, like the activity and facility classes

listed in Table 4. Similarly, detailed private sector data are lacking on facility operating and replacement costs. Additional facility surveys are needed to provide these data. Private sector facility requirements are incorporated in the existing investment module of the regional economic model. Facility requirements of recreation-related activities in the private sector are not differential from other facility requirements. This differentiation occurs, however, in the private capital formation account.

Data Organization. The organization of a decision-focused data base for recreation resource management is prescribed by the arrangement of data elements in the regional economic model and, particularly, the tourism/recreation module. Two sets of data are utilized, namely, the base-year facility and user surveys and the annual, quarterly, and monthly time series for updating the base-year surveys.

Local and regional base-year surveys complement existing data series in the estimation of variables and parameters specified in the economic model and its auxiliary modules. The survey forms are pre-coded and ready for entry into micro-computer data files. Survey respondents represent varying proportions of stratum populations of households, local governments, and recreation-related businesses.

The occasional surveys are an essential input in timely and effective private and public facility planning. In the context of the study framework, these surveys help monitor the status of existing tourism/recreation facilities and their contribution to the growth and development of the region's tourism/recreation industry. Facility and site development is, in short, product development, the "product" being the tourism/recreation experience.

Formulation of product development strategies in the tourism/recreation industry is essentially a public-private partnership in Northeast Minnesota. It is part of Minnesota's market development strategy for promoting its tourism/recreation activities, particularly in Northeast Minnesota. It is, also, one of the two critical variables (the other being distance from market to focal area) in accounting for Northeast Minnesota's share of the tourism/recreation market in the rest of Minnesota and in other states.

TOURISM/RECREATION EXPENDITURES

Tourism/recreation expenditures are included in 14 of the 107 personal consumption expenditure categories in the National Income and Product Accounts. (These categories were listed earlier in Tables 1 and 2.) Private investment categories also conform with corresponding NIPA classifications of new construction and producer durable equipment. In addition, recreation-related private capital expenditures are differentiated from other private capital investment.

Model Estimation. Changes in tourism/recreation expenditures in the study region are entered in the regional economic model as corresponding changes in final purchases. Extensive use of matrix methods helps translate tourism/recreation market development scenarios into facility operation, maintenance and development outlays, and finally, into corresponding changes in tourism/recreation activity participation and related expenditures. Thus, the direct, indirect, and induced expansion in total economic activity associated with the initial relaxation of tourism/recreation facility constraints results in corresponding increases in business and household earnings and state and local government revenues.

Effective use of matrix methods starts with the preparation of working tables, which are described as follows:

1. Total developmental and maintenance expenditures (in current and constant dollars) for specified tourism/recreation facilities, including initial construction and annual operating expenditures, by year;
2. Total annual and average daily, weekly, and seasonal resident and non-resident participation (in hours) in specified tourism/recreation activities, by year;
3. Capacity and expected daily, weekly, and seasonal activity utilization rates for specified tourism/recreation facilities, by activity and year;
4. Total annual and average daily, weekly, and seasonal recreation-related expenditures (in current and constant dollars) of residents and non-residents in specified tourism/recreation activities, by type of expenditure and year;

5. Total private recreation-related capital expenditures in specified industry, by type of expenditure and year;
6. Total federal, state, and local government current and capital expenditures for specified industry output, by level of government, type of expenditure and year; and
7. Total requirements of specified industry output, by economic unit, type of expenditure, and year.

Thus, recreation-related spending for each final demand sector--household, business, and government--is estimated and its distribution by type of facility, activity, and industry is derived.

Activity participation and facility utilization budgets are prepared, finally, from the statistical series. The budgets show the proportion of total personal time and money spent in each activity and total business and government spending for each type of facility. From these budgets, the spending coefficients are derived for use in the matrix transformations of recreation-related facility expenditures into corresponding industry output, employment, and earnings effects, as illustrated earlier.

