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THE SOCIO-ECONOMIC IMPACT
OF THE
BWCAW LEGISLATION: A PROPOSAL

by

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Working Paper

Bureau of Business and Economic Research

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INTRODUCTION

Several controversies have emerged out of the apparent incompatibility between a clean environment and industrial activity. These kinds of controversies are often based on a preservation vs. utilization argument. One well known controversy along these lines is the one associated with the Boundary Waters Canoe Area Wilderness (BWCAW) Legislation recently passed by the United States Congress.

One typical feature of conflicts of this type is that many predictions are made by proponents for both sides of the argument as to the expected effects of their proposals as well as the effects of their opponent's proposals. Most research conducted during the proposal development period represents an attempt to confirm the position of one or the other parties to the conflict.

One problem with this type of research is that it is often conducted during the most emotional period of the argument. In addition, much of the research is conducted with one or another advocate's interests at heart, often resulting in little objectivity in results. Claims and counterclaims often serve to confuse the issue rather than provide any real enlightenment.

Once the decision is made and the heat of controversy has ended, interest in determining just what the true effects of that decision might be often die. Yet, the effects are there and are capable of detection and measurement.

The effects that result from an important environmental decision should be monitored because of the value it has for understanding future controversies of the same type; to suggest ways of alleviating the more negative aspects of such decisions in the future. This research has the strength of being conducted in an atmosphere that is relatively free of the intense emotions that accompanied the controversies. It can also take into account any programs designed to mitigate against the disadvantaged position of the parties that may have resulted from the attempt to resolve the issue(s) involved in the controversy. Monitoring

research programs of this type will also provide on-going information that can be used to judge the efficiency of existing plans designed to help a region cope with environmental decisions as well as to suggest new areas where effective plans might be beneficial.

The research that is here being proposed will address itself to the impact of the recent Boundary Waters Wilderness Legislation on the economy of Northeast Minnesota. This would include an assessment of the impact of both the BWCAW bill itself and the programs that are expected as part of the appropriations that are to follow the originial legislation. Maximum use will be made of existing research pertaining to the region. Particularly, the research conducted for the Copper-Nickel Research Group of the Minnesota Environmental Quality Council will be used as a baseline against which comparisons can be made for future years.

In addition to the existing research, data will be collected immediately to complete the needed baseline information set. The economy will be monitored over a three-year period to note changes that occur as the impact of the legislation is felt by the region. Appropriate models will be developed, utilized or expanded to provide a framework for analysis.

IMPACT ASSESSMENT: THE DETAILS

The research will be divided into several components. The first of these involves a thorough review of the research and data that is already available for use in designing a baseline against which future changes will be compared. Funding for this element of the total research design has already been received from the Upper Great Lakes Regional Development Commission and the project is operational.

The second component is that of determining the data requirements, in addition to those that are already available, that would be required to prepare an effective baseline. The identified additional data will be collected during

this stage for incorporation into existing and developing predictive models.

The third component concentrates on the review of existing models and the development of new models to be used in the analysis. Two principle model types will be employed in this analysis:

1) Input-output analysis for use in tracing through the rounds of impacts that result from changes that occur in any one component of an economy, and

2) Regression analysis attached to the more important of the likely changes in the character of the region that result from changes in certain sectors of the economy, such as Tourism.

The characteristics of these models will be described in sections of this proposal that follows. It should be pointed out that versions of these models already exist for various geographic areas within the Northeast Minnesota Region.

The final component of the proposed research involves the development of a monitoring procedure for determining changes in both the level and the structure of the regional economy that result from the implementation of the BWCAW Legislation. This component involves both the collection of new information and the modification of the structure of existing models to account for the new character of the economy.

This final component represents the unique character of the proposed research design. It involves the tracing of impacts as they actually occur. It also involves the comparison of these impacts with the predictions that were made by the various parties to the controversy during the heat of the debate. Finally, attempts will be made to assess the extent to which expected negative impacts were offset by appropriations and planning efforts on the part of federal and state governmental agencies.

One benefit of the successful completion of the proposed research will be the development and strengthening of an emerging and already strong data and model set for the region. Just as the previous research efforts will be

adapted to the concerns of the current research design, the results of this research effort will be strong and flexible enough for use in the future by researchers dealing with new information needs for the region. Thus, each research effort adds to the growing base of knowledge and usable information for use in planning and governmental decision making.

The character of the data to be collected and the models to be used follows in the discussion of the section on Model Development/Input-output. Excerpts of the descriptions for the input-output and the regression analysis are taken from previous research efforts along these lines that were either conducted or proposed in association with the Copper-Nickel research for the region.
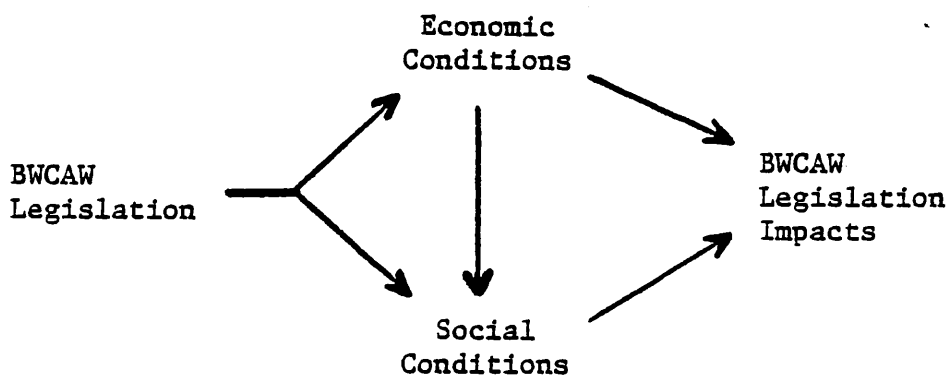
DATA REQUIREMENTS

The data that will be collected for this project are of three types. The first is structural data that reviews the forms of the regional economy in terms of purchases from and sales to various regional components of the economy. Much of these data have been collected and organized for the baseline case in connection with the Copper-Nickel work mentioned earlier. The task here will be to update this material to include changes in emphasis and regional delineation.

