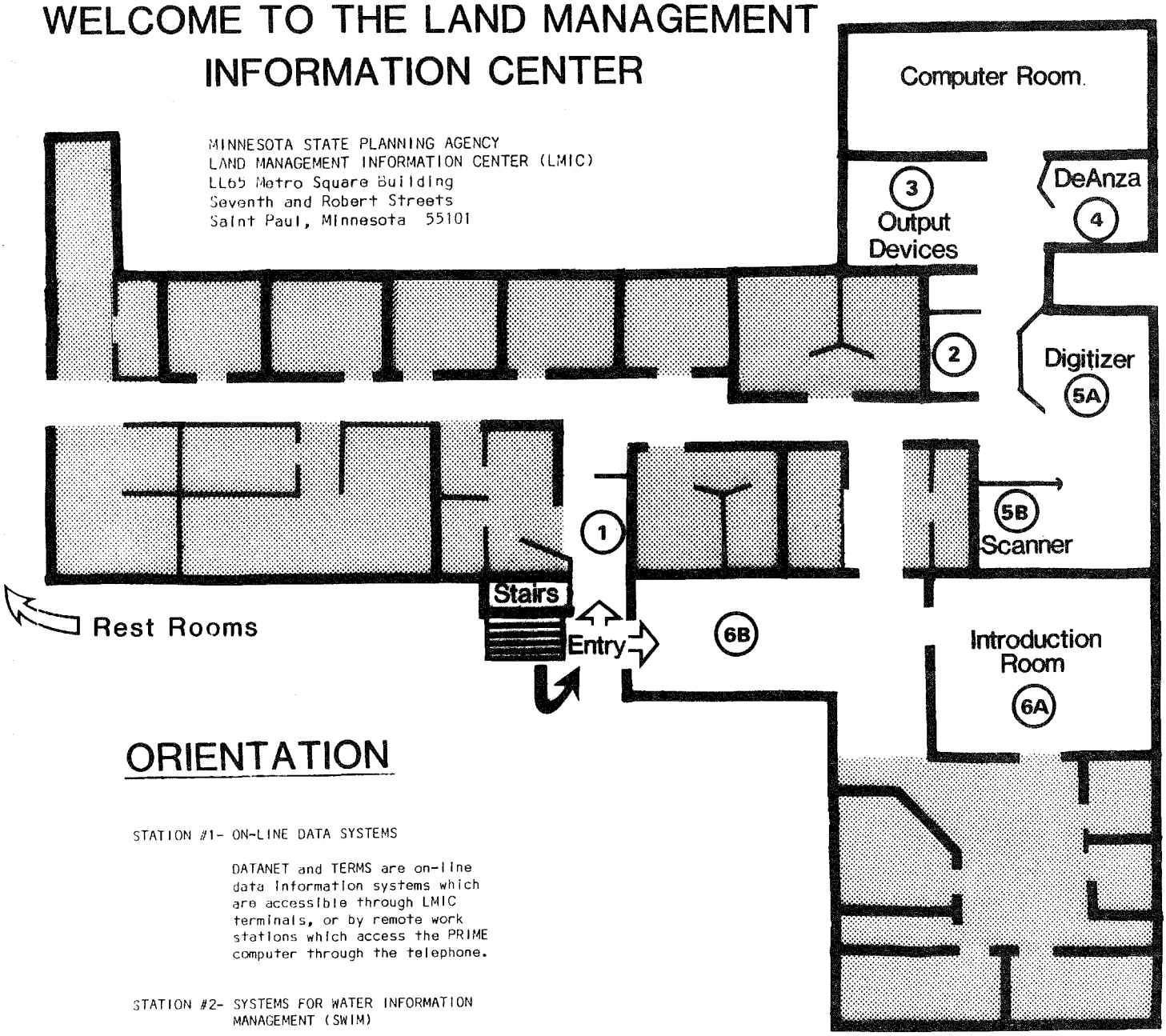
MINNESOTA

LAND MANAGEMENT INFORMATION CENTER

STATE PLANNING AGENCY
LL65 Metro Square Building
Seventh and Robert Streets
St. Paul, Minnesota 55101

WELCOME TO THE LAND MANAGEMENT INFORMATION CENTER

MINNESOTA STATE PLANNING AGENCY
LAND MANAGEMENT INFORMATION CENTER (LMIC)
LL65 Metro Square Building
Seventh and Robert Streets
Saint Paul, Minnesota 55101



ORIENTATION

STATION #1- ON-LINE DATA SYSTEMS

DATANET and TERMS are on-line data information systems which are accessible through LMIC terminals, or by remote work stations which access the PRIME computer through the telephone.

STATION #2- SYSTEMS FOR WATER INFORMATION MANAGEMENT (SWIM)

SWIM provides the communication function so water management information systems in Minnesota have consistent data and are compatible.

STATION #3- COMPUTER SYSTEM AND OUTPUT DEVICES

The computer room houses the PRIME 850 super-mini computer and the tape and disc storage devices. Hardcopy output devices include a printer, a pen plotter, and an electrostatic plotter.