Thus, the use of matrix methods in relating recreation-related expenditures to changes in regional and national input-supplying industries circumvents the need to redefine industry structure. General purpose interindustry transactions tables are as effectively and economically used in tourism/recreation industry studies as very costly special-purpose interindustry transactions tables. The special-purpose tables require careful, but still an arbitrary, differentiation of a tourism/recreation industry cluster in each region.

In summary, therefore, the matrix methods approach in model estimation is implemented in a final series of steps, which are summarized as follows:

1. Prepare vector of tourism/recreation public facility development expenditures [FG];
2. Prepare activity-facility [AFG] matrix of technical coefficients showing distribution of public facility development expenditures (based on activity use) by activity; post-multiply matrix by vector to obtain a new vector [AG] of public facility development expenditures, by activity;

3. Prepare additional activity expenditure vectors for public facility operation [AO], private facility development [AB], non-resident personal spending [AN], and resident recreation-related personal spending [AR];
4. Prepare expenditure-activity matrices of technical coefficients showing distribution of specified activity-related expenditure, by type of public capital goods expenditure [ECG], private capital goods expenditure [ECB], public operating expenditure [EOG], non-resident personal expenditure [EPN], and resident, recreation-related personal expenditure [EPR]; post-multiply matrix by corresponding vector in Step 3 to obtain new vectors [EG], [EB], [EO], [EN], and [ER], respectively;
5. Prepare industry-expenditure matrices of technical coefficients showing distribution of specified type of expenditure, by industry, for public capital goods [ICG], private capital goods [ICB], public operating expenditures [IOG], non-resident personal expenditure [IPN], and resident, recreation-related personal expenditure [IPR]; post-multiply by new vectors in Step 4 to obtain industry output requirement vectors [IG], [IB], [IO], [IN], and [IR], respectively;
6. Prepare tables of industry-specific effects on output, employment, and earnings by pre-multiplying industry vectors in Step 5 with appropriate Type I or Type II multipliers;
7. Alternatively, use Northeast Minnesota computer simulation model to obtain industry effects from specified tourism/recreation industry expenditures.

Data Organization. Organization of tourism/recreation expenditure data is prescribed by (1) the data requirements of the economic model(s), and (2) the matrix method of implementing either the regional input-output approach or the regional computer simulation approach in economic impact assessment. Again, the overall structure of the study presented in Figure 1 provides the conceptual framework for expenditure data organization.

The final demand sectors drive both the input-output and the computer simulation models. The exogeneous demand is represented by the non-resident personal spending in the region. The endogeneous demands are represented by

the resident, recreation-related, private capital, and government capital and operating expenditures while the total tourism/recreation demand is the sum of the exogeneous and endogeneous demands. It is, in part, affected by the direct, indirect, and induced effects of its total demand, which are appropriately viewed as "feedback" effects. The computer simulation approach, as well as the Type II multipliers, include the induced effects of personal spending and incorporate their feedback effects in the final results.

Thus, the task of preparing the tourism/recreation expenditures matrices for use in the two economic models focuses on the multi-state tourism/recreation market and Northeast Minnesota's share of each state and substate market. Each regional market, composed of individual states and the rest of Minnesota, is represented by its total recreation-related personal spending. The total spending is a function of total population, per capita disposable income, and other variables. The distribution of total spending among recreation focal areas is a function of distance to each area and the perceived quality of each area's tourism/recreation facilities (8). State-sponsored tourism advertising and promotional campaigns are intended to enhance a focal area's image as a provider of unique and fulfilling recreation experiences. Without a quality product, however, the market development programs would fall short of promises.

The overall analytical framework integrates the evaluation of market and product strategies as a decision aid in both market promotion and facility development programs. Coordination of market development and facility development strategies is achieved already through trial and error efforts. As market promotion outpaces facility development, disappointed customers register their dissatisfaction by turning to competing recreation areas. When facility development outpaces market demand, the excess facilities burden both private business and public agencies with high unit costs. The Northeast Minnesota study plan focuses on the use of accurate and timely economic information in exploring alternative approaches to recreation resource and market planning and demonstrating their implications for specific industries and sectors in the regional economy.