A second set of data will include information on the significance and level of performance for the "three T's" that are known to be important to the Northeast Minnesota economy: taconite, timber and tourism. As important as the tourism-recreation component is to the area's economy, little information on its true character and significance is currently available. Thus, the data collected here should be of great utility and relevance for several different, but related, information needs. Data that allow for the assessment of the effects of the "three T's" on the individuals and communities adjacent to the BWCA will also be collected.

Thirdly, data will be secured that relates to the BWCAW controversy itself, the predictions that were made by researchers and proponents of the various aspects of the controversy, and the various programs that were designed to deal with the adverse aspects of the decisions made. These data will serve as the basis for evaluation during the monitoring precedure.

A second benefit that can be gained from the data and the process of collecting the data concerns the identification of the social effects of the economic changes. Generally, the economic changes are considered as "drivers" for changes in social variables. The social variables that may be most affected are such things as population changes (numbers and/or composition), way of life changes (occupations, recreation patterns) and institutional changes (governmental services, education system, community structure). The general approach to understanding the relationships between the BWCAW Legislation and the social economic effects are represented by Diagram I.

DIAGRAM I

By emphasizing the interrelationships as represented in Diagram I in designing the proposed research, it will be possible to provide a preliminary level assessment of the socio-economic impacts of the BWCAW Legislation.

While the specific focus of the proposal is the BWCAW, the analysis of socio-economic impacts, because of the very nature of the BWCAW as an "uninhabited area," is concerned with the area outside of the BWCAW. That is, the

socio-economic effects, other than the more obvious ones such as different recreation patterns in the BWCAW, will largely be found in the areas adjacent to the BWCAW. In addition, the appropriation associated with the legislation is heavily oriented to funding activities and impacts outside the BWCAW. The activities and projects outside the BWCAW can be expected to have economic and associated social effects. Again, the question of location, magnitude and direction of impacts will be addressed. Since much of the area immediately adjacent to the BWCAW on the U.S. side is U.S. Forest Service land or land owned by the State of Minnesota, it is appropriate to focus a major part of the analysis on "forest-related impacts"--taconite, timber, tourism. Therefore, there are two levels of impacts which will be considered. First, the community type impacts, such as those in the Ely area, the Grand Marais area, Cook-Orr area, etc., will be considered. Topical or "sector" level impacts, such as forest products, recreation and mining will be the second level of impact analysis. It is clear that the BWCAW Legislation has and will cause changes in the BWCAW. The question being addressed in this research is what effect will these changes have on the social and economic structure of the area outside of the BWCAW.

MODEL DEVELOPMENT: INPUT-OUTPUT*

<u>Background</u>

Since its creation in the 1940's by Leontief, I/O has become one of the most widely used models for economic forecasting and planning in the world today. Although there are weaknesses that are associated mainly with the assumptions that are required to construct such a model, it is probably as close to a general equilibrium picture of a functioning economy as has yet been developed.

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*This section was taken from an unpublished report for the Copper-Nickel Research task force, State of Minnesota.

Briefly, the input-output model divides an economy into homogeneous industrial sectors (or as homogeneous of sectors as is possible given data and financial constraints). The pattern of trade between these sectors is then determined and reported in a linear matrix format. Assuming fixed production technique (i.e., assuming a linear and homogeneous production function to the first degree) and a constant trading relationship between the region being studied and the rest of the world, interindustry multipliers can be estimated and related to levels of final demand. It is important to note that, as long as the assumptions are valid, projection of regional activity can be made on the basis of separately determined or assumed changes in the levels of final demand components.

Input-output models, like economic base, can be constructed on the basis of either primary or secondary data. Secondary data tables can be constructed in a variety of ways, but they all have common requirements of a current table for the nation or at least for a larger region, such as a state table. The co-efficients of the larger table are then adjusted for observed local tendencies. The easiest basis for adjustment along these lines utilize location quotient values associated with a simpler form of analysis known as economic base. In at least one case, this method proved to be more successful than other more elaborate methodologies.

Primary data tables, on the other hand, require detailed accounting inform-ation from a representative sample of regional industries. These data would include the purchases of intermediate goods, of services and of resource inputs by source of purchase along with the dispensation of the output that these industries produce. The collected data are summarized, using appropriate control totals for total industry output in the region, in a cost-accounting framework, with debits equaling credits throughout the purchase/sale matrix. This summary serves as the basis for the analytics of input-output that follow.

The Input-Output Model

The key to understanding input-output analysis, the form of analysis that is here being proposed for the Northeastern Minnesota area to determine the internal and external linkages of the economy, is to realize that its primary focus is on the interindustry structure of the regional economy. Any firm that operates in a given locality needs certain inputs from other firms or economic units (such as households) in order to produce its own outputs. These firms often sell their outputs to other regional firms or economic units or to exports. These purchases and sales are the meat of an input-output system, as they occur over a specified period of time, usually one year.

What is really being presented is the stages of production that a product must go through towards its final form. Each stage requires certain intermediate products and/or services from other stages plus the input of such resources as labor, capital, land and enterprise. In the national economy, based on the 1967 U.S. Input-Output Table, the intermediate sales by firms to other firms represents well over fifty percent of the total dollar value of transactions that take place in the economy. This figure will be much less for small area economies since fewer stages of product development are likely to exist in that economy.

The input-output system divides an economy into several industrial sectors, each containing a number of firms that are at least similar in their production patterns. It then traces the flows of sales and purchases of intermediate products between these firms, leading eventually to a final sale, such as that to exports. It is made up of three tables: the transaction, the direct requirements, and the direct and indirect requirements table. Each table will be discussed in turn.

The Components of Input-Output: The Transactions Table

An input-output system generally consists of three interrelated tables

highlighting the industrial structure of a regional economy. These are the
transactions table, the direct dollar requirements table, and the direct and
indirect dollar requirements table.

The dollar transactions table is exemplified by Table 1 below.

