

P82-26

December 1982

ASSESSING ECONOMIC DEVELOPMENT  
OPTIONS IN NORTHEAST MINNESOTA

Wilbur R. Maki

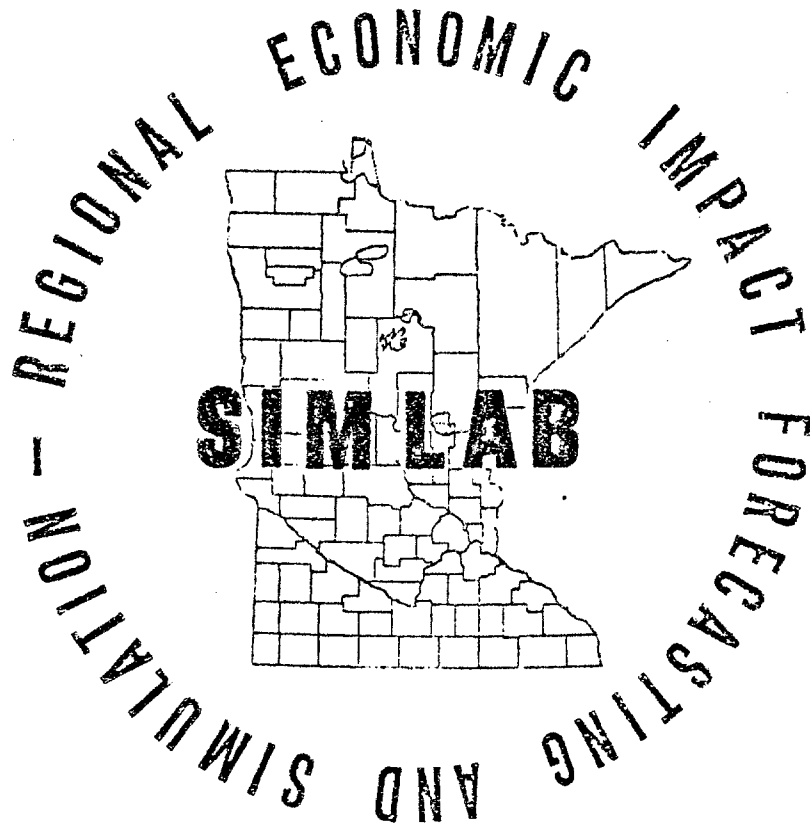


**Department of Agricultural and Applied Economics**

University of Minnesota  
Institute of Agriculture, Forestry and Home Economics  
St. Paul, Minnesota 55108

ASSESSING ECONOMIC DEVELOPMENT  
OPTIONS IN NORTHEAST MINNESOTA

Wilbur R. Maki



REIFS Report No. 22

Staff papers are published without formal review within the Department of Agricultural and Applied Economics.

## ACKNOWLEDGEMENTS

This report has its origins in Duluth, the Lake Superior North Shore, and the Iron Range. It draws on past studies focusing on the northeast Minnesota economy and its development options, particularly those authored by Wayne Jesswein, Richard Lichty and Jerrold Peterson -- all from the School of Business at the University of Minnesota - Duluth. It also makes use of the work of Minnesota Futurists -- those remarkable individuals from many specializations who talk about simulating alternative futures and learning from the process, which is what this report is about. In its approach, it parallels the concept of an economic strategy process as presented to a Minnesota Wellspring group by Don Heeney from Strategic Planning Institute. Finally, the financial support of the Minnesota Sea Grant Program and the Minnesota Agricultural Experiment Station is also appreciated and gratefully acknowledged.

## ABSTRACT

This report presents a framework for assessing regional development options in which alternative futures for northeast Minnesota are first delineated. Regional development goals, objectives, and options emerge from an economic strategy process in which the regional implications of individual development options are derived with the help of a new computer-based capability for simulating alternative regional futures. A tourism/recreation development option is selected, finally, for evaluation of its regional economic impact.

## TABLE OF CONTENTS

	<u>Page</u>
Introduction .....	1
Future Scenarios for Northeast Minnesota .....	2
Goals, objectives and options .....	3
Regional baseline projection .....	7
Development Options and Job Creation .....	10
Focusing on Tourism/Recreation Development .....	11
Recreation focal areas .....	12
Recreation activities .....	13
Recreation expenditures .....	14
Decision Information System .....	19
Summary and Conclusions .....	27
Regional Economic Impact Forecasting System Report Series .....	30

## ASSESSING ECONOMIC DEVELOPMENT OPTIONS IN NORTHEAST MINNESOTA\*

Wilbur R. Maki\*\*

Here in northeast Minnesota chronic unemployment and outmigration are once again the grim realities of our time. This is not the trough of an ordinary boom and bust cycle, but the inevitable consequence of long-run shifts in regional and world markets and resources. The certainty of a decent job for all working people in northeast Minnesota is now shared less and less with each passing week.

This conference is on economic analysis for regional development and planning. It addresses an overriding issue in this region and, indeed, in the nation -- job creation. It also addresses the issue of tracking jobs and the economic conditions which work for and against job creation.

Like many others of my time, I have a deep and abiding respect for the intrinsic joy and worth of a decent job. As a child of the Great Depression I could not escape the fact that 20 percent, at times 50 percent, or more of my community was without work and wages. Some were even without the means of simple survival.

My focus today is not the despair of depression but community leadership and decision making. Granted that we cannot control the forces shaping our future, we can nonetheless anticipate their emergence and in certain ways affect their consequences. We have the tools and capabilities for shaping our future within the constraints of our time and place.

---

\* Prepared for conference sponsored by Center for Economic Education and Department of Economics, University of Minnesota, Duluth, and Center for Urban and Regional Affairs, University of Minnesota, Minneapolis-St. Paul on computer-assisted methods in regional economic impact forecasting held at University of Minnesota, Duluth, October 30, 1982.

\*\*I am indebted to Patricia Dalton, Miguel Garcia and Peter Stenberg for their help in preparing the statistical series presented in this paper and to Uel Blank and Kathleen Novak for their collaboration on the report on which this presentation is based (see ref. 21, p.30).

