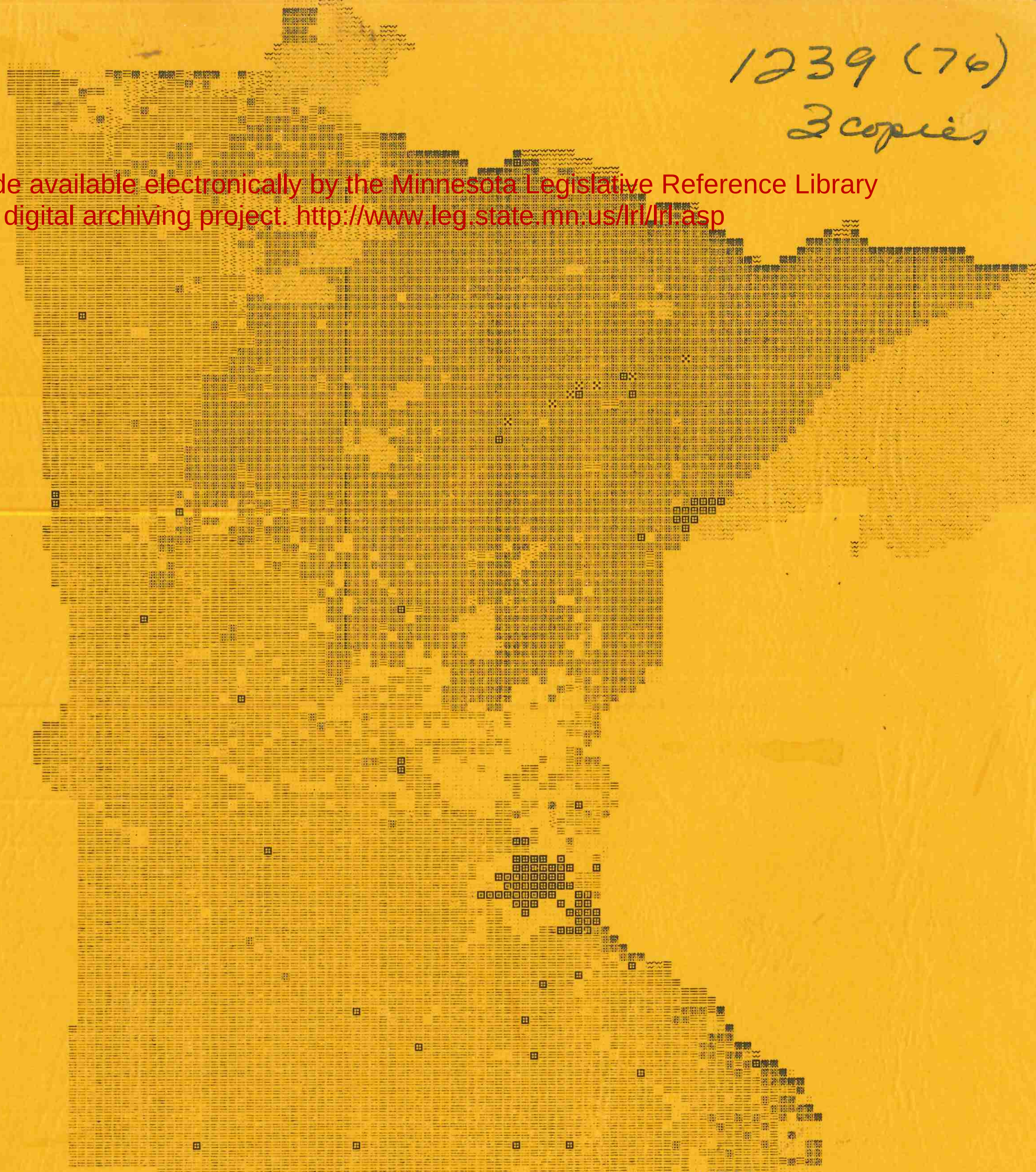



# MLMIS



# MINNESOTA LAND MANAGEMENT INFORMATION SYSTEM

# UNIVERSITY OF MINNESOTA
# CENTER FOR URBAN AND REGIONAL AFFAIRS

## STATE PLANNING AGENCY

# OVERVIEW OF THE MINNESOTA LAND MANAGMENT INFORMATION SYSTEM



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# TABLE OF CONTENTS

# OVERVIEW OF THE MINNESOTA LAND MANAGEMENT INFORMATION SYSTEM

## I. INTRODUCTION

### Need for an Information System

If current development trends continue, various land uses will compete more intensively for the state's 54 million acres. Urban uses will continue to expand into rural areas. Transmission lines, pipe lines and highways will crisscross the landscape. An increased need for iron, copper and nickel ore may decrease the base of forest and recreation land. The pressures to drain wetlands, develop lakeshore and use surface and ground water will mount. More people will require more food to be produced on fewer acres of farmland. These are but a few of the issues that will require decisions about the future use and allocation of land in Minnesota.

A major obstacle to solving these problems is that government programs at various levels in the state operate without the benefit of an overall statewide perspective of our total resource. A private developer's proposal to use a certain site in a certain manner is difficult to assess without having some idea of the comparative quality and distribution of other sites that may be suitable for that same use. For example, if the state is to design programs and policies to prevent development from encroaching on prime agricultural land, it must first determine what prime land is, where it is found, and how much there is. The State must also know the location and quality of alternative sites that might be suited to the development types that encroach on agricultural land.