TABLE 1

Dollar Value of Transaction for a Hypothetical Regional Economy

	Agri- culture	Enter- tainment	Home Furnishings	Final Sales	Total Output
Agriculture	100	700	000	4,625	5,425
Entertainment	50	200	50	6,400	6,700
Home Furnishings	75	300	75	4,905	5,355
Resource Inputs	5,000	5,500	230	18,000	28,730
Imports	200	000	5,000	000	5,200
Total Inputs	5,425	6,700	5,355	33,930	51,410

As was stated earlier, an input-output table aggregated all of the individual
firms of a regional economy into a set of industrial sectors. The industrial
sectors must be chosen such that they include all of the firms in the area. In
the hypothetical example, a highly simplified structure of three industries is
presented: Agriculture, Entertainment, and Home Furnishings. In addition to
the industrial sectors, there is a component of the table titled Final Sales.
This consists of the value of transactions between the noted industrial sectors
and the users of the product when such use is not intended to further produce
additional products.

Final sales generally consist of the so-called components of Gross National
or Gross Regional Product. That is, it consists generally of household purchases
of goods and services, government purchases, purchases for the purpose of invest-
ment by business units, and purchases of the reference regional products by
other regions (exports).

A third section of an input-output table deals with the value added by the resources used by each sector. This generally includes the wages, interest, rents, and profits that are earned by households and by business units in a regional economy as well as the goods and services that are used by a regional economy but produced elsewhere, i.e., imports. The rows of an input-output relationship indicate the sales by industries to one another and to final sales. The columns of an input-output structure highlight the productive inputs of semi-finished goods or resource inputs by each sector.

For example, the 700 total in the Agriculture row and Entertainment column of Table 1 indicates that Agriculture sold $700 worth of intermediate products to Entertainment reading across the row, or it indicates a purchase of $700 by Entertainment from Agriculture reading down the column. The $5,500 total in the fourth figure of the second column indicates that Entertainment purchased $5,500 worth of productive resources in producing its own output. These totals would represent the totals for a period of time such as the year 1978.

Input-output at this level represents, in effect, a cost accounting sheet for a regional economy, treating the industrial sectors of the regional economy like successive departments in an individual firm. As such, the accounting identity of debits equaling credits is required to hold for input-output as it would be required to hold for an individual firm. This is indicated by the fact that the total dollar transaction for the row (e.g., $5,425 of total output for the Agriculture row) is equal to the dollar transaction totals for the corresponding column of that table (e.g., $5,425 total input for the Agriculture column).

The transactions table of an input-output system is, taken by itself, purely descriptive. It is possible to determine from such a table the level of Gross

Regional Product for the area under study. It is also possible to get some feel for the level of transactions that take place within that regional economy. It is not generally possible, however, to use this table for detailed analysis of structural impacts that result from such things as changing demands for the regional economy's output. Using the assumptions that were discussed in the first section of this report, a second table can be derived from the transactions table which is more useful for analytic purposes.

The Components of Input-Output: The Direct Requirements Table

A second input-output table can be derived from the transactions table if each entry in any given industry's column of the transactions table is divided by the total for the row of that same industry. The resulting number represents the dollar value of inputs required from the various industries to produce one dollar's worth of output for each industry taken separately. It is a measure of the aggregate contributions to the output of the region by each industry. Table 2 represents a direct requirement based on the data in Table 1.

TABLE 2

Direct Dollar Requirements for a Hypothetical Regional Economy

	Agriculture	Entertainment	Home Furnishings
Agriculture	.018	.105	.000
Entertainment	.009	.030	.009
Home Furnishings	.014	.045	.014
Resource Inputs	.922	.821	.043
Imports	.037	.000	.934
Total Inputs	1.000	1.000	1.000

The direct requirements table is based on the notion that, for example, Agriculture would not have purchased $75 from Home Furnishings during the reference year of this study unless this $75 worth of intermediate input was

required in order to produce the $5,425 of total Agricultural output. It may be said, then, that Agriculture required an input of $75 from Home Furnishings to produce the $5,425.

The question may then be asked, "If Agriculture required $75 of intermediate production from Home Furnishings in order to produce $5,425 of total output, what was the requirement from Home Furnishings by Agriculture per dollar of output?" That answer, of course, can be derived by dividing $75 by $5,425. The results of that division appear as .014 in the Home Furnishings row and Agriculture column of Table 2. The interpretation of that figure is as follows--for every dollar of output that Agriculture produced in the reference year, it required 1.4¢ worth of the output of Home Furnishings. Similarly, Entertainment required 3¢ from its own sector for every dollar's worth of output that is produced in the reference year, and so it goes through each column of the direct requirements table.

Some limited analysis is possible with this direct requirements table. For example, Entertainment must purchase 10¢ worth of the output of Agriculture for every dollar's worth of output in Entertainment services. The question might be asked, "What is the effect of an increase in the final sales of Entertainment of $1,000 on the intermediate sales of Agriculture?" The obvious answer is that the direct effect is .10 times $1,000, or $100. For every increase of $1,000 for Entertainment, Agriculture will also feel a direct increase in its sales, and if the assumptions of the model hold, this can also be applied to the sales of all the other industries in the region as well as those of the productive resources of the region.

This is not where the story ends, however. If a change in the sales of one industry exerts direct changes in the sales of all other industries, then the second round industries will also require more inputs from the economy.

The third and final table to be discussed takes these "indirect" effects into account, as will be discussed below.

The Components of Input-Output: The Direct and Indirect Dollar Requirements Table

Table 3, the direct and indirect dollar requirements table, is probably the most useful of the three tables. The mathematics of input-output are presented in an earlier report, so they will not be reviewed here. Rather, a short description of the process by which Table 3 is derived will be presented for those not interested in the technicalities of input-output.

TABLE 3

Direct and Indirect Dollar Requirements for a Hypothetical Regional Economy

	Agriculture	Entertainment	Home Furnishings
Agriculture	1.019	.109	.001
Entertainment	.010	1.032	.010
Home Furnishings	.015	.049	1.015

It was stated in the example above that Entertainment requires 10.4¢ worth of the intermediate output of Agriculture in order to produce $1.00 of Entertainment output. It was also mentioned that, under the specified assumptions, an increase in the final demand requirements of entertainment equal to $1,000 would result in an increase in sales to Entertainment by Agriculture of $104. In order for Agriculture to produce $1.00 of output, that industry requires 1.4¢ of the output of Home Furnishings. So, in order to produce $104 to supply to Entertainment, Home Furnishings would have to provide Agriculture with $1.46 (1.4 x $104) worth of intermediate outputs.