## Future Scenarios for Northeast Minnesota

The first important step in the economic analysis of regional development options is to delineate and understand the different futures we may envision for this region. At least four alternative futures have been outlined on previous occasions, starting with the most dismal prospect, namely, deep recession and depression. Other futures include: stagflation, that is, a combination of economic stagnation coupled with inflation; delayed U.S. and regional economic recovery, which is the most likely alternative; and rapid economic recovery and revitalization.

Regional development options can be associated with the future scenarios as follows:

1. Deep recession and depression: extensive business closures, especially basic industries, like mining, and related infrastructure; unemployment would be very high and widespread.
2. Economic stagflation and industry liquidation: limited economic recovery in nation and region, with taconite production levels in Range taconite industry declining to well below 50 million tons; unemployment would remain moderately high, thus precipitating increases in outmigration to job opportunities elsewhere.
3. Delayed economic recovery and limited industry revitalization: U.S. and regional recovery delayed by high interest rates and slow recovery of consumer and capital markets; some new investment would occur in Great Lakes steelmaking and northeast Minnesota recreation facilities which would result in new jobs and a reduction in unemployment levels and an increase in the proportion of total population in labor force.
4. Rapid economic recovery and extended industry revitalization: U.S. and recovery with expected low inflation and rapid growth in consumer

confidence and private capital formation, including primary metal and energy industries.

Of the four scenarios, the more likely are 2 and 3 with 1 and 4 less likely.

#### Goals, objectives and options

Preparation of regional scenarios of the future is essential to the next three steps in regional economic analysis, namely, the articulation of regional goals, objectives, and options, as illustrated in Figure 1. Each succeeding step depends on the selection of one of the four scenarios and the projection of likely changes in the economic status of other U.S. regions, and their industries. Indeed all economic analysis depends on our perceptions and understandings of existing conditions and their likely effects upon future activity. Included among the initial conditions are values, attitudes and intentions as well as natural and human resources, and regional income and product.

High among stated regional goals is job creation, that is, a decent job for every person willing to work. If the northeast Minnesota economy were simply to carry its share of the total U.S. job commitment to all its people, then the number of new jobs needed would equal the new entrants into the labor force, minus retirees. For northeast Minnesota the application of this rule is complicated by its low labor force participation rates. Fewer people are working per 1,000 total population here than in the rest of the state or nation. With a lower proportion of employed persons, per capita income remains lower in northeast Minnesota than elsewhere, even when earnings per worker approach the state average. Thus, an added challenge faces this region, namely, increasing total jobs relative to total population.

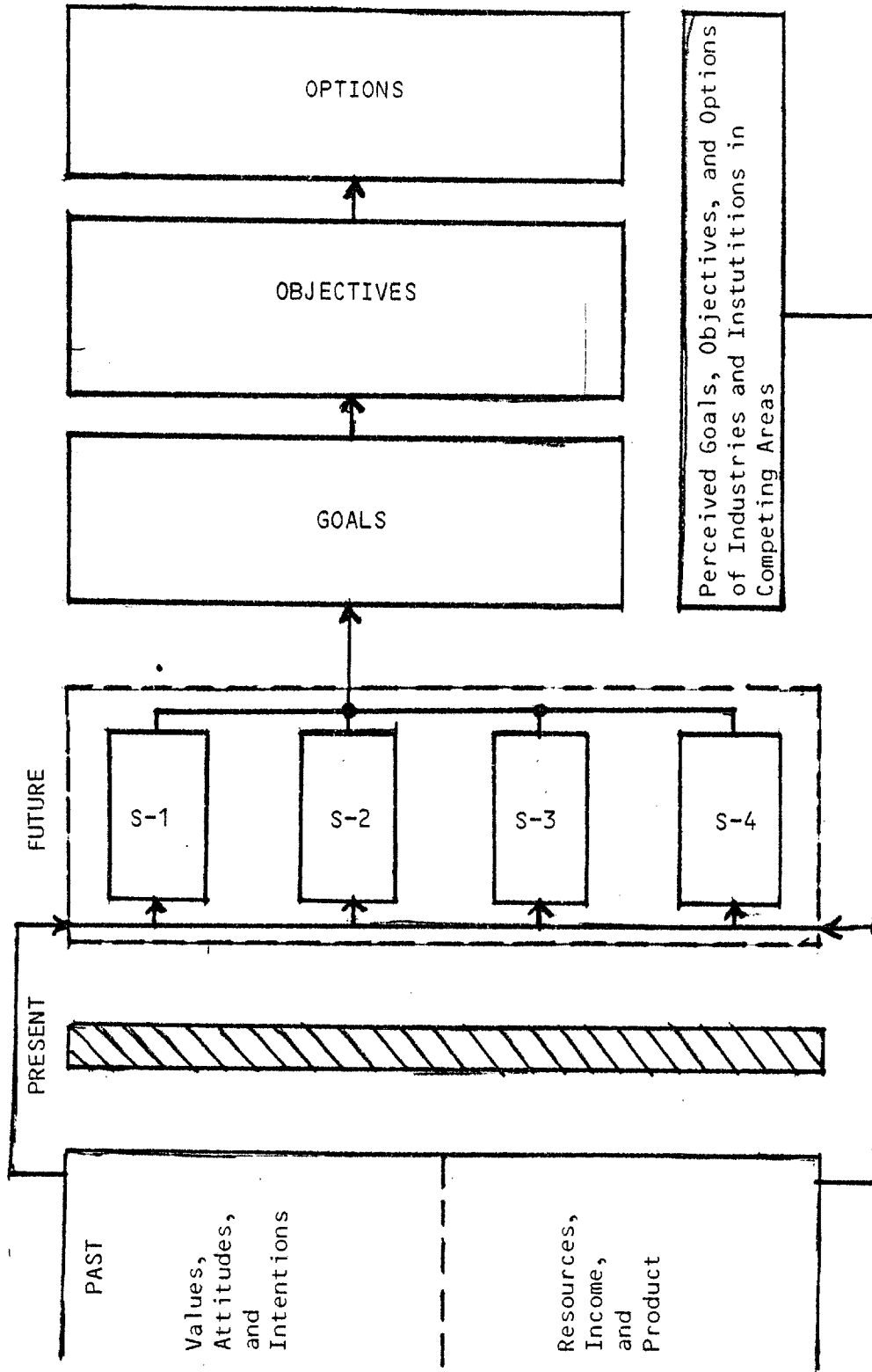


Figure 1. Relation of Economic Options to Alternative Futures in Regional Development Process in Northeast Minnesota.