Virtually all of the persons involved in the utilization of land (developers, planners, regulators, etc) evaluate the same basic criteria of that land - accessibility of location and suitability of the site. If they use the same criteria, they must need the same information - information on site quality (e.g. soil, topography, current use, ownership) and location (accessibility to population, jobs and markets).

Much of the social, economic and physical resource data necessary to support land use decisions is already routinely collected by various public agencies that deal with particular sectors of the state's total resource. Unfortunately, after its initial use by the collecting agency, much of the information is often tucked away in obscure files. Others that could make use of it may be forced to collect it again, sometimes at public expense, because they do not know that the data exist, because it is not readily available or because it is not in a format that is useful.

This information needs to be collected, organized and analyzed in a systematic manner so all can use it. While manual files could be kept, this would require a major staff effort to keep tabs on all available information. The efficient data handling capabilities of the computer make it a more attractive alternative.

## Background of MLMIS

To ensure that future land use and resource proposals meet the needs of the public and that public policies are created to support these plans, the State Planning Agency and the University of Minnesota's Center for Urban and Regional Affairs (CURA) have begun developing a computerized resource information system for the State of Minnesota. The system is called the Minnesota Land Management Information System (MLMIS) and is housed at the University of Minnesota Computer Center.

The primary goal of this project is to improve the quality of public decisions regarding land use. The project is contributing to this goal with the development of a data base that contains information on physical resources, relative accessibility to market of these resources, and information on current land use, zoning, and ownership patterns. MLMIS hopes to expedite public policy formulation and decision making by developing maps and supporting data that indicate the relative suitability and priority of land for various types of development or preservation. This research process is being carried out in close consultation with public officials.

During the past several years of research and development, the MLMIS has been used to produce various products and to successfully solve a number of land and/or resource related problems. The first major product of MLMIS was a wall map of the state produced in 1971. This was the first time that the land use patterns of Minnesota had ever been accurately displayed on one map. The analytical capabilities developed for MLMIS have been successfully used to solve a number of problems on small scale sites throughout the state.

In 1973, funds were appropriated to begin systematically entering information on a statewide basis. Then a number of technical problems were encountered - problems in developing a geographic reference scheme, analyzing data, and accurately mapping output for extremely large areas. It became apparent that the functional component of the system - the programming - had to be redesigned. The period of 1974-1975 was devoted to this task.

The current work program of MLMIS has two major components, consistent with the two essential ingredients of an information system:

1. Completion of the information base, by region, for the entire state along with manuals that document the data and the systems analytical capabilities.

2. A series of research applications to demonstrate the usefulness of an information system for assessing actual land use problems.

The Arrowhead Region was selected as one pilot study area where various methods of coding, entering and analyzing data could be tried and evaluated. Another pilot project was a state-wide assessment of agricultural patterns, utilizing a different data base and different data handling techniques.

## Funding Sources

Funding for MLMIS has come from a variety of agencies and users. The major contributors to the development of the system are outlined below. Specific users of the system such as the Department of Natural Resources or Northern States Power Company have not been listed because their contracts called for specific services from MLMIS. They have, nonetheless, contributed to the system, in that any data prepared for analysis has become a permanent part of the data base:

### 1969-71 Biennium

| | |
|---|---|
| Minnesota Resources Commission* | $50,600 |
| State Planning Agency | $50,000 |
| SPA/Upper Great Lakes Regional Commission | $95,000 |
| Land Exchange Review Board | $10,000 |
| | $205,600 |

### 1971-73 Biennium

| | |
|---|---|
| Information Resources Development Fund (Department of Administration) | $121,100 |
| State Planning Agnecy | $35,000 |
| Rockefeller Foundation | $54,200 |
| | $210,300 |

*Now Legislative Commission on Minnesota Resources

1973-75 Biennium

| | |
|---|---|
| Information Resources Development Fund | $129,200 |
| State Planning Agency | $151,400 |
| Rockefeller Foundation | $45,800 |
| | $326,400 |

1975-77 Biennium

| | FY'76 | FY'77* | Total* |
|---|---|---|---|
| Information Resources Development Fund | $69,500 | $52,800 | $122,300 |
| State Planning Agency | $192,600 | $178,700 | $371,300 |
| Center for Urban and Regional Affairs (U of M) | $30,600 | $35,000 | $65,600 |
| | $292,700 | $266,500 | $559,200 |

# II. ELEMENTS OF THE INFORMATION SYSTEM

Format

MLMIS has been designed to perform a library function, for cataloging and housing selected portions of the information collected from various sources, and a delivery function, for making this information rapidly available to a variety of users throughout the state. But this is not the real strength of the system. The real strength and long range benefit of the system is that it facilitates analysis of large quantities of information in a geographic reference system for assessing relative location - i.e. computer mapping.

MLMIS utilizes a "data cell" technique for entering information into the computer. A data cell is simply a unit of fixed dimensions that can be geographically located on the ground. In the main data base of this system, a data cell represents a 40 acre parcel. This unit was adopted because it is the smallest consistent unit in the U.S. Public Land Survey, the survey system used for most land in the central and western United States The 40 acre parcel is used for many governmental records in Minnesota at the county, regional, state and federal levels. Finally, the size of the 40 acre unit is a convenient scale for the computer mapping and analysis of data at the regional scale.