This means that Home Furnishings would have to increase its output by $1.46, which would increase its requirements from the Entertainment industry of .009 times $1.04, or .01. The process that is described above continues until all of the interactive forces have played themselves out.

It would be quite cumbersome to determine the total of these rounds of impact through a step-by-step process as is used in the example immediately above. This would be cumbersome for a three sector table, and the difficulty would increase proportionately with increasing numbers of sectors used in an actual table. Fortunately, this solution can be obtained through the use of high speed computer technology. Table 3 summarizes the results of this type of interactive process.

Table 3 is interpreted as providing the direct impact (found in Table 2) along with the additional indirect impact of a dollar of final sales per industry. It is used in the following manner: If Agriculture produces $1.00 worth of output, it requires 1.8¢ directly from itself, .9¢ directly from Entertainment, 1.4¢ from Home Furnishings. This is in addition to the $1.00 of output that was already attributed to the Agriculture industry.

It might be said, therefore, that Agriculture directly requires $1.018 from itself in order to produce $1.00 worth of output. In addition, it required indirectly (according to Table 3) another .001¢ to produce that dollar because it has to service itself and the other firms that are involved in supplying intermediate goods for that dollar's worth of input. The total impact, direct and indirect, of a $1.00 level of output by Agriculture on itself is $1.019. In a similar fashion, in order to produce that dollar's worth of output, 9¢ is required from Entertainment directly, and an additional .1¢ is required indirectly as Entertainment services itself and other firms servicing Agriculture. And so it goes throughout the Agriculture column.

These figures down the column of Table 3 may be interpreted as interindustry multipliers for the hypothetical regional economy. If the column is summed, the resulting figure for total multiplier would be the total impact of a $1.00 change in the final output of the reference industry on itself and on all the other industries in the region due to the trade relationships that were specified in

Tables 1 and 2. It is generally these total multipliers that are used to
analyze impacts stemming from (hypothesized) <u>changing levels of final sales</u>
for regional industry's outputs.

MODEL DEVELOPMENT: THE REGRESSION FORMAT

The various developments that have been and are currently taking place in
Northeast Minnesota bring with them a constantly changing economy. One industry
that is clearly expected to be effected is the recreation industry which is
thought to be so important to the economy of the region.

Copper-Nickel development, for example, will have two major, and opposite,
effects on the recreation industry. The positive effect will be simply that
local population will increase bringing with it a greater demand for recreation
in the area. The effect of the BWCAW Legislation is likely to be a change in
the mix of tourist types that will be the customers for regional facilities and
services.

It is proposed that such effects can best be converted into user days,
and eventually into dollars through the input-output framework, using an Aggre-
gate Econometric Model of Recreational Demand (AMERD).

In the econometric model to be proposed, demand will (as previously noted)
be measured in user days. These days will be disaggregated into various cate-
gories, such as fishing, resorting, canoeing, hunting, and related recreational
activities.

All such econometric models will use regression techniques so that predic-
tions made from such models will have a forecasting error estimate. That is,
it will be possible to make an interval prediction (e.g., between 2000-2500 user
days of one type of activity) for any desired significance statistical level.
However, at this time it is impossible to suggest what the magnitude of such
error might be since the econometric models have yet to be estimated.

Furthermore, interval estimates of demand, when converted (e.g., through the input-output table) into dollars, would retain the same statistical significance level. It is useful to make the point that this is one of the basic strengths of the econometric models of demand. The models provide a systematic, and statistically valid, way of projecting changes in recreation demand following economic shock to the region.

The alternative is that the "educated guess" which might involve "scenarios" of 10, 20 and 30 percent changes in demand (user days). The trouble here is that forecasting errors are not capable of measurement in a statistical fashion. It is precisely for this reason that it is crucial that some econometric models of recreation demand be combined with input-output for the strongest possible estimates in which can be put the confidence of those needing such information.

The aggregate model will be of the form:

$$Q_i = f(A, W, F)$$

where Q_i is activity i user days demand at an individual lake, A is some measure of the lake's accessibility, W is a factor of water quality attributes of the lake, and F is a vector of facilities that are available at each lake. It is believed that a current survey of lakes in the Superior National Forest can be used as a sample in order to estimate parts of the model. This would be supplemented with survey information on usage of these same lakes using in part the BWCA permit system obtained from the U.S. Forest Service.

One strength of a model for individual lakes, such as AEMRD, is that changes in demand can be isolated for specific lakes in the region. It will be necessary to disaggregate such effects on usage into local and non-local days so that such usage can be converted into dollars and jobs with the economic impact (input-output) model.

USE POTENTIALS FOR RESEARCH

When put in equation and model formats, the research program being suggested might look estoric and highly technical. Although the models being proposed are complicated in concept, the fortunate aspect of this research design is that they are relatively easy to use.

In the simplest terms, the program would include a demand model that contains elements that are potentially under the control and/or influence of governmental, planning and private development agencies. The demand model being proposed is oriented towards the recreation industry, but depending on the interests of the sponsors and the level of funding that is available, it could be expanded to take into account additional consumer demand orientations.

Industrial demands, that is, demand for products by other than households, are also capable of measurement and inclusion into the input-output framework. With some effort, the framework itself may even be modified to take into account the changing structure of the economy, for example, the development of Copper-Nickel Mining operations into the region.

The input-output table itself has as its primary use the estimation of secondary and subsequent rounds of impacts that result from a computed change in final demand. As was mentioned earlier, these subsequent rounds result from the interaction between area industries in terms of firm purchases and sales of intermediate products and services.

The usefulness of these models lies in their flexibility and the ability to manipulate them to simulate the impacts of various assumed policy alternatives. Thus, for example, if the plan were to build a new campground with boat and like landings outside of Ely, with electrical hook-ups and sewer facilities, with nature track and a central lodge, and with canoe and related equipment rentals, the demand model will be able to predict (based on past experience) the change in the number of user days of tourist activity that would result.

The input-output table would take this user-day information, converted into dollars of expenditure by household, and trace through the rounds of impacts that would ripple through the area economy as a result of this development object.