This task is tempered by demographics -- many workers will be retiring in the 1980's and 1990's, which thus will reduce the internal pressures for population outmigration.

Also, high among regional goals is a decent level of income, that is, income from earnings, savings, and other sources sufficient for the life style to which one aspires. This is stated as a goal even though it may not be a reality for all. It is part of a community's social conscience as well as a source of its economic prosperity. It depends on the productivity of its human resources, its people. It depends, also, on the total income of the community and its distribution, that is, how much of it is received by the rich, the poor, and those in the middle. This income, in turn, sets economic constraints on size of market for local trade and service businesses.

A diversity of human services and personal spending options also is important to a region's quality of life. Diversity depends on scale -- the total population, its purchasing power, and its access to a trade center. In addition, easy access to a wide range of amenities -- cultural, recreational, and social -- is important.

Goals for northeast Minnesota are translated into specific objectives in the economic development process. For each goal area cited earlier, one or more objectives can be listed, as illustrated below:

<u>Goal Area</u>	<u>Objectives</u>
Job creation	<ol style="list-style-type: none"> <li>1. Improve access to markets by reducing transportation costs of locally-produced goods and services.</li> <li>2. Improve access to material inputs for locally-produced goods and services by reducing input procurement costs.</li> </ol>

3. Improve regional and national market shares of locally-produced goods and services by (a) reducing labor and other input costs and/or (b) increasing output per worker.
- Income per person
1. Increase labor force participation rates by improving access jobs for women and young people.
  2. Increase value added per worker by increasing output per worker in existing industry and acquiring new, highly value added businesses.
- Diversity of spending options and amenities
1. Improve individual access to a wide range of services and amenities by providing services in closer proximity to individual households.
  2. Reduce scale requirements for public and private service enterprises by developing new technologies specially suited for small scale enterprises.
  3. Improve quality of, and access to, recreational, cultural, and social amenities by public and private investment in urban and regional urban infrastructure.

Thus, each objective specifies a particular action for achieving a given goal. The individual objectives, and goals relate, in turn, to one or more development options.

At least four development have been addressed recently in northeast Minnesota. These include:

1. Copper-nickel development in East Range Area.

2. Peatland development for agricultural, horticultural, industrial, and energy-producing purposes in selected areas.
3. Direct reduction iron (DRI) production in East and West Range areas, Duluth-Superior, and Lake Superior North Shore.
4. Tourism/recreation development in Boundary Waters Canoe Area and Lake Superior North Shore.

Each development option is directed, in varying degree, towards the three regional goals and their related objectives, that is, towards the creation of new job opportunities at competitive wages in a wide range of occupations.

The job and income outcomes of each development option are measured from a baseline projection which depicts the growth of the regional economy without the development options. The baseline projection changes from year to year as the underlying conditions affecting the region's economic health and well-being are perceived to change.

#### Regional baseline projection

Because knowledgeable people differ in their selection of an appropriate baseline projection for measuring job and income effects of development options, some clarification of these differences is essential before moving to the next major task in assessing economic development. These differences stem, in part, from questions as to why the baseline projections were as high as they were for the copper-nickel and peatland development projects and why they were as low as they were for the DRI project assessment. Changes in underlying economic conditions and, in our perceptions of these conditions, especially for the taconite industry, have not been clearly delineated nor understood. These questions have been addressed in past discussions, but they must be addressed again, if for no other reason than to clarify the role of economic projections in the process of assessing development options.

Underlying assumptions for copper-nickel study were derived from expert testimony on projected capital expenditures and production for the taconite industry, which, in 1978, were extremely optimistic according to current expectations for this industry. Taconite production was projected at 85 million tons in 1990 and 100 million tons in 2000. Taconite production capacity had approached nearly 70 million tons as a result of the massive modernizing and capacity-increasing investment programs completed earlier in the 1970's. Meanwhile, lack of needed cost-reducing investments in the Great Lakes steel-making industry, together with low labor productivity, lead to the gradual decline of this industry relative to its counterparts in Europe, Asia, and South America. The market outlook for northeast Minnesota taconite thus worsened sharply in the late 1970's. By mid-1981 a revised set of projections was introduced in the DRI study, which indicated, for the 1980's, declining taconite production at levels below 50 million tons.

A similar, although further delayed, revision of existing scenarios is now occurring in peatland development and planning. The cost of producing energy from northeast Minnesota peatland, for example, had not been determined when the northeast Minnesota peatland development study was completed in 1979 and even when it was extended in 1981. Rather, the economic production of synthetic natural gas was assumed in the development scenario, not only as a substitute for existing natural gas imports, but as an export to adjoining regions. Both the 1979 and the 1981 studies were completed under the auspices of the Minnesota Department of Natural Resources and the stated assumptions were those proposed by this agency. When studies on the costs of producing synthetic natural gas are

completed, the critical assumptions of the peatland development studies are likely to be revised much like the taconite projections were revised and, indeed, are being revised again for each of the four future scenarios cited earlier.

A critical look at the northeast Minnesota baseline projections prepared in the late 1970's and the earlier 1980's is essential in the preparation of baseline projections for each new future scenario. The early baseline projections would suffice now only for the most optimistic future scenario and then only marginally; that is, the general economic decline projected for the late 1980's would occur earlier than projected, given much-reduced taconite production levels. The underlying reason for the inadequacy of the earlier scenarios for the 1980's stems from sharply reduced expectations for U.S. economic growth. Much of the reduced growth expectations, in turn, can be attributed to the reallocation of the federal budget from productive to nonproductive expenditures and the related increases in federal deficits and interest rates. Even this short critique clearly demonstrates the importance of both economic and political considerations in the preparation of future scenarios. Neglect of political considerations, particularly, accounts for much of the excess optimism in the earlier scenarios for northeast Minnesota, as well as the state and the nation.