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Table 2. Visitor Expenditures for Specified Consumer Items per \$1 Total Expenditures by Type of Tourism/Recreation Activity, Northeast Minnesota, 1981.1/

No.	Industry Title	Food and Bev.			Transportation			Recreation			Other					
		Off	Purch.	Lodg- ing	Repr., Grease, Rental	Case- line & Oil	Taxi- cab	Bus	Air- line	Books, mags.		Sprtg. Cds. Mondur.	Dur. Amuse.	Adm., Spect. Amuse.	Commer. Part. Amuse.	
1.	Dairy and Poultry Prod.	.023	0	0	0	0	0	0	0	0	0	0	0	0	.034	
2.	Meat An. and Prod:	.001	0	0	0	0	0	0	0	0	0	0	0	0	0	
3.	Food, Feed Gr.	.001	0	0	0	0	0	0	0	0	0	0	0	0	0	
4.	Other Crops	.016	0	0	0	0	0	0	0	0	0	0	0	0	0	
5.	Forest., Fish. Prod.	.006	0	0	0	0	0	0	0	0	0	0	0	0	0	
6.	Agri., For., Fish. Serv.	0	0	0	0	0	0	0	0	.024	0	0	0	0	.011	
15.	Ordn. & Rel.	0	0	0	0	0	0	0	0	0	0	0	0	0	.023	
16.	Meat Products	.235	0	0	0	0	0	0	0	.024	.040	0	0	0	0	
17.	Dairy Products	.119	0	0	0	0	0	0	0	0	0	0	0	0	0	
18.	Canned, Froz. Pres.	.053	0	0	0	0	0	0	0	0	0	0	0	0	0	
19.	Grain Mill. Prod.	.003	0	0	0	0	0	0	0	0	0	0	0	0	0	
20.	Bakery Prod.	.078	0	0	0	0	0	0	0	0	0	0	0	0	0	
21.	Alch. Bev., Soft Dr.	.077	0	0	0	0	0	0	0	0	0	0	0	0	0	
22.	Misc. Food Tob.	.056	0	0	0	0	0	0	0	0	0	0	0	0	0	
24.	Apparel, Fab. Tex.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
31.	Printing and Publ.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
33.	Petr. Ref. & Prod.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
44.	Other Non. Electr.	0	0	0	0	.448	0	0	0	0	0	0	.020	0	0	
47.	Electrical Mach.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
49.	Other Trans. Equip.	0	0	0	0	0	0	0	0	.024	0	0	0	0	0	
51.	Optical, Ophth., Phot.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
52.	Misc. Mfg.	0	0	0	0	0	0	0	0	.096	.071	0	0	0	0	
53.	Railroad Trans.	0	0	0	0	0	0	0	0	.386	.081	0	0	0	0	
54.	Local Transit	.009	0	0	0	.013	.278	.333	.255	0	0	0	0	0	0	
55.	Truck Trans.	.010	0	0	0	.008	.167	.167	.157	0	0	0	0	0	.081	
56.	Air Trans.	.008	0	0	0	.013	.278	.334	.275	0	0	0	0	0	.054	
57.	Other Trans.	.003	0	0	0	.010	.222	.166	.235	0	0	0	0	0	.081	
58.	Communications	0	0	0	0	.005	.055	0	.078	0	0	0	0	0	.054	
62.	Wholesale Trade	.064	0	0	0	0	0	0	0	0	0	0	0	0	0	
63.	Retail Trade	.232	0	0	0	.110	0	0	0	.077	.096	0	0	0	.080	
66.	Hotels, Pers., Rep.	0	0	1.000	0	.393	0	0	0	.297	.337	0	0	0	.014	
67.	Business Serv.	0	0	0	0	0	0	0	0	0	0	0	0	0	.023	
68.	East. and Drink. Places	0	1.000	0	0	0	0	0	0	0	0	0	0	0	.241	
69.	Automobile Repair	0	0	0	0	0	0	0	0	0	0	0	0	0	.161	
70.	Motion Pic. & Recr.	0	0	0	1.000	0	0	0	0	0	0	0	0	0	0	
71.	Health Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
72.	Educ., Nonpr.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
74.	State and Local Enter.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

1/ Based on allocation of specified industry inputs to expenditure class in: Ritz, Philip M., Eugene P. Roberts, and Paula G. Young, Dollar-Value Tables for the 1979 Input-Output Study Survey of Current Business 39(4): 51-72, 1979.