The results of this program would be capable of being included in a cost-benefit framework for analyzing the economic efficiency of such a public or private investment for the region.

A second major use of the data and the analysis relates to the monitoring procedure mentioned earlier in this proposal. This monitoring involves the constant collection of updated information in order to trace through the structural changes that do occur due to the BWCAW Legislation. All of the monitored data will be compared to the baseline information that already exists and that will be immediately updated upon the approval of this contract.

The monitoring process is considered the most useful aspect of the proposal. It assures that the research design will take into account the movement of an economic structure rather than to take a "still picture" at a point in time as is so often the case for such research. It also provides a capability for answering questions pertaining to the nature of conflict over issues that are similar to the one in Northeast Minnesota and, therefore, provides some useful insights that can be used in managing these other areas of debate.

Finally, this research will have the effect of consolidating, and adding to, the emerging data-information base for development and growth management in Northeast Minnesota. Use will be made of strong, large scale simulation models such as SIMLAB (developed at the University of Minnesota, St. Paul, by Wilbur R. Maki) that exists in various stages of development for the region.

Although the models will be integrated and expanded to assess the impact of the BWCAW and related legislation and planning measures, it will also be

broad enough in scope to be capable of being applied to a wide variety of development questions. Copper-Nickel development has already been mentioned, and some of these models were constructed to address that issue. Gasoline shortages and price changes could also be analyzed in terms of their impacts on the area economy without major revisions in the modeling structures. A general capability will have been developed for projection of the economy of the region under a variety of assumptions concerning world demands for steel, timber, and the other products that are such an important past of the regional economy.

This is not as ambitious in scope as might first appear. The modeling capabilities that have been discussed at such length here have been in the process of being developed for a number of years now. The vitae of the two principal investigators that are included with this proposal reflect work that has been started in this direction. In addition, associates to the project were selected on the basis of both their expertise in the models chosen as well as in terms of their previous research oriented towards issues affecting Northeast Minnesota. This project will go a long ways towards tying these previous efforts and experiences together in a coherent package that is of use to those in the area that need solid economic information and a projection capability.

TASKS AND OUTPUTS

1. Develop a list of changes as prescribed by the BWCAW Legislation (those aspects of the study area that are addressed directly and prepositively in the legislation).

2. Review history of BWCAW and associated controversy.

3. Document existing conditions

    A. Legislation Time-line
      1) Prior to legislation
      2) Prior to implementation of legislative prescriptions
      3) Following implementation of legislation and allocation of funds

B. Methods
   1) Photographs
   2) Oral Reports
   3) Written documentals - reports, records, maps, etc.

4. Develop list of predicted changes

   A. Prelegislation
      1) Opponents perspectives
      2) Proponents perspectives

   B. Post legislation
      1) Knowledgeables
      2) Legislative intent (from 1 above)
      3) Similar situations (e.g., Railroad Abandonment)

5. Finalize study variables

   A. Variables pertaining to economic input-output table

   B. Variables pertaining to socio-economic effects

6. Collect data

   A. Secondary Data:
      1) Use Cu/Ni Project Data
      2) Use SCORP Activity Data
      3) Use MNDOT - North Shore 61 Study
      4) Other studies

   B. Primary Data
      1) Emphasis on Recreation-Tourism Sector
         a. Resorts/Hotels-Motels
         b. Recreation service (bait and tackle, service stations,
            souvenir shops)
         c. Recreation facilities (campgrounds, etc.)
      2) Updating the Ely Study used in the Cu/Ni Project and expanding
         the geographical area to include the Cook-Orr area, the Grand
         Marais-Gunflint area and the Silver Bay-Two Harbors-Isabella area.

   C. Repeat the Data Collection as part of the basis for assessing change
      over time.

7. Project Output

   A. Input-output table which can be used to estimate the economic effects
      of the legislation and the associated allocation of funds.

   B. Develop a predictive tourist related econometric model that will predict
      the final demand component from tourism for the input-output table.
      This would facilitate the prediction of changes in the future regarding
      tourism in the study area.

   C. Description of the effects of the economic changes on the area outside
      the BWCAW.

   D. A viable procedure for identifying changes which can be assessed as to
      their desirability. These changes may become the focus of effort to
      mitigate the undesirable effects and facilitate the continuation of
      the desirable effects.

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Associate Professor, Department of Economics University of Minnesota, Duluth	1974-present
Assistant Professor, Department of Economics University of Minnesota, Duluth	1972-1974
Instructor, Department of Economics University of Minnesota, Duluth	1971-1972
Instructor, Department of Economics Kansas State University	1970-1971
Research Assistant, Department of Economics Kansas State University	1969-1970
Instructor, Department of Economics Kansas State	1967-1968
Teaching Assistant, Department of Economics Kansas State University	1965-1966

JOURNAL PUBLICATIONS ACCEPTED:

Regional Economics:

Richard W. Lichty, Raymond L. Raab, Gordon L. Levine, "The Relationship Between the Elderly's Housing Preferences and Their Demographic Characteristics: A Case Study in Multivariate Statistical Analysis," Regional Science Perspectives, Vol. 7, No. 2 (1977).

William A. Fleischman, Wayne A. Jesswein, Richard W. Lichty, "A Theory of Slum Types: A Case Study," Regional Science Perspectives, Vol. 7, No. 1 (1977).

Richard W. Lichty and Wayne A. Jesswein, "A Case Study: Assessing University Impacts Using Interindustry Analysis," Growth and Change, Vol. 9, No. 2, (April 1978) pp. 24-28.

Richard W. Lichty and Wayne A. Jesswein, "Economic Impact of an Air Base on the Duluth-Superior Region," Journal of the Minnesota Academy of Science, Vol 43, No. 3 (1977).

Book review on J. A. MacMillan, et. al,: Manitoba Interlake Area - A Regional Development Evaluation in Regional Science Perspectives, Vol. 8. No. 1 (1978) pp. 117-119.

JOURNAL PUBLICATIONS ACCEPTED: (continued)

Economic Education:

Richard W. Lichty, "Approaches to an Interdisciplinary Course in the Social Sciences for Secondary School Teachers," Resources in Education, Vol. 10, No. 6, (June 1975), pp. 159-160.