*Estimates

There are approximately 1.36 million 40 acre parcels in the State of Minnesota. This large number of cells makes state wide analysis somewhat cumbersome, so another data file was developed where a data cell represents approximately one-quarter of a township. The location of a cell is based upon a Universal Transverse Mercator projection. These are approximately 9,000 cells in the statewide quarter township file.

The area represented by a data cell can be varied to fit virtually any size for which representative data exists. A cell size of 2 1/2 acres has been used in many of the large scale site analysis conducted.

## Data Handling Procedures

A statewide information system is not developed quickly. It requires careful planning and cooperation from many sources. Certain steps must be taken before data can be retrieved and analyzed. These are:

A. Data collection
B. Data coding
C. Data entry into the computer
D. Data output and error checking

Inherent in all of the steps are the programs that must be written to make the computer perform the desired routines.

### A. Data Collection

Data is collected from a wide variety of sources. These include federal, state, and local government agencies, the University of Minnesota, and others. In the 40 acre data base 19 seperate elements of information are collected and computerized. Each of these elements is termed a "data variable". Table 1 lists these variables as V01 through V19. Various other data elements can be coded as needed for specific studies or for specific areas.

### B. Data Coding

There are a number of different categories that describe each data variable. Each category must be given a code for storage in the computer. For instance, the descriptive categories of forest cover (V17 in Table 1) and the corresponding codes for each category are:

0 Non-Forested (MLMIS Land Use - 1969)
1 White, Red, or Jack Pine
2 Spruce-Fir
(continued)

3 Oak-Hickory
4 Elm-Ash-Cottonwood
5 Maple-Birch-Basswood
6 Aspen-Birch
7 Unproductive
8 Reserved
9 Non-Forested (U.S. Forest Survey)

Data that is collected by public agencies in map or photo form must be converted to reference the appropriate grid cell. A transparent overlay on which a grid pattern has been drafted is laid over the map or photo. The category of the data element that occurs within each grid cell is recorded on a coding form. For instance, if aspen-birch vegetation is located within a particular data cell, the number 6 is recorded in the appropriate spot on the coding form. If more than one tree species occurs within the cell, the dominant type is recorded.

C. Data Entry and Error Check

After coding is completed, the code number for each cell in the study area is punched on computer cards. After a data element has been punched for each cell in the study area, the cards are fed into a card reader (a machine that reads the punched numbers on each card) that electronically transfers the information into a file for storage on computer tapes or disks.

Through the use of computer programs, the data can now be retrieved both in tabular and map form. Before reliable analyses can be conducted, however, the data must be checked for possible errors made in the data handling process. Error checking presents a sizeable task, as it involves a complete review of the coding process.

A schematic diagram of the coding and data entry process is shown in Figure 1. The diagram also shows the production of data output maps from the computerized data files.

## System Capabilities

Access to the Minnesota Land Management Information System's data bank depends on several computer programs. Each program allows the user to manipulate, analyze and dispaly data in different ways. The user can choose specific programs that yield the most suitable information for a defined problem.

The major advantages of this system are the ability to simultaneously analyze many variables for large areas and the ability

TABLE 1: Computerized Data Elements

| | DATA ELEMENTS | RELIABILITY (ACRES) | DESCRIPTION | SOURCE & DATE |
|---|---|---|---|---|
| V01 | Site | 40 | The total area being studies. May be any size. | - |
| V02 | Township | 40 | Distribution of legal townships (6 mi. x 6 mi.) study area | General Land Office Public Land Survey 1974 |
| V03 | Minor Civil Division | 40 | Organized townships and incorporated municipalities | U.S. Census Bureau 1970 |
| V04 | School District | 40 | Boundary of each school district | Atlas of Minnesota School Districts 1970 |
| V05 | Public Ownership | 40 | Federal, State and County owned land by administering agency | Land Records of Public Agencies |
| V06 | Type of Acquisition Public Land | 40 | Manner in which public land was acquired | Minnesota Department Natural Resources (DNR) Land Classif-ication Program 1973 |
| V07 | Recommended Best Use | 40 | Recommended use of state and county owned lands | DNR Land Classification Program 1973 |
| V08 | Recommended Disposition | 40 | Recommended disposi-tion of state and county land | DNR Land Classification Program 1973 |
| V09 | Management Unit | 40 | Indicates if state or county land is in a management unit | DNR Land Classification Program 1973 |