## Development Options and Job Creation

Each development option is examined next with reference to the jobs attributed directly and indirectly to the option. For example, copper-nickel development, if it were to occur as an open-pit operation, would create over 9,000 new jobs as a result of the spending and respending activities attributed to the work and income derived from a net increase of 2,071 positions. The difference between nine thousand and two thousand positions is attributed to the feedback effects of respending the initial income payments originating from the open-pit single-mine development.

The job impact of each development option was derived from a particular mining scenario. The scenario preparation involved the efforts of both economists and engineers in the actual design of a copper-nickel mine complex, including its staffing requirements and all input purchases. The construction activities in each scenario were to be completed within a two-to-three-year period. The job impact of copper-nickel development included both the two-to-three year construction phase and a much longer operating phase. The total job impact of each development option was related, finally, to the change in jobs in the baseline projection. Declining baseline employment was projected as a result of increases in output per worker which exceed corresponding increases in industry output, particularly mining. The ripple effects of reduced levels of employment in export-producing industries account for further reduced levels of total employment.

Comparison of jobs in each development option is incomplete without comparison of the costs and benefits of job creation. Both public and private costs are associated with each development option as represented

by the direct and indirect input requirements of the construction and the operating phases of mining development. Benefits are represented by the income payments derived from value added, which covers employee compensation, depreciation allowances, direct and indirect taxes, dividend payments, and retained earnings. However, excess of private benefits over private costs of job creation are more clearly demonstrated than the excess of public benefits over public costs or of social, that is, combined public and private, benefits over costs simply because of available data and procedures. Who actually bears the burdens and benefits of job creation will still remain an unanswered question.

#### Focusing on Tourism/Recreation Development

The tourism/recreation industry was identified earlier as an economic development option. As many as 5,000 additional jobs may be created with additional public and private investment in tourism/recreation facilities and related services. The job creation depends, however, on parallel expansion in facilities and services, with the expansion in services being in response to an increase in visitors seeking these services and paying for them. The task of economic analysis is to identify, not only the job-creating potential of an expanded tourism/recreation industry, but also, existing bottlenecks to industry expansion.

To study the tourism/recreation industry is no simple task. First, this industry is services-producing, not goods-producing, which makes economic measurement of growth and development difficult. Second, the tourism/recreation industry is not delineated in the standard industrial classification systems. Indeed, there is no tourism/recreation industry

which is identified specifically, like "eating and drinking places". Third, useful, reliable information is lacking for resource management and development purposes in this industry.

While the task itself is not simple, it can be approached in a simple and straight-forward manner. Tourism/recreation activities are readily defined with reference to particular tourism/recreation facilities. Tourism/recreation expenditures can be classified according to both type of activity and type of expenditure. Tourism/recreation activity areas also can be delineated, in this case, within the seven-county Arrowhead Development Region in northeast Minnesota.

#### Recreation focal areas

Professor Uel Blank has already delineated a set of tourism/recreation focal areas in northeast Minnesota. These focal areas include Duluth, Lake Superior North Shore, Boundary Water Canoe Area, and the Iron Range. Each focal area is characterized by a particular mix of recreation activities and recreation-related facilities and services.

The recreation focal areas are part of the seven county Arrowhead Development Region. This region has a split personality with its two urbanized areas, namely, Duluth and adjoining suburbs and an additional 21 Range municipalities extending over 50 miles from near Grand Rapids to Ely.

For overall planning purposes, the Arrowhead Development Region is the appropriate geographic scale of organization. Economic analysis of development options also is best conducted on the same geographic scale as the development planning. While planning moves from bottom up, analysis moves from top down. The results of economic analysis are more readily



disaggregated to the focal area than aggregated by focal area. The analysis depends on data, which, however, are more available on a county and multi-county level than a sub-county level. Results of the economic analysis can be related to individual focal areas, which serve, also, as recreation planning and development areas.

### Recreation activities

To focus on the tourism/recreation industry is to focus on individual tourism/recreation activities. The term tourism/recreation activity refers simply to the use of tourism/recreation facilities and related resources by visiting and resident recreationists. This is a construct first proposed for the North Shore study as a simple way of avoiding the impasse of not having a clearly defined tourism/recreation industry. The thought was to relate activities to expenditures and expenditures to industries. Thanks to the important work of my colleague, Kathleen Novak, we now have a clear definition of tourism/recreation activities which relates activities to facilities and services as follows:

<u>Activity Class</u>	<u>Relation to Facilities and Services</u>
1. Trail (bicycling, hiking, back-packing, ski touring, ORV).	1. Public or privately maintained trails for access to forest or wilderness areas.
2. Water (canoeing, motor boating, sailing, swimming).	2. Access to lake or rivers, docks and/or rental provisions and boat launching ramps.
3. Licensed (fishing, hunting).	3. Permit acquired prior for engaging in activity.
4. Driving (for pleasure, sightseeing).	4. Publicly maintained streets and highways.

<u>Activity Class</u>	<u>Relation to Facilities and Services</u>
5. Resort (golf, tennis, swimming pool, downhill ski, lodging).	5. Community-owned recreation facilities or privately-owned facilities associated with a particular resort.
6. Park (developed camping, wilderness camping, picnicking, cooking).	6. Public lands, such as state parks, wayside rests, state and federal forests, and private campgrounds.
7. Urban (movies, live entertainment, dining for pleasure, shopping).	7. Commercial development and urban areas.
8. Educational (historic sites, interpretive centers, industry tours).	8. Learning more about the natural, historic, economic or industrial aspects of the area.
9. Personal (sunbathing, reading, jogging, observing nature, picture taking)	9. Use facilities and services in conjunction with any or all of the other activities cited previously.
10. Enroute (intermediate destinations).	10. Lodging provisions, either wilderness or developed, public or private.

#### Recreation expenditures

A third construct proposed for this project is the specific recreation expenditure exactly as it is defined in the U.S. income and product accounts. My wish is that our colleagues in tourism/recreation research also would define expenditures similarly so that our findings are more fully interchangeable with reference to type of expenditure in each tourism/recreation activity.

A recent survey of visitors to the Lake Superior North Shore provides us with expenditure and activity participation data to estimate expenditures by activity. The results of our first effort in distributing visitor survey data by type of expenditure are summarized in Table 1. This initial effort is perhaps more illustrative than factual at this time. Kathleen Novak, who I mentioned earlier, is anticipating the next step by preparing a new set of questions for inclusion in future visitor surveys which will ask the respondent to link specific expenditures with specific recreation activities.