"Peer Evaluation - A Necessary Part of Evaluating Teaching Effectiveness," International Quarterly Journal for Improving College and University Teaching (accepted for future publication). Co-author Jerrold M. Peterson.

Richard W. Lichty, Jerrold M. Peterson and David A. Vose, "The Economic Effect of Grade Inflation on Instructor Evaluation: An Alternative Interpretation," Journal of Economic Education (to be published in the Spring issue).

Environment/Energy:

Richard W. Lichty and Jerrold M. Peterson, "Pure Competition, Monopoly and the Control of Energy Prices: A Comment," Journal of Energy and Development (to be published in the Spring issue).

Jerrold M. Peterson and Richard W. Lichty "Taxes, Quotas and Environmental Policies: A Comment on Economic Efficiency," The American Economist (to be published in the Spring issue).

Other:

Book Review: "The Benefits and Costs of Import Substitution in India: A Microeconomic Study" by Anne O. Krueger, The American Economist, Vol. XX, (Spring 1976), pp. 88-89.

"Distribution Costs for Fresh and Frozen Meat," Western Meat Industry, Vol. 20, Number 5, pp. 28-29, May 1974.

MONOGRAPHS:

"The Impact of UMD on the Duluth-Superior Growth Center Region," with Wayne A. Jesswein and Wilbur Maki, Reserach Study No. 15, Bureau of Business and Economic Research, University of Minnesota (Duluth, April 1977).

"Perspectives on Economic Growth in Northeast Minnesota," with Wilbur R. Maki and Leonard A. Laulainess, Jr., Staff Paper Series, No. P 77-7, Department of Agriculture and Applied Economics, University of Minnesota (St. Paul, February 1977).

"The Interindustry Impact of Reserve Mining Company on the Arrowhead Region of Northeast Minnesota Plus Douglas County, Wisconsin," (Economic Development Administration, Arrowhead Regional Development Commisssion, and Lake Superior Basin Studies Center, University of Minnesota, Duluth) with Wayne A. Jesswein, 1975.

MONOGRAPHS: (continued)

"The Employment Impact of Reserve Mining Company on the Arrowhead Region of Northeast Minnesota Plus Douglas County, Wisconsin," (Economic Development Administration, Arrowhead Regional Development Commission, and Lake Superior Basin Studies Center, University of Minnesota, Duluth) with Wayne Jesswein, 1974.

"Cost Analysis of Systems to Distribute Fresh and Frozen Meats,". Frozen Meat, (Kansas State University), 1974.

"Background-Resource Paper for Economic Analysis Impact Council," sponsored by the Upper Great Lakes Consortium for Transportation Research, 1973.

"Transient Housing Study," sponsored by the Center for Urban and Regional Affairs, University of Minnesota, with William Fleischman, 1973.

"Senior Citizens' Housing Study," sponsored by the Planning Department, City of Duluth and the Housing and Redevelopment Authority, Duluth, 1973.

"Duluth-Superior Economic Base Study," (Arrowhead Regional Development Commission - Duluth) with Wayne Jesswein, 1973.

Frozen Meat: Its Distribution Costs, Acceptance and Cooking and Eating Qualities. "Cost Analysis of Systems to Distribute Fresh and Frozen Meats," (Agricultural Experiment Station, Kansas State University). pp. 35-46, 1973.

Jarvin Emerson, in association with Richard Lichty, et al, Interindustry Projection of the Kansas Economy: Industry and Regional Forecasts for 1980, 1990, 2000, 2010, and 2020, Kansas State University Press, 1972.

Chapter II, "Report on Objective II - Cost Analysis," Preliminary Final Report--Frozen Meat Systems Research, (Kansas State University, 1971.

PAPERS READ AT PROFESSIONAL MEETINGS:

Jerrold Peterson and Richard Lichty, "Benefit-Cost Analysis of a Regional Energy Strategy: UMD Coal Gasification, Western Economic Association, Hawaii, June 20-26, 1978.

Discussed paper, "The Education of Economics' Majors," by R. K. Stuart, Western Economic Association, Hawaii, June 20-26, 1978.

Discussed paper, "Toward a More Effective Procedure for Evaluation of Economic Education Innovation," by T. R. Swartz, et. al., Western Economic Association, Hawaii, June 20-26, 1978.

Presented paper, "Selecting a Regional Forecasting System, with Wilbur Maki and Ronald Dorf, Mid-Continent Regional Science Association, Manhattan, Kansas, May 5-7, 1977.

Discussed paper, "Regional Disparities in India and its Implications in Regional Economic Forecasting," by S. S. Distider, Mid-Continent Regional Science Association Meetings, Manhattan, Kansas, May 5-7, 1977.

PAPERS READ AT PROFESSIONAL MEETINGS:

Presented paper, "An Analysis of the Economic Impact of the Duluth Air Base on the Duluth-Superior Growth Center Region" at the Minnesota Academy of Science Meeting, St. Cloud, Minnesota with Wayne Jesswein, April 30, 1977.

Discussed paper, "Estimating Spatial Relationships: A Methodological Inquiry into the Use of Alternative Measures of Accessibility: By Gerald S. McDougall, at Midwest Economics Association, St. Louis, Missouri, March 31-April 2, 1977.

Presented paper, "Past Trends and Future Prospects for the Northeast Minnesota Economy" with Wilbur Maki, Minnesota Economics Association Meetings, November 12, 1976.

Presented paper, "Input/Output as an Impact Forecasting Tool" to the Copper-Nickel Research Advisory Board Meeting, October 15, 1976.

"Techniques for Predicting the Housing Desires of Low Income Senior Citizens," Western Economics Association, San Francisco, California (June 26, 1976) with Raymond Raab and Gordon Levine.

"The Economic Effects of Grade Inflation on Instructor Evaluation," The Western Economics Association, San Francisco, California (June 26, 1976) with David Vose and Jerrold Peterson.

"Senior Citizens' Housing and Location Preferences." Western Social Science Association, Tempe, Arizona. (April 30 - May 1, 1976) with Raymond Raab and Gordon Levine.

"The Theory of Slum Types: A Case Study." Mid-Continent Regional Science Association, Bowling Green, Ohio, (April 30-May 1, 1976) with William Fleischman and Wayne Jesswein.