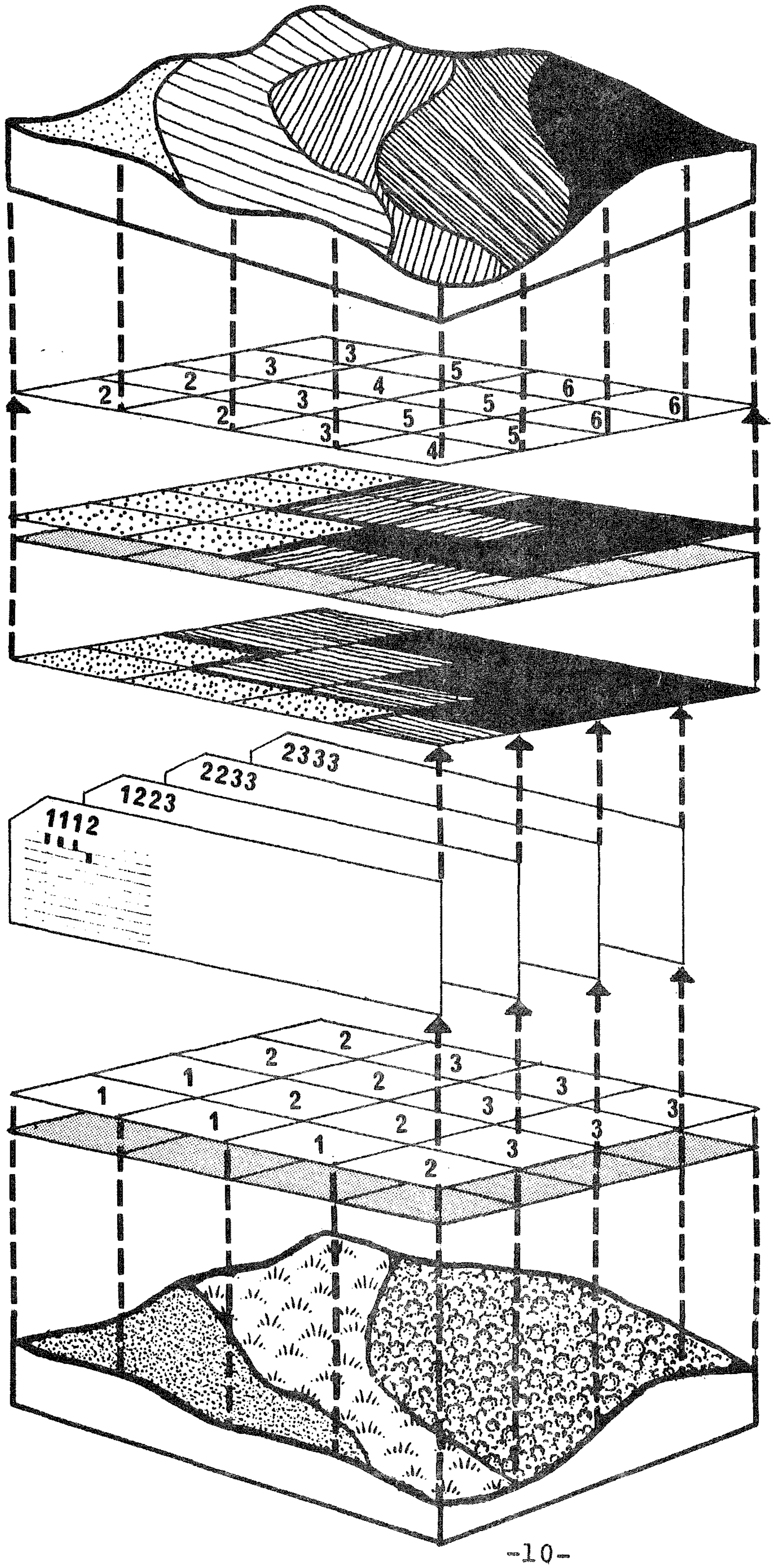
TABLE 1: Computerized Data Elements (continued)

| | DATA ELEMENTS | RELIABILITY (ACRES) | DESCRIPTION | SOURCE & DATE |
|---|---|---|---|---|
| V10 | County Zoning Class | 40 | Land use categories in county zoning ordinance | County Zoning Ordinance 1973 |
| V11 | Bedrock Geology | 40 | Bedrock type under land surface | MN Geological Survey (MGS) U of M 1974 |
| V12 | Mineral Potential | 160 | The technical and economic potential of mining a particular mineral resource | DNR Records |
| V13 | Copper Nickel Leases | 40 | Leases on state and federal land | DNR Records 1974 |
| V14 | Soil Landscape Unit | 640 | Generalized soil texture, drainage characteristics, and color | Agriculture Experiment Station, U of M 1971 |
| | Includes ratings of soils types for crop production, urban residential construction, flooding problems, septic tank limitations, ground water contamination potential, etc. | | | U of M Soil Science Dept. Soil Cons. Service |
| V15 | Arrowhead Regional Soil Survey Soil Associations | 40 | Intermediate detail survey based on soil characteristics | U.S. Dept. of Agriculture Soil Cons. Service 1973 |
| | Includes ratings similar to V14 | | | U of M Soil Science Dept. Soil Cons. Service |

TABLE 1: Computerized Data Elements (continued)

| | DATA ELEMENTS | RELIABILITY (ACRES) | DESCRIPTION | SOURCE & DATE |
|---|---|---|---|---|
| V16 | Land Use | 40 | Dominant land use by 40 acre parcel | U of M CURA, State Planning Agency 1969 |
| V17 | Forest Cover | 160 | Type of tree species | U.S. Forest Service 1962 |
| V18 | Water Orientation | 40 | Type of water feature that adjoins a 40 acre parcel | U.S. Geological Survey Topographic Maps |
| V19 | Highway Orientation | 40 | Type of road and intersection adjoining a 40 acre parcel | MN Highway Dept. County Highway Maps |

# Fig. I: Data Coding and Entry




8. RESULTANT LAND PATTERN

Site capacities from analysis maps can be easily visualized using a gradation of tones from dark to light.