TOURISM/RECREATION MODEL

MARKET AREAS

1. GEOGRAPHIC AREAS: N.E. MINNESOTA, REST OF THE STATE,
OTHER STATES, REST OF WORLD
2. POTENTIAL PARTICIPANTS: RECREATIONAL ACTIVITY
PATTERNS, POPULATION AND
PARTICIPATION RATES, SOCIO-
ECONOMIC CHARACTERISTICS, TRAVEL
COSTS

LINKAGES : COMMUNICATIONS
AND TRANSPORTATION

FOCAL AREA

1. RECREATION PARTICIPANTS:
PARTICIPATION RATES BY RECREATION ACTIVITY
EXPENDITURES BY RECREATION ACTIVITY
2. SUPPORTING FACILITIES:
NUMBER AND CAPACITY OF RECREATION FACILITIES
EXPENDITURES BY RECREATION FACILITIES

LINKAGE : EXPENDITURE-
INDUSTRY MATRICES

IMPACT AREA

INDUSTRY SECTOR: PRODUCING INDUSTRIES
DIRECT/INDIRECT EFFECTS MEASURED BY GROSS
OUTPUT, PERSONAL EARNINGS, AND
EMPLOYMENT

Figure 1. Economic Model of Tourism/Recreation Indicators and Linkages For Measuring Supply-Side Economic Impacts on Tourism/Recreation Industries.

Table 1. Visitor Expenditures for Specified Consumer Items per \$1 Total Expenditures by Type of Tourism/Recreation Activity, Northeast Minnesota, 1981.^{1/}

No.	Expenditure Class	Destination Activities										TOTAL ^{2/}
		Trail 1	Water 2	Licen- sed 3	Driv- ing 4	Re- sort 5	Park 6	Urban 7	Educ- tional 8	Per- sonal 9	En- route Activ- ities 10	
		(dollars)										
1.	Food and bev. off prem. cons.	.116	.153	.036	.019	.070	.819	.021	0	.096	.031	.091
2.	Purch. meals and beverages	0	0	0	.287	.425	.098	.308	0	.145	.188	.272
3.	Lodging	0	0	.345	.185	.481	0	.397	0	0	.365	.351
4.	Repair, grease, rental	0	0	0	.114	0	0	0	0	0	.089	.036
5.	Gasoline and oil	0	0	0	.338	0	0	0	0	0	.259	.107
6.	Taxicab	0	0	0	0	0	0	.025	0	0	0	.002
7.	Bus	0	0	0	0	0	0	0	0	0	.005	.001
8.	Airline	0	0	0	0	0	0	0	0	0	.041	.012
9.	Books, magazines	0	0	0	.002	.001	.002	.017	.702	.239	.003	.015
10.	Nonurable sporting goods	.114	.150	.381	.019	.009	.032	.020	0	.094	.006	.035
11.	Durable sporting goods	.765	.689	.235	.022	.003	.009	.011	0	.109	.007	.041
12.	Admly. spect. amuse.	0	0	0	.002	.004	.013	.104	.132	.015	.002	.014
13.	Commercial part. amuse.	0	0	0	.007	.004	.023	.036	.095	.272	.001	.013
14.	Other	.005	.008	.003	.005	.003	.004	.061	.071	.030	.003	.010
	TOTAL ^{3/}	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

^{1/} Based on Lake Superior North Shore 1981 total visitor expenditures, by item, as follows:

Item	Exp. Class	Total Exp.
Food and beverage	1,2	\$11,393,000
Lodging	3	11,029,000
Transportation	4-8	4,998,000
Recreation	9-13	3,652,000
Other	14	304,000
TOTAL		\$31,378,000

^{2/} Visitor expenditure classes conform with listing in expenditure totals, by item, to expenditure classes.