Table 1. Total Visitor Expenditures for Specified Consumer Items by Type of Tourism/Recreation Activity, North Shore Study Area, Minnesota, 1981<sup>1/</sup>

No.	Expenditure Class Title	Destination Activities										TOTAL <sup>2/</sup>
		Traff 1	Water 2	Licen- sed 3	Driv- ing 4	Re- sort 5	Park 6	Urban 7	Educa- tional 8	Per- sonal 9	En- route Activ- ities 10	
		(\$1,000)										
1.	Food and bev. off prem. cons.	55	54	57	57	802	1,425	58	0	57	282	2,846
2.	Purch. meals and beverages	0	0	857	857	4,872	171	854	0	85	1,708	8,547
3.	Lodging	0	0	545	552	5,514	0	1,101	0	0	3,317	11,029
4.	Repair, grease, rental	0	0	0	340	0	0	0	0	0	809	1,149
5.	Gasoline and oil	0	0	0	1,009	0	0	0	0	0	2,354	3,362
6.	Taxicab	0	0	0	0	0	0	69	0	0	0	69
7.	Bus	0	0	0	0	0	0	0	0	0	45	45
8.	Airline	0	0	0	0	0	0	0	0	0	373	373
9.	Books, magazines	0	0	0	6	11	3	47	236	141	27	472
10.	Nondurable sporting goods	54	53	602	57	103	56	55	0	55	55	1,090
11.	Durable sporting goods	360	243	372	66	34	16	31	0	64	64	1,248
12.	Admin. spect. amuse.	0	0	0	6	46	23	288	44	9	18	434
13.	Commercial part. amuse.	0	0	0	21.	46	40	100	32	160	9	408
14.	Other	2	3	5	15	34	7	169	24	18	27	304
	TOTAL	470	353	1,581	2,985	11,463	1,740	2,774	336	589	9,087	31,378

<sup>1/</sup> 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

<sup>2/</sup> Visitor expenditure classes conforms with listing in Table 4, The National Income and Product Accounts; U.S. data were used to allocate survey expenditure totals, by item, to expenditure classes.

According to our calculations, visitors to the North Shore Study Area spent over \$31 million in 1981 in various activities. Of the 10 activity groups listed in Table 1, resort activities accounted for the largest share of the total -- 34 percent, while enroute activities (transportation, lodging, etc.) were a close second. Education, trail, and water, and personal activities individually accounted for less than five percent of the total.

The largest category of North Shore visitor expenditures in 1981 was lodging with purchased food and beverages a close second. These two expenditure categories accounted for practically all of the visitor expenditures associated with resort activities. Transportation was the third largest expenditure which, in turn, was attributed largely to the enroute activities.

Type of recreation expenditure is an important construct, like type of recreation activity and type of recreation area. Without this construct we could not determine the costs and benefits of job creation in what is still called the tourism/recreation industry. To use the construct, however, total visitor and resident recreation expenditures must be compiled according to their classification in the U.S. income and product accounts. For this expenditure classification, data are available to obtain the industry requirements of each type of expenditure from individual input-supplying industries in northeast Minnesota and, also, from imports, which are identified by specific input-supplying industries outside the region.

Purchases of goods and services from local and nonlocal industries are combined in Table 2. The industry-specific inputs are disaggregated between local and nonlocal when used in the economic analyses discussed later. However, in this table, individual items among each of the 14 expenditure categories were allocated to their respective originating industries, whether these industries



were in northeast Minnesota and rest of state and nation. For example, food and beverages eaten off-premises were purchased largely in food stores, which, in turn, had acquired the individual items largely from food products manufacturing industries outside northeast Minnesota. Transportation and related marketing services were required to move the food products from farm to factory and, finally, to retail outlets.

Among the 75 industry groups listed in Table 2, the largest beneficiaries of North Shore visitor spending in 1981 were hotels and motels, including resorts, eating and drinking places, and retail stores. Altogether, 38 difference industry groups benefitted directly from North Shore visitor expenditures while indirectly all industries were affected in some degree by the ripple effects originating from the initial visitor expenditures

The data presented in Tables 1 and 2 are absolutely essential in assessing economic development options in northeast Minnesota. They represent the structure of tourist/recreation expenditures for the Lake Superior North Shore Study Area.

Industry-specific input requirements are converted, finally, to changes in total industry sales, employment, and related industry-specific statistics, including imports, for the northeast Minnesota economy. These results can be derived with the existing impact assessment system known as SIMLAB which Professor Richard Lichty discussed earlier today. I refer to these results, in part, in the discussion, next, on building a decision information system for northeast Minnesota.

## Decision Information System

A decision information system for assessing development options can be used in several ways, but particularly in demonstrating the effects of changes in future scenarios, goals, objectives, and options on the northeast Minnesota economy. Together with SIMLAB, the current North Shore Study, of which the preceding tables are a part, provides such a decision information system. With this system, economic effects of alternative tourism/recreation development options can be simulated over an extended time period. Thus, both short-term and long-term changes stemming from particular tourism/recreation development projects can be demonstrated and their costs and benefits measured.

SIMLAB is not a substitute for wise, judicious, temperate, and sometimes courageous thought and action. It serves simply as an instrument of individual and collective desires to base action on well-informed thought. It has its uses as well as misuses. It can be used for serious and important, as well as trivial, purposes.

One trivial and misused purpose of SIMLAB, is to produce multipliers that is, the calculation of the indirect, or ripple, effects of given economic activity, for example, North Shore visitor purchases. Whether short-run or long-run, the use of multipliers, in and by themselves, is seldom worth the effort. This is not to say that multipliers are not used in SIMLAB. They are simply one of many thousands of other bits of data which are essential in demonstrating the full impact of major economic events on the regional economy. What may appear as a simple addition to a region's economy may turn out to be a net deficit. When revenues fail to cover costs, a business eventually dies, and so will a region.