7. ANALYSIS MAP

As the data is combined, descriptions of the site's capacity can be determined, mapped, and quantified. The diagram shows a hypothetical case of timber productivity with "6" showing high timber productivity and "2" showing low productivity.

6. OTHER DATA MAPS

Information on many resource variables is known for each grid cell and each is stored as a separate data file.

5. COMPUTER DATA DISPLAY MAP

Data can be displayed on computer printed maps as symbols or grey tones.

4. COMPUTER CARDS

Coded data is keypunched onto computer cards. Positions on computer cards correspond to those on the coding sheets.

3. DATA CODING

The coding process involves the determination of the predominant resource class within each grid cell and recording it with a numerical symbol. The example in the diagram shows: 1 = grassland; 2 = marsh; and 3 = forest.

2. GRID

The scale of the base map and the size of the grid cell are established according to the detail of the data available, and the detail of desired results. Thus, cell size could range from one acre to one square mile.

1. SITE

A site is composed of many natural land features including soil, water, and vegetation. Each of these is identified and recorded on a base map.

to map the results. This capability is much larger than other similar systems around the country and is limited only by computer costs and problems of physically handling the printed maps. The mapping capability is a very necessary and important feature of a land use information system. Mapping converts data into geographical patterns, it allows for the consideration of relative location - the relationship of one land parcel to others surrounding it - in determing land use suitability.

The controlling computer programs for MLMIS are called Environmental Planning Programming Language (EPPL). EPPL was developed by students at the University of Minnesota under contract with the Center for Urban and Regional Affairs. Specific EPPL manipulation and analysis functions incorporated into MLMIS include:

1. Frequency counts of the distribution of parcels among the various categories for any data element.

2. Crosstabulation - testing how frequently data categories occur simultaneously in the same parcel (up to three data elements can be crosstabulated at the same time).

3. Creation of a new data element by combing or modifying categories from an existing element.

4. Creation of a significant "site type" or site composite using a logical statement (such as a decision tree) describing the desired combination of up to eight data elements.

5. Numerical weighting and scoring of a parcel's resource components to evaluate site suitability.

6. Evaluation of the visibility of land areas from selected observer points, considering topographic elevation and vegetative cover.

7. Location of boundaries or edges between dissimilar areas (such as shorelines) or isolating parcels within stated distances from selected features (such as roads).

These functions can be used sequentially in the same run to systematically solve stated planning objectives. With the necessary data in the computer, the user can specify a series of these operations to seek out relationships or combinations of the data. These resource requirements can then be developed into criteria for selecting sites for various land uses.

## III. MLMIS RESEARCH ACTIVITIES

Producing individual resource summaries over large areas with frequency counts and maps is one of the most frequent tasks of MLMIS. Simply knowing the pattern and amount of various resource combinations is important in assessing the regional impact of many sepcific land use proposals. Tables 2 and 3 itemize the types of studies that have utilized MLMIS programs for resource analyses. Figure 2 and 3 show the extent and location of the individual study areas. As Tables 2 and 3 indicate, many groups, including government agencies, university studies and private companies, have become active users of the system.

MLMIS has also conducted several research demonstrations internally, funded by the State Planning Agency and by the Center for Urban and Regional Affairs. The demonstrations are intended to illustrate the system's analytic capabilities and the value of the current data base. The focus of the MLMIS research effort is on use of the system to shed light on broad problems of allocating land among competing uses. Land allocation problems involve a determination of the suitability of the land in question for various uses. The suitability of any parcel of land for a specific use is open to varying interpretations by resource managers, depending upon the values assigned to individual characteristics by each resource manager. Resource managers, for example, may differ on the relative importance of soil productivity as compared to existing tree cover in the determination of suitability of parcels for commercial forestry. If so, such varying perceptions can be accommodated by the analytic processes developed for the system.

The general process employed here is essentially composed of three steps:

1. Combination of Data Categories

   Often, research purposes require that the categories of a variable be combined or reduced in number. A computer programming operation called category conversion makes this possible. Combination of categories makes variables more useable for specific research purposes.

   Suppose, for a particular study, it is only necessary to determine the visual quality of trees and not the specific tree species. The data element Forest Cover is composed of ten categories. The categories of this data element can be combined and simplified in the following manner:

TABLE 2

LAND USE PLANNING CASE STUDIES - REGIONAL SCALE

| REF. NO. | PROJECT AUTHOR | FUNDING SPONSOR | NAME | AREA (SQ.MI.) | FUNCTION |
|---|---|---|---|---|---|
| R-3 | MLMIS | S.P.A. | Region III | 20,000 | Suitability |
| M-1 | Consultants | Metropolitan Council | Natural Resource Protection Study | 450 | Development Controls |
| U-1 | UM-CURA MGS, SCS, MPCA, Met. Coun. | Washington Co. Ramsey Co. | Washington Co. Solid Waste | 500 | Facility Siting |
| U-2 | UM-Landscape Arch. Dept. | U.M. | Washington Co. | 500 | Comprehensive Planning |
| P-1 | NSP-EGAD & MLMIS | NSP-MP&L | Manitoba East Transmission Line | 19,000 | Corridor Routing |
| M-2 | CURA/MLMIS | Metro. Waste Control Comm. | Chemical Waste Landfill Site Selection Study | 3,000 | Facility Siting |
| H-1 | UM CURA, MGS, SCS, MPCA, Met. Council | Hennepin Cty. Public Works | Hennepin County Solid Wast | 625 | Facility Siting |
| R-4 | SPA/DNR/MHD/ MLMIS | State of MN | Coastal Zone | 2,500 | Comprehensive Planning |
| R-5 | MLMIS | SPA | Roseau County | 1,700 | Agricultural Assessment |
| R-6 | MLMIS | SPA | Fine Lake Power Plant Site | 950 | Power Plant Siting |
| R-7 | Aitkin Cty./ ARDC | Aitkin Cty. | Drainage Ditch Assessment | 2,000 | Environmental Assessment |
| R-8 | Agriculture & Applied Econ. & Ag. Ext. | Title V Land Use | Region 6E<br>Region 6W | 2,900<br>3,300 | Regional Planning Pilot |