STATION #4- IMAGE PROCESSING

The DeAnza Image Array Processor interprets and displays data for analysis on a high resolution color monitor. Presentation graphics (mostly color slides) are made here.

STATION #5A DIGITIZING STATION

The capture of point, line and polygon data is done manually at this station.

STATION #5B SCANNING STATION

Information is scanned with a camera to capture lines from a map for storage on the computer. This system is much faster, but more limited, than digitizing.

STATION #6A HORIZONS

Slides will be shown from the 1983 Minnesota Horizons Report. The process from initial research to slide and book production will be described.

STATION #6B LMIC DATA DISPLAYS

This exhibit displays various products of the Land Management Information Center for examination.

Please sign our guest book in the Introduction Room.

INTRODUCTION TO THE LAND MANAGEMENT INFORMATION CENTER (LMIC)

Prepared for the American

Planning Association

Conference held in Minneapolis

May 1984

INTRODUCTION

The Land Management Information Center (LMIC) is a service bureau that provides land managers throughout the state with computer-based data analysis and display of natural resource, cultural, and political boundary information.

LMIC maintains the Minnesota Land Management Information System (MLMIS), a geographically-based resource information system that is used to map and analyze environmental data (soils, geology, hydrologic features, forest cover, for example) as well as cultural data (land use, highways, census data, political jurisdictions, for example). The majority of statewide information is stored by 40-acre parcel, with more detailed information available for special study areas. In addition, point, line, and polygon data such as rivers, lake boundaries, and census tracts are also stored in the MLMIS.

Minnesota is 84,000 square miles in area. There is a diversity of natural resources - forests, croplands, and minerals. Although Minnesota does not have a high degree of urban and industrial pressures, Minnesota's information system is used to properly manage resource production as well as protect environmental quality.

DEVELOPMENT HISTORY

The system was developed at the University of Minnesota. During this period from 1967 to 1977 the initial pilot study was conducted, the data base was developed, and case study projects were completed. This was a period of early computer hardware development and the system grew as technology advanced.

In 1977 the system was transfered to the state government to function as a service bureau. The data base and computer programs were at an operational level for natural resource planning projects. The office is the Land Management Information Center in the State Planning Agency.

The development of the system has been slow and deliberate with early funding at a small level. This can be considered an "evolutionary" as compared to "grand design" approach to system development.

The pattern of funding has been steadily increasing:

General appropriations from the Minnesota Legislature which currently supports permanent staff of eleven has increased slightly and has leveled off.

Research funding, from the Legislative Commission on Minnesota Resources, including computer equipment acquisition and a current system development staff of seven has increased substantially after the initial success of the system had been demonstrated.

Fees from clients who request products and services have increased substantially following the general acceptance of the system and establishment of a computer center.

CURRENT ACTIVITY

The Service Bureau role is that of a clearinghouse between data sources and data users. This is the same approach used for individual planning projects - but expanded into a comprehensive system, including:

Geographic coverage of the entire state.

General application of the system for many natural resource planning projects.

A "common pool" of data provided by sources on a continuous basis.

A broad range of information services and products.

The data is provided and maintained by source agencies at the state, federal, and local levels. Efforts are made to coordinate their collection procedures. The users are the research, planning, and management units within government agencies. Users can access this data bank or purchase information that provides objective data and technical services.

The Service Bureau offers comprehensive information services to potential users. It is, in effect, a "marketplace" where users can obtain information products as they need to conduct their planning studies:

The data bank continues to expand as new needs are identified by users.

Users can contribute data to the system and use digitizing equipment at the Center or access the computer by telephone from their own terminals.

The analysis packages include polygon and grid modeling, data base managers, statistical packages, and a bibliographic retrieval system.

Graphics facilities include polygon and grid display programs, business graphics, and text display; products are generated on either hardcopy printers or video displays, in black/white or color.

The computer maintenance fees are distributed among the users each month on a usage basis.

In addition to the technical facilities the Center has a staff to assist users:

The consultation staff assists users in the design of their projects. This involves matching the needs of the client with the available data, analysis, and graphic capability. These professionals have a "hybrid" resources and systems background to serve as translators between the users and the system.

The computer programming staff continues to maintain and augment the system and also provides systems design advise to users.

Users can request products by paying the cost of production, staff and computer expenses to conduct data entry, analysis, and/or graphics.

The Service Bureau is a resource for other government agencies. It provides unique technical capabilities that are otherwise beyond the staffing and budget limitations of the user agency. The office and the system are operated as a "service enterprise".

Quality of decision-making has been improved through the use of information provided by the Land Management Information Center (LMIC). There has been a greater degree of participation by scientists, elected officials and citizens. Through the use of computer technology it is possible to ask more enlightened questions and develop more responsive answers. In all of this the Service Bureau serves as a clearinghouse and facilitator to translate the needs of clients and the knowledge of specialists. The system is being used by advocates of both development and conservation toward the goal of making more rational and informed decisions. We are continuing to expand the capabilities of the system to meet the future needs of natural resource planning in Minnesota.