"The Relationship Between the Elderly's Housing and Their Demographic Characteristics," Mid-Continent Regional Science Association, Bowling Green, Ohio. (April 30-May 1, 1976) with Raymond Raab and Gordon Levine.

Presented a one day seminar on, "The Analysis of Fresh and Frozen Meat Distribution Systems: Some Preliminary Results," American Meat Institute Meetings, Chicago, Illinois, September, 1975.

Presented two day seminar on, "The Analysis of Fresh and Frozen Meat Distribution Systems: Some Preliminary Results," Super Market Institute Workshop on Meat, Chicago, Illinois, August 21-22, 1975.

Discussant for the paper, "A Model for the Analysis of Demand for and Socio-Economic Impacts of Recreation in Manitoba," by J. Craven, Mid-Continent Regional Science Association, Champaign-Urbana, Illinois, 1974.

Presented paper, "Information Systems for Regional Development and Planning," Minnesota Economics Association Annual Meeting, 1971.

OFFICES HELD IN PROFESSIONAL SOCIETIES:

President, Mid-Continent Regional Science Association	1977-1978
President-Elect, Mid-Continent Regional Science Association	1976-1977
Vice-President, Mid-Continent Regional Science Association	1975-1976
Co-Chairman for the program of the Seventh Annual Meeting of the Mid-Continent Regional Science Association held in Duluth	June 1975

HONORS AND AWARDS:

Selected for International Who's Who in Education	1978
Selected for Who's Who in the Midwest and for Who's Who Among American Men and Women of Science	1976

VITA

William A. Fleischman

PERSONAL HISTORY

Birth: February 12, 1942   LaCrosse, Wisconsin

High School: Graduated from West Salem Public High School
          May 1960   West Salem, Wisconsin

Marital Status: Married September 14, 1968 to Anne Marie Schomberg
          Two Children: Christine Marie (6/6/73)
                         Elizabeth Anne   (18/8/76)

EDUCATIONAL BACKGROUND

B.S.:   1964 University of Wisconsin-LaCrosse   LaCrosse, Wisconsin
               Major: Sociology, Biology
               Minor: Chemistry
M.S.:   1967 Iowa State University   Ames, Iowa
               Major: Sociology
Ph.D.:   1973 Iowa State University   Ames, Iowa
               Major: Sociology

ACADEMIC RANK

Associate Professor, Sociology. Department of Sociology/Anthropology
                                 University of Minnesota - Duluth

EMPLOYMENT

Employing Institution	Title of Position	Primary Responsibility	Dates (inclusive)
University of Minn., Duluth	Assoc. Prof.	Teaching	1977-present
University of Minn., Duluth	Assist. Prof.	Teaching	1973-1977
University of Minn., Duluth	Instructor	Research	1970-1973
Iowa State Univ.	Research Associate	Research	1968-1970
Iowa State Univ.	Research Assistant	Research	1965-1968
Western Wisconsin Technical Institute LaCrosse, Wisc.	Driver Training Instructor	Teaching	1964-1965

BIBLIOGRAPHY

A. Books and monographs

Beal, George M., Bohlen, Joe M., Warren, Richard D., and Fleischman, William A. "Behavior Studies Related to Pesticides: Agricultural Chemicals and Iowa Agricultural Chemical Dealers." P-Bulletin 139. Agricultural and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa. 1969.

Beal, George M., Bohlen, Joe M., Warren, Richard D., Fleischman, William A., and Edwards, George W. "Behavior Studies Related to Pesticides; Urban Chemicals and Urban Chemical Dealers in Iowa." P-Bulletin 140. Agricultural and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa. 1970.

Beal, George M., Warren, Richard D., and Fleischman, William A. Smoking Behavior. Sociology Report 88 A. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa. 1971.

Beal, George M., Warren, Richard D., and Fleischman, William A. Smoking Behavior: Data Book. Sociology Report 88 B. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa. 1971.

Fleischman, William A. and Scribner, Duane C. "A Case Study: Minnesota-Sensitivity to the Intervention Process in State and Local Reform Efforts," in Agranoff, Robert (ed) Coping with the Demands for Change Within Human Services Administration. Section on Human Resources Administration - American Society for Public Administration, University of Northern Illinois, Dekalb, Illinois, 1977.

Fleischman, William A. "Copper Nickel: Social Impact and Social Responsibility," in Klein, Thomas et al. (eds.). The Proceedings of Minnesota Copper-Nickel : A Public Symposium-Scientific and Humanistic Perspective. Pp. 202-206. 1976.

Fleischman, William A. Coalition Planning: Service Integration Research. The Evaluation of the Service Integration Project of the Human Resources Planning Coalition of Greater Duluth, Inc. University of Minnesota, Duluth. Department of Sociology and Anthropology. Report No. 1. Duluth, Minnesota 1973.

Fleischman, William A. Peat Land Policy Study, Minnesota Department of Natural Resources. July 1978.

Fleischman, William A. "Participation in Planning: Whose Interests and How Represented" in Wolersley , Robert P. and Miller, Edward J. The Small City and Regional Community Vol. 1. Proceedings of the first conference on the small city and regional community, Univ. of Wisconsin Stevens Point, March 1978

Fleischman, William A. Organizational Intervention: A Case for
Capacity Building. University of Minnesota, Duluth. Department
of Sociology. Evaluation Report No. 2. June, 1975.

Jesswein, Wayne A., Lichty, Richard W. and Fleischman, William A.
Results of Duluth Shoppers' Preference Survey, University of Minnesota
Duluth, November 1977.

Klonglan, Gerald E., Beal, George M., Paulson, Steven K., Warren,
Richard D. and Fleischman, William A. "The Potential of Organiza
tional Coordination as an Intervention Process: Applied to the
Problem of Cigarette Smoking and Health." Sociology Report No. 91.
Department of Sociology and Anthropology. Iowa State University,
Ames, Iowa. 1971.

B. Publications and Professional Journals

Fleischman, William A., Jesswein, Wayne A., and Lichty, Richard W.
"A Theory of Slum Types: A Case Study," Regional Science
Perspective, Vol. 6. Mid-Continent Regional Science Association,
Kansas State University, Manhattan, Kansas, 1976.