Because multipliers were mentioned earlier in this conference, and now again, the least I can do is to illustrate the use of demand multipliers for northeast Minnesota, I want to compare the short-term, that is, within year, effects of an increase in North Shore visitor expenditures on the entire northeast Minnesota economy with reference to industry output and employment and the personal earnings of those employed in each industry. The numbers in Table 3 are intended, therefore, to illustrate the wide range in the magnitudes of the short-term direct and indirect effects of additional tourism/recreation expenditures on all industries in the northeast Minnesota economy. In terms of industry output the total effects vary from \$4 thousand to over \$15 million, but in terms of personal earnings and industry employment, they vary from near zero to \$5,251 thousand and 0.1 to 550.1 jobs, respectively. In summary, if an expansion in tourism/recreation activities resulted in corresponding expansion of expenditures as shown in Table 1, then individual expenditure categories would have industry output requirements as shown in Table 2. In this report, the individual industry output requirements in Table 2 are multiplied by their respective multipliers to obtain, in Table 3, the total northeast Minnesota impact of each of 38 categories of industry output requirements of the North Shore visitor expenditures. The total visitor impact of \$31,378 thousand in expenditures, including indirect effects, is \$43,470 thousand increase in total industry output, \$12,007 increase in personal earnings, and 1,259.9 increase in jobs.

Use of the North Shore tourism/recreation decision information system estimating and forecasting the northeast Minnesota impact of North Shore tourism/recreation activities is only one of its several contributions. It can be used also to simulate the regional economic impact of various



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 (\$1,000)	Direct and Indirect Effects		
			Gross Output (\$1,000)	Personal Earnings (\$1,000)	Employ- ment (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
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, 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	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

development options and their related employment, capital and, even public infrastructure requirements. Only its most obvious use in estimating the regional impact of the 1981 North Shore visitor expenditures is presented here simply to identify the individual industries affected by these expenditures and the specific industry responses in persons employed and income earned.

Assuming that 1980 multipliers were to also represent the 1981 industry structure of the northeast Minnesota economy, then the 1981 North Shore visitor expenditures of \$31,318,000 impose total industry output requirements which total \$43 million, as shown in Table 4. To produce these output requirements, 1,260 persons were employed in the region. Virtually every industry in northeast Minnesota was affected directly or indirectly by these North Shore visitor expenditures, with the largest total output impact being attributed to the hotels and personal services industry. The largest employment and income effects are being attributed to hotels and personal services businesses and eating and drinking places, respectively. The long-term effects of the 1981 North Shore visitor expenditures are roughly twice the short-term effects because of basic role attributed to these expenditures.

The computer models and programs of the decision information system for tourism/recreation industry development and planning implement the notion, finally, that changes in tourism/recreation expenditures lead later to additional changes in the total regional economy which, in turn, lead to certain changes in tourism/recreation expenditures. This notion is illustrated in Figure 2. Changes in tourism/recreation expenditures elicit

Table 4. Direct and Indirect Effects of all North Shore Tourism/Recreation Expenditures on Specified Industry Output and Related Personal Earnings and Employment, Northeast Minnesota, 1981.

No.	Industry Title	Gross Output	Personal Earnings	Employment
		(\$1,000)	(\$1,000)	(number)
1.	Dairy and Poultry Prod.	206	12	10.2
2.	Meat An. & Prod.	176	5	6.8
3.	Food, Feed Gr.	26	2	1.7
4.	Other Crops	55	8	5.4
5.	Forest., Fish. Prod.	57	21	0.7
6.	Agr., For., Fish. Serv.	56	18	0 <sup>1/</sup>
7.	Iron & Ferr. Ores	3	2	0.1
8.	Nonferrous Ores	5	0	0
9.	Coal and Peat Mining	2	0	0
10.	Oil and Nat. Gas	0	0	0
11.	Stone, Clay Mfg., Qua.	4	2	0.1
12.	Other Mining	0	0	0
13.	New Construction	0	0	0
14.	Main & Rep. Constr.	385	124	3.0
15.	Ordinance	76	0	0
16.	Meat Products	2,096	158	6.9
17.	Dairy Products	709	37	1.7
18.	Canned, Froz. Pres.	348	72	5.0
19.	Grain Mill. Prod.	63	6	0.2
20.	Bakery Prod.	438	124	5.1
21.	Alch. Bev., Soft Dr.	296	69	3.1
22.	Misc. Food, Tob.	367	61	2.6
23.	Textile Goods	31	8	0.4
24.	Apparel, Fab. Tex.	196	70	8.8 <sup>1/</sup>
25.	Logging	21	1	0 <sup>1/</sup>
26.	Sawmills	30	3	0.2
27.	Other Wood Prod.	43	11	0.6 <sup>1/</sup>
28.	Furniture	0	0	0 <sup>1/</sup>
29.	Pulp and Paper Prod.	124	9	0.5
30.	Paperboard Cont.	76	22	1.0
31.	Printing and Publ.	521	283	12.9
32.	Chem. and Allied Prod.	116	15	0.4
33.	Petr. Ref. and Prod.	2,276	81	2.2
34.	Rubber Prod.	53	17	0.7
35.	Leather Prod.	5	2	0.1
36.	Glass, Stone, Clay	68	7	0.3
37.	Primary Fe/Steel	148	12	0.6 <sup>1/</sup>
38.	Iron and Steel Found.	12	0	0 <sup>1/</sup>
39.	Primary Copper	4	0	0 <sup>1/</sup>
40.	Other Prim. Met.	52	10	0.5
41.	Fabricated Metals	140	15	1.0 <sup>1/</sup>
42.	Farm Machinery	7	0	0 <sup>1/</sup>
43.	Machine Shops	14	3	0.1
44.	Other Non. Electr.	53	4	0.3
45.	Comp., Off. Mach.	0	0	0
46.	Serv. Ind. Mach.	26	3	0.2
47.	Electrical Mach.	87	10	0.6
48.	Motor Vehicies	25	3	0.1
49.	Other Trans. Equip.	490	89	6.8
50.	Prof., Scient.	21	5	0.1
51.	Optical, Optn., Pho.	215	23	1.7
52.	Misc. Mfg.	754	74	7.1
53.	Railroad Trans.	385	168	8.1
54.	Local Transit	154	34	3.8
55.	Truck Trans.	364	169	9.0
56.	Air Trans.	206	74	2.7
57.	Other Trans.	111	50	2.0
58.	Communications	234	91	4.0
59.	Electric Utilities	724	76	3.3
60.	Gas Utilities	254	19	0.9
61.	Water and San. Serv.	117	33	0.4
62.	Wholesale Trade	1,748	735	41.9
63.	Retail Trade	2,957	1,521	192.8
64.	Finance, Ins.	356	132	7.2
65.	Real Estate	1,079	38	2.0
66.	Hotels, Pers., Rep.	11,525	4,487	505.7
67.	Business Serv.	750	236	13.6
68.	Eat. and Drink. Places	8,749	1,694	289.9
69.	Automobile Repair	1,344	327	24.1
70.	Motion Picture and Recr.	901	385	31.8
71.	Health Services	28	15	1.0
72.	Educ., Nonpr.	82	32	3.5
73.	Fed. Gov't. Enter.	253	133	7.4
74.	State and Local Enter.	156	50	3.1
75.	Scrap, Used and Second	8	8	0.7
	ALL INDUSTRY	43,470	12,007	1,259.9