LMIC SERVICES

STATE OF MINNESOTA

INFORMATION CLEARINGHOUSE AND SERVICE CENTER

CONTACT LMIC AT (612) 296-1211

Minnesota State Planning Agency
LAND MANAGEMENT INFORMATION CENTER
LL45 Metro Square, 7th and Robert St. Paul MN 55101

ACCESS TO COMPUTER SERVICES AND PRODUCTS

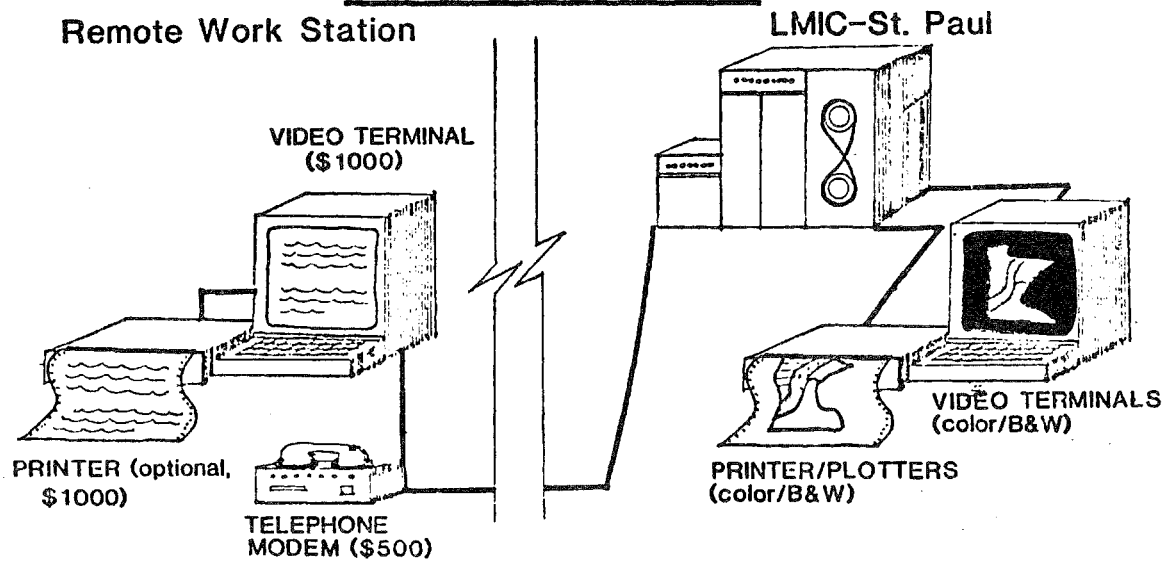
The Land Management Information Center's (LMIC) primary computing and data storage facility, a PRIME 850 computer, is located in downtown St. Paul. Available services include computer-assisted data analysis and mapping and business graphics production.

Users are able to access a wide range of data services by dialing into the LMIC computer from a remote work station. The computing costs for services are minimal and several data retrieval systems can be used by the public at no cost (see DATANET).

A work station consists of a terminal (CRT), a modem (telephone hookup), a printer (optional) and and a telephone. The typical work station involves a minimal investment in equipment ($1000-$2500).

New users can contact LMIC staff for support services in developing remote work stations. The Office of Local Government will also act as a service broker to clients interested in pursuing development of local information systems.

COMPUTER EQUIPMENT



SERVICES/PRODUCTS

DATA RETRIEVAL

- Datanet — a series of resource profiles
- Index-text searching
- OLG-assistance from office of local government

TECHNICAL SERVICES

- Computer mapping
- Environmental analysis
- Business graphics
- Statistical Reports

Continued

REMOTE WORK STATIONS

* Can be developed with a minimal investment in equipment.
* Access to LMIC Prime 850 computer (24 hours/day) at two speeds:
  300 BAUD (Half Duplex) (612)297-2617
  1200 BAUD (Full Duplex) (612)297-3848
* Dial up access to an expanding number of statistical data bases and services.
* Operational costs are very low, consisting of minimal computer costs plus your telephone charge.
* Remote work station HELP line - Les Maki (612) 296-1211

DATANET ON-LINE INFORMATION

* A series of automated data bases. Available through LMIC computer
* "User Friendly", menu-driven system.
* Provides key statistical data and technical assistance.
* Includes several data sponsors
* See Monitoring Land Use Change brochure

INFORMATION AND DATA EXCHANGE (INDEX)

* An information network and referral service for environmental and related cultural, social, and economic resources.
* Free-text searching computer services, including file design and management, report-writing and printing, and mapping capabilities.
* Computerized catalog of information on data collections, research projects, and resource people.

For more information see INDEX brochure or call (612) 296-2073.

OFFICE OF LOCAL GOVERNMENT

* The Office of Local Government is concerned with promoting a healthy system of local government.
* The mission of the Office is to provide technical assistance