C. Notes, Book Reviews, and Abstracts

Fleischman, William A. "Values and Ideologies and the Development
Process: A Summary Report." Sociologia Ruralis. Vol. XII No. 3/4.
1972.

Fleischman, William A. Review of "Organizations and Beyond" by
William A. Rushing and Mayer N. Zald. for Rural Sociology. Winter
1977.

Fleischman, William A., et al. "Analysis of Departmental Space
Requirements/Proposal for Space Allocation for Selected Departments,"
University of Minnesota, Duluth. 1974.

Fleischman, William A., et al. "Analysis of Departmental Space
Requirements/Proposal for Space Allocation for Selected Departments:
Summary," University of Minnesota, Duluth. 1975.

Fleischman, William and Franz, Robert. "Opinions on Development in
the Voyageur National Park Perimeter." Arrowhead Regional Development
Commission, Duluth, Minnesota. 1974.

Fleischman, William and Lichty, Richard. "Report on the Transient
Nature of Selected Downtown Residents in Duluth, Minnesota." Center
for Urban and Regional Affairs, University of Minnesota, Minneapolis,
Minnesota. 1974.

Fleischman, William A. "Section 2e-Continuing Planning and Evaluation
in Comprehensive Demonstration Plan Year IV." City of Duluth Fourth
Action Year in the Model City Program. Submitted to U.S. Department
of Housing and Urban Development, August, 1972. Pp. 173-186.

D. Papers read at Professional Meetings

Fleischman, William A. Participation in Planning. Whose Interests
and How Represented. Prepared for the 1st Annual Conference on the
Small City and Regional Community, University of Wisconsin, Stevens Point.
March 1978.

Fleischman, William A. Resident and Non-Resident Owner Attitudes Toward
Land Use. Prepared for the Rural Sociological Society Annual meeting,
San Francisco, California. September 1978.

Fleischman, William A. and Scribner, Duane C. A Case Study: Minnesota-
Sensitivity to the Intervention Process in State and local Reform Efforts.
Presented by invitation at the "Coping with the Demands for Change Within
Human Services Administration," ASPA and the Southeast Institute for Human
Resources Development, Louisville, Kentucky. June, 1976.

Fleischman, William A., Jesswein, Wayne A., and Lichty, Richard W.
A Theory of Slum Types: A Case Study. Presented at the Eighth Annual
Meeting of the Mid-Continent Regional Science Association, Bowling
Green, Ohio, April, 1976.

Panel Chairperson. "Evaluative Research Panel," Annual Meeting of the
Minnesota Sociologists, Hamline University, October, 1973.

Panel Participant. "Sociology in the Community." Annual Meeting of
the Midwest Sociological Society, Kansas City, Kansas, April, 1972.

Secretary, "Values and Ideologies and the Development Process. Seminar
#8." Third World Congress for Rural Sociology. Baton Rouge, Louisiana,
August, 1972.

Panel Chairperson, Minnesota Copper-Nickel, University of Minnesota,
Duluth and the Minnesota Humanities Commission. February, 1975.

Discussant. Annual Meeting of the Mid-Continent Regional Science
Association, Duluth, Minnesota. June, 1975.

RESEARCH ACTIVITIES

Principal Investigator: Sociological Analysis - Forest Planning Process
(USDA - U.S. Forest Service).

Principal Investigator: Minnesota Motor Vehicle Visitors Survey, Summer,
1978. (Minn.-DNR).

Principal Investigator: Minnesota Peat Lands Policy Development --
Peat Lands Goals, Policy and Preliminary Social Impact Assessment.
(Minn-DNR).

Co-Investigator - Land Use and Attitudes Survey of the North Shore.
Center for Urban and Regional Affairs, University of Minnesota, Minneapolis.

Governor's Office of State of Minnesota. Service Integration Project:
Office of Program Development.

Co-Investigator - Voyageur National Park Perimeter Study. Minnesota
State Planning Agency and the Arrowhead Regional Development Commission.

Co-Investigator - Duluth Transient Housing Study. Center for Urban and
Regional Affairs, University of Minnesota, Minneapolis, and the Duluth
City Planning Department.

Director for the University of Minnesota, Duluth, Human Resources
Planning Coalition Evaluation Project.

Director of Research and Evaluation for the University of Minnesota,
Duluth, Model City Project.

CONSULTANTSHIPS, LECTURESHIPS AND EDITORIAL WORK

Research Consultant for the Development of the Proposal for the
Evaluation Clinic for Multiple Handicapped Children. Miller-Dwan
Hospital and Medical Center, Duluth, Minnesota. 1970.

Training leader for a Citizens Evaluation Training Session for
St. Paul, Minnesota Model Cities Program. 1971.

Training leader for Carlton City Council on Planning and Zoning. 1975.

Beck and Associates. Community Corrections Management Information
System. 1976-1977.

Chapman College: Residence Education Center. MBA Program. Taught
"Complex Organization" at the graduate level at the Duluth Air Base.

POST DOCTORATE EDUCATION

Attended Evaluation Training Institutes conducted under the auspices
of the U.S. Department of Housing and Urban Development:
    (1) Evaluation on the Model Cities Program, Columbia, Maryland, 1971;
    (2) Conducting Evaluations, Washington, D.C., 1972;
    (3) Impact Evaluations on the Model Cities Program, Santa Fe,
        New Mexico, 1972.

Attended Land Use Training, "Training of Trainees," August, 1974.
Sponsored by State Planning Office of Local and Urban Affairs and
the Center for the Study of Local Government, St. John's University.

Attended Rural Development Leadership Conference, February, 1975.
Sponsored by Governor's Rural Development Council.

Participant, N.S.F. Chautauqua Type Short Course--Public Policy Analysis,
University of Wisconsin, 1974-75.

Participant, N.S.F. Chautauqua Type Short Course--Social Impact Assessment,
Duke University, 1975-76.

Selected by ORAU and ERDA to attend a Summer Faculty Institute, "Energy
Production and the Social Sciences" presented by the Special Training
Division of Oak Ridge Associated Universities and sponsored by U.S.
Energy Research and Development Administration. Oak Ridge, Tennessee.
July, 1976.