FIGURE 2: Regional Scale Case Studies

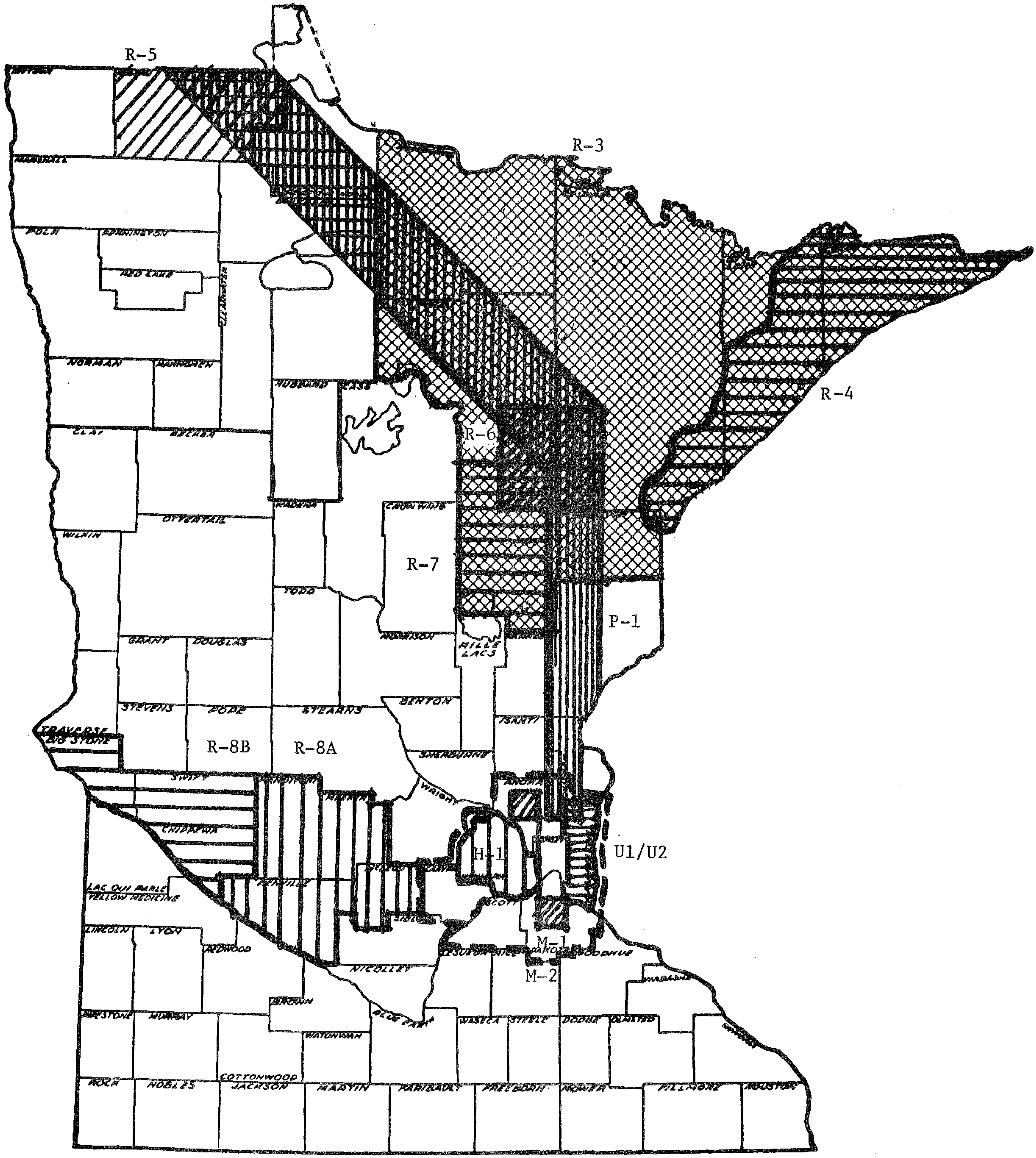


TABLE 3

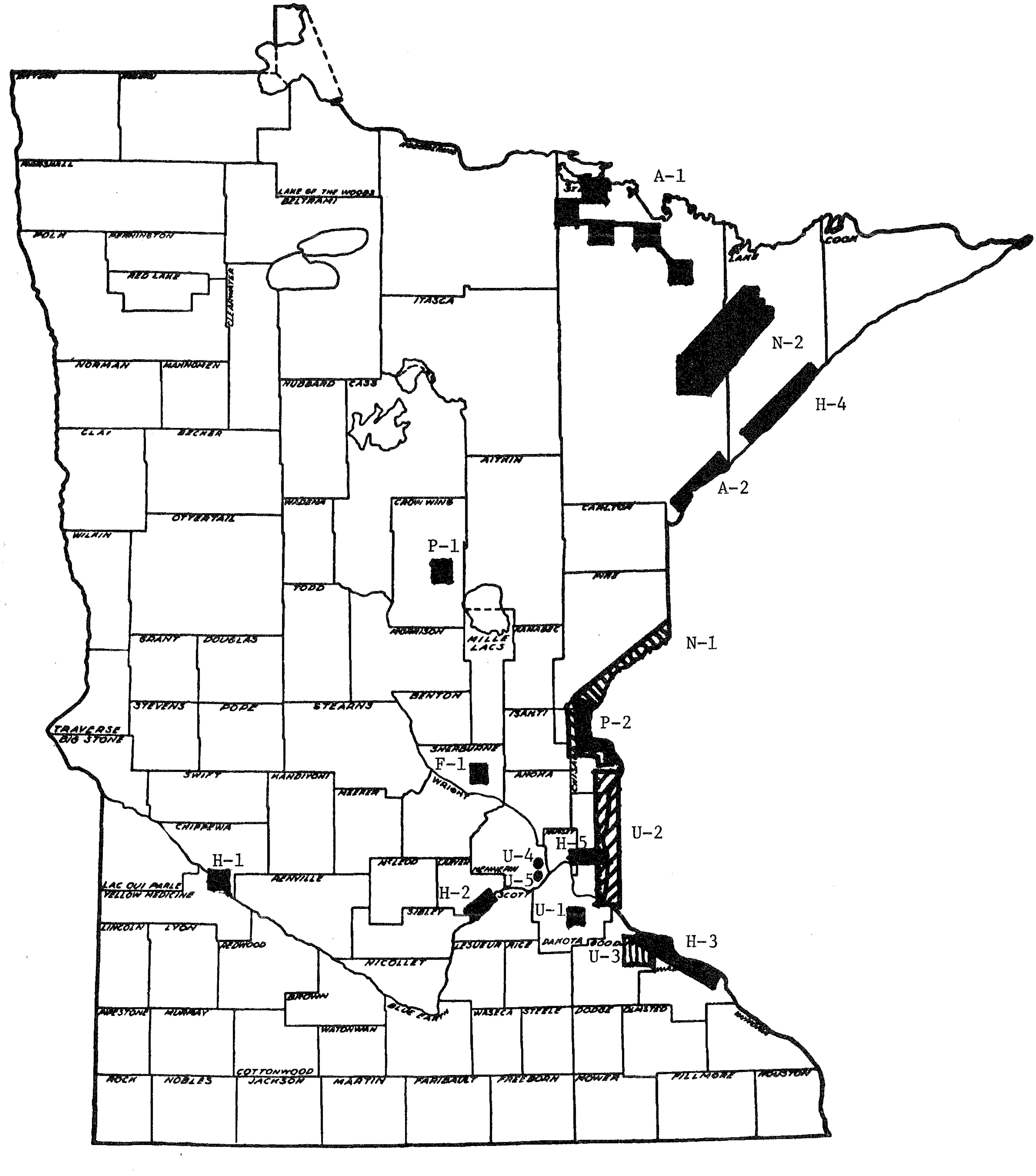
LAND USE PLANNING CASE STUDIES - SITE SCALE

| REF. NO. | PROJECT AUTHOR | FUNDING SPONSOR | NAME | AREA (SQ.MI.) | FUNCTION | TYPE |
|---|---|---|---|---|---|---|
| H-1 | M.H.D. | M.H.D. | Granite Falls | 32 | Highway Alignment | 1,2 |
| H-2 | M.H.D. | M.H.D. | Chaska | 11 | Highway Alignment | 1,2 |
| H-3 | M.H.D. | M.H.D. | Red Wing-Wabasha | 340 | Highway Alignment | 1,2 |
| H-4 | M.H.D. C.U.R.A. | M.H.D. | North Shore | 260 | Highway Corridor | 1,2 |
| H-5 | M.H.D. | M.H.D. | I-94 Corridor | 85 | Highway Corridor | 1,2 |
| N-1 | D.N.R. | D.N.R. | Upper St. Croix | 200 | Park-Forest Plan | 2,4 |
| N-2 | D.N.R. C.U.R.A. | D.N.R. | Mine Land Use | 586 | Mining Controls | 1,2 |
| P-1 | C.U.R.A. M.R.C. | S.P.A. | Blackbear | 44 | Forest Plan | 2,4 |
| P-2 | C.U.R.A. M.R.C. | S.P.A. | Sunrise | 52 | Park Plan | 2,4 |
| U-1 | U. of M. Land. Arch. | None | Land Use Phototype Study | 36 | Township Plan | 1,2 |
| U-2 | C.U.R.A. League of Women Voters | MN-WI Boundary Area Comission | Lower St. Croix | 200 | Scenic Corridor | 2,3 |
| A-1 | A.R.D.C. Staff | A.R.D.C. | Voyageuers Perimeter Study | 400 | Development Controls | 1,3 |
| A-2 | A.R.D.C. Staff | A.R.D.C. | Northshore Coastal Zone Pilot Study | 58 | Development Controls | 1,3 |
| A-3 | A.R.D.C. Staff | A.R.D.C. | Areawide Study - Coastal Zone | 430 | Development Controls | 1,3 |
| A-4 | Duluth Planning | Duluth Planning | Duluth Open Space | 200 | Open Space Study | 1,4 |
| U-3 | U. of M. Land. Arch. | U. of M. | Red Wing | 30 | Comprehensive Study | 1,2 |
| U-4 | David Steen (Student) | U. of M. Land. Arch. | Whittier Neighborhood - Mpls. | 1 | Open Space Planning | 1,4 |
| U-5 | John Swanson (Student) | U. of M. Land. Arch. | Mpls.-C.B.D. | 3.3 | Urban Planning | 1,2 |
| F-1 | Consul-tants | U.S. Fish & Wildlife Service | Sherburne National Wildlife Refuge | 47 | Master Plan | 2,4 |