<sup>1/</sup>0.5 employment or less

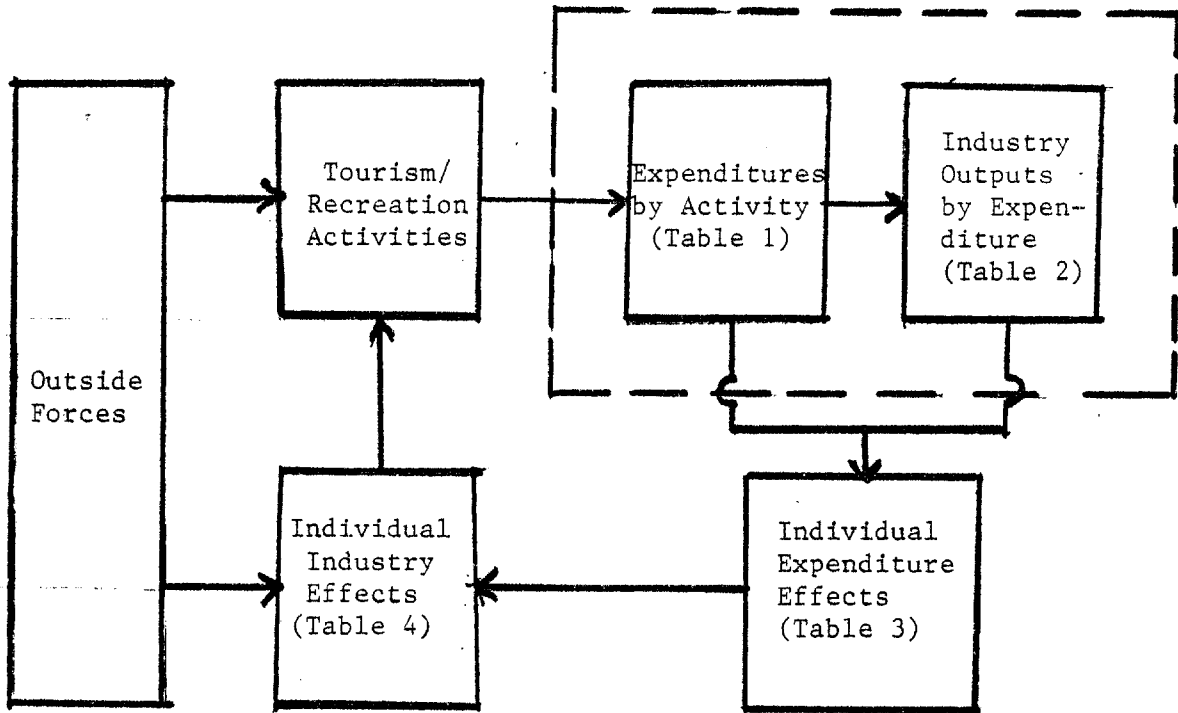


Figure 2. Casual Relationships Between Tourism/Recreation Expenditures, Individual Industry Outputs, and Total Area Wide Effects

corresponding changes in industry outputs in northeast Minnesota and, in the case of imports, in the rest of nation. The changes in regional industry outputs result in further changes in inter-industry purchases and income payments to industry employees and owners and, also, government. The interindustry purchases require additional industry outputs, which, in turn, lead to related increases in industry payments to employees, owners, and government. These increases in turn lead to increases in local final purchases, including tourism/recreation-related facilities and services. Visitor final purchases are affected by the local capital expenditures which make possible increases in the variety and scale of tourism/recreation services. Thus, both resident and visitor tourism/recreation expenditures would increase in future periods as a result of the initial expansion in the capacity and utilization of North Shore tourism/recreation facilities and services.

Once the effects of certain changes in future scenarios are determined, their implications for the people and economy of northeast Minnesota can be demonstrated. Without new businesses to replace existing, but declining businesses, the economic implications are clear: fewer jobs, less income, more out-migration and, ultimately, a much smaller population. Self-sustaining economic growth must occur, first, in the basic industries, that is, among businesses producing goods and services for sale to markets and residents outside northeast Minnesota. A healthy economic base is an essential requirement of a healthy regional economy. The supporting residentiary activities, which cater to the resident population, can prosper only as the region's economic base prospers.

Northeast Minnesota's economic base is its natural resources and its people. Development of the mineral and forest industries has been, and

continues to be, important in each of the four scenarios described earlier. The degree of dependence on the natural resource-based industries, differs, however, in each scenario. The new location factor for the 1980's is the geographical spillover of the expanding specialized manufacturing and services complex centered on the Minneapolis-St. Paul metropolitan area. Because of its proximity to the Minneapolis-St. Paul area, together with its own amenities and services, northeast Minnesota offers attractive location option for some businesses.

Thanks to the availability of the newly built decision information system, industry-specific effects of any development option can be determined, even if the development option itself is not readily defined in conventional terms. With the information available I can show, as in Table 4, the industry-specific output and employment requirements of the estimated 1981 North Shore visitor expenditures presented earlier in Tables 1 and 2. Associated with the employment requirements are corresponding personal income payments. I can show, also, what the given expenditures imply in terms of private and public investment in specific tourism/recreation facilities. For now, I leave the reporting of these numbers for the forthcoming report series we expect to complete in coming months.

### Summary and Conclusions

Assessing economic development options is no simple task even when options are many and the need is small. When the options are few and the need for economic development is urgent, this task becomes doubly difficult.

The task of assessing regional development options starts with the delineation of alternative futures, that is, the preparation of a series of economic and demographic forecasts for the region based on different assumptions about the general business cycle, the market outlook for the region's basic industries, and the productivity of human and physical resources in these industries. For northeast Minnesota four alternative futures were delineated, which were tentatively labeled as follows:

- Delayed economy recovery and limited industry revitalization was identified as a likely scenario.
- Economic stagflation and industry liquidation was identified as another likely scenario.
- Deep recession and depression or rapid economic recovery and extended industry revitalization were identified as less likely futures.

The next three steps in assessing regional development options follow from the delineation of alternative futures. First of these three steps is the setting of regional goals, which, in a general way deal with both production and consumption, supply and demand, issues. These include:

- Job creation
- Income generation
- Diversity of choice

Associated with each goal area are action-oriented objectives which

precede the delineation and articulation of development options. This obviously must occur before the assessment of regional options.

In recent years, several development options have been presented, for northeast Minnesota of these include:

- Copper-nickel development
- Peatland development
- Direct reduction iron production
- Tourism/recreation development

The development options were delineated in separate studies which started with varying and unique assumptions about the northeast Minnesota economy with and without the given development activity. Thus the alternative regional futures represented in these studies differed significantly, particularly with reference to the level of basic economic activity in the region.

The tourism/recreation development option was presented as a case study in assessing industry output and employment and personal income effects of a given expansion in a particular development option. Estimated 1981 North Shore visitor expenditures were delineated by tourism/recreation activity, expenditure category, and industry requirements. The industry requirements of \$31,387,000 of tourism/recreation expenditures in 1981 were estimated as follows:

- \$43 million of industry output
- 1,260 industry jobs
- \$12 million in personal earnings

Altogether 38 of 75 industries in northeast Minnesota were involved in producing the goods and services to satisfy the direct requirements of the 1981 North Shore visitors. Virtually all regional industries were



indirectly affected by the additional economic activity generated by North Shore visitor expenditures. Long-term effects of the North Shore visitor expenditures would be roughly twice the short-term effects because of the role of these expenditures in the regional economic base.

## REGIONAL ECONOMIC IMPACT FORECASTING SYSTEM REPORT SERIES\*

1. Perspectives on Economic Growth in Northeast Minnesota by W.R. Maki, R.W. Lichty and L.A. Laulainen, Jr. Staff Paper Series P77-7.
2. Simulation of Alternative Growth Policy Scenarios for a Metropolitan Region by Wilbur R. Maki. Staff Paper Series P77-8.
3. Users' Guide to Economic Forecasting Systems for State Policy Development by W.R. Maki, R.J. Dorf and R.W. Lichty. Staff Paper Series P77-13.
4. Socio-Economic Effects of Peat Resource Development in Northern Minnesota by W.R. Maki, Leonard A. Laulainen, Jr. and Patrick D. Meagher, Report prepared for Phase II Peat Program, Minnesota Department of Natural Resources, St. Paul. July 1977.
5. Economic Effects of Minnesota Peatland Development by Patrick D. Meagher and W.R. Maki. Staff Paper Series P79-3.
6. Population Effects of Copper-Nickel Development in Northeastern Minnesota by Patrick D. Meagher and W.R. Maki. Staff Paper Series P79-13.
7. Economic Effects of Copper-Nickel Development in Northeast Minnesota by W.R. Maki, Patrick D. Meagher and Leonard A. Laulainen, Jr. Staff Paper Series P79-26.
8. Users' Guide to the Minnesota Regional Development Simulation Laboratory by W.R. Maki, Patrick D. Meagher, Leonard A. Laulainen, Jr. and Mason Chen. Staff Paper Series P79-28.
9. Users' Guide to the Minnesota Two-Region Input-Output Model by Henry H. Hwang and W.R. Maki. Staff Paper Series P79-34.
10. Economic Trade-Off Analysis of State Industrial Development Policies by W.R. Maki, P.D. Meagher and L.A. Laulainen, Jr. Staff Paper Series P80-1.
11. Fiscal Effects of Mineral Related Industry in Minnesota by W.R. Maki. Staff Paper Series P80-13.
12. Regional Input-Output and Social Accounting Systems for Agricultural and Rural Development Planning By W.R. Maki. Staff Paper Series P80-21.
13. Economic Importance of Export-Producing Industry in Minneapolis-St. Paul Metropolitan Region by Wilbur R. Maki, Peter L. Stenberg and Mason Chen. Staff Paper Series P80-29.
14. Economic Importance of Export-Producing Industry in Minnesota by W.R. Maki, Peter L. Stenberg and Mason Chen. Staff Paper Series P81-3.
15. Economic Importance of Agriculture-Related Industry in Minnesota by W.R. Maki, Peter L. Stenberg and Mason Chen. Staff Paper Series P81-7.
16. Consistent Forecasting for Major State Industrial Sectors: The Case of the Paper Industry in Minnesota During the 1980's by R.W. Lichty, R. L. Raab, and P.K. Doty. UMD Bureau of Bus. & Econ. Research Working Paper 81-6.
17. Socioeconomic Models for Development Planning. I. Validation Methods by W.R. Maki. Staff Paper Series P81-9.
18. Consistent Forecasting for Major State Industrial Sectors: The Case of Mineral Development in Minnesota During the 1980's by R. L. Raab and R. W. Lichty. UMD Bureau of Bus. & Econ. Research Working Paper 81-8.
19. Input-Output Methods for Labor Market Analysis and Projection by W.R. Maki. Staff Paper Series P81-20.
20. Statewide Economic and Fiscal Effects of the Direct Reduction of Iron Ore to Steel in Northeast Minnesota by W.R. Maki. Staff Paper Series P81-13.
21. Decision Systems Research for the Tourism/Recreation Industry by Uel Blank, Wilbur Maki, and Kathleen M. Novak. Staff Paper Series P82-22.

\* Available from Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, MN 55108 (unless otherwise stated).