The National Income and Product Accounts; U.S. data were used to allocate survey

^{3/} Northeast Minnesota tourism/recreation activity participation rates were used to allocate total expenditures, by expenditure class, to individual activities which, in 1981, were as follows (in \$1000):

Trail, 470; Water, 353; Licensed, 1581; Driving, 2985; Resort, 11463; Park, 1740; Urban, 2774; Educational, 336; Personnel, 589; Enroute, 9087.

Table 3. Direct and Indirect Effects of Specified North Shore Visitor Expenditures on Northeast Minnesota Gross Output and Related Personal Earnings and Employment, 1981.

No.	Industry Title	North Shore Visitor Expenditures	Direct and Indirect Effects		
			Gross Output	Personal Earnings	Employment
		(\$1,000)	(\$1,000)	(\$1,000)	(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.	Ordinance	76	76	0	0
16.	Meat Products	669	1,081	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
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.	1,506	1,790	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, Optch., 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	2,862	3,478	1,620	195.1
66.	Hotels, Pers., Rep.	11,103	15,253	5,251	550.1
67.	Business Serv.	61	86	27	1.6
68.	Eat. and Drink. Places	8,547	12,813	2,493	337.4
69.	Automobile Repair	1,149	1,474	354	25.4
70.	Motion Pic and Recr.	809	1,062	415	33.7
71.	Health Services	24	30	14	.9
72.	Educ., Nonpr.	10	13	5	.5
74.	State and Local Enter.	14	23	6	.4
Visitor Expenditures		31,378	43,470	12,007	1,259.9

Table 4. Tourism/Recreation Facilities and Related Activities, Northeast Minnesota, 1984.

Activity Class	Tourism/Recreation Activity	Tourism/Recreation Facility
TRAIL	Bicycling	Bicycle Trails
	Hiking	Hiking Trails
	Back Packing	Back Packing Trails
	Horseback Riding	Horseback Trails & Stables
	Cross Country Skiing	Cross Country Trails
	Snowmobiling	Snowmobile Trails
	Sledding & Tubing	Open Space
	Four Wheeling	Four Wheel Drive
WATER	Canoeing	Canoe Portage Water Access Minor Docking Facility
	Swimming	Bathing Beaches Swimming Pools
	Sail, Mtr. Boat/Wtr. Ski	Boat Dock., Launching, Mooring
	Ice Fishing	Fishing, Rental, Bait
LICENSED	Fishing	Fishing, Rental, Bait
	Hunting	Wildlife Areas
DRIVING RESORT	For Pleasure	Streets, Roads, Waysides
	Downhill Skiing	Downhill Ski Areas
	Golf	Golf Courses
	Tennis	Tennis Courts
PARK	Archery, Shooting Range	Archery Ranges
	Lodging	Resorts
	Camping/Wilderness	Campgrounds, Wilderness
	Camping/Developed	Campgrounds, Developed
URBAN	Picnicing	Picnic Grounds
	Cooking	Complementary
	Ice Skating	Ice Skating Rinks
	Baseball/Softball/Ft. ball	Baseball, Football Fields
EDUCATIONAL	Movies	Motion Picture Theaters
	Live Entertainment	Other Entertainment
	Dining for Pleasure	Dining Rooms
	Shopping	Retail Trade
	Visit Hist. Sites	Museums, Gardens, Zoos, Hist.
	Visit Interp. Centers	Learning Resource Centers
PERSONAL	Industry Tours	Industry Centers
	Nature Study	Complementary
	Sun Bathing	Complementary
	Reading	Complementary Bookstore
ENROUTE	Jogging	Complementary Sports Stores
	Picture Taking	Complementary Photo Services
	Lodging	Hotel, Other Lodging
	Driving	State, Federal Highways

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