TYPE

1. Environmental (Growth) Policy
2. Environmental Impact Study
3. Critical Areas
4. Master Planning

FIGURE 3: Site Scale Case Studies



| Primary Categories | | Combined Categories |
|---|---|---|
| 1 | White, Red, or Jack Pine | CONIFEROUS |
| 2 | Spruce-Fir | |
| 3 | Oak-Hickory | DARK BARK |
| 4 | Elm-Ash-Cottonwood | |
| 5 | Maple-Birch-Basswood | |
| 6 | Aspen-Birch | LIGHT BARK |
| 0 | Non-Forested (MLMIS Land Use-1969) | NON-FORESTED, UNPRODUCTIVE |
| 7 | Unproductive | |
| 8 | Reserved | |
| 9 | Non-Forested (U.S. Forest) | |

2. Production of Composite Maps

   Suitability analysis requires the combining of two or more variables into composite maps. These maps can be used to show the combined resource and location characteristics of each parcel in the study area. Once the appropriate resource combinations are mapped relative weights or ranks can be assigned to determine which parcels are more suitable than others for a specific land use. Because of the diverse skills needed, this step is conducted within an interdisciplinary group to insure a variety of points of view.

3. Productions of Potential Conflict Maps

   Once composite maps have been developed for two or more land uses, a conflict analysis can be conducted to see where, under the given assumptions, land parcels may be suitable for more than one use (signalling a potential land use conflict).

The pilot study area for this analysis was the Arrowhead Region. Experimental suitability maps were prepared for the following land use categories:

Seasonal Residential Development
Permanent Residential Development
Commercial Forestry
Copper-Nickel Mining
Peat Harvesting
Recreation Open Space
Preservation Open Space

These maps provided a starting point for discussions with local and regional planners for refining the analysis process and for displaying the capabilities of MLMIS to those persons actively involved in planning and resource management programs.

The same analysis process was coupled with the statewide quarter township data file to conduct the study of Statewide Agricultural Patterns. This study was intended to display the utility of MLMIS for mapping and quantifying resource utilization patterns of state concern and for lending valuable data to policy decision makers in deciding what course if any, an appropriate state body should take in protecting the resources of Minnesota.

## IV. THE FUTURE OF MLMIS

### Goal

The overall goal is to establish MLMIS as an information service bureau within state government with information and analytical services available on a contract basis with interested parties. The target user group will be state agencies, regional development commissions and county planning agencies.

Example of services might include:

a) Operational

- Power plant siting and transmission line routing studies
- Critical areas inventory
- DNR land classification program
- Regional development commission land use planning programs
- Metropolitan Council development framework implementation

b) Demonstrations

- Statewide land suitability analyses for selected land uses
- Application of an information system for developing land use controls in conformance to regional plans
- Special studies; e.g. copper-nickel mining impacts and locational impact of hazardous wast disposal sites

### Funding Needs

The recommended approach to funding the proposed information bureau is to cover staff salaries, administrative expenses, and computer costs for maintaining the system through a legislative appropriation (state agency budget line item). Direct costs of services can be covered by a user-fee system to cover all out-of-pocket expenses associated with a particular project. The target date for implementing the information system service bureau is the beginning of the 1977-79 biennium.

a) Cost of Maintaining the System (1977-79 biennium)

| | |
|---|---|
| Staff Salaries | $412,800 |
| Computer Costs | $72,000 |
| Travel and Supplies | $20,000 |
| Overhead | $36,000 |
| | $540,800 |

b) User Costs

Fees will be established to cover the costs of data collection, entry, output, analysis, and documentation for those who want specific products, and to provide data, advice, and training for those who wish to be active users of the system.

Format

Current plans call for the installation of MLMIS as a bueau within the Minnesota State Planning Agency. To insure active participation by other state and local agencies, a user committee, composed of current and potential users, will be established to form user by laws, user fee schedules, policies for developing standards for updating existing data and for adding new data elements to the system, and for identifying new analytic capabilities for inclusion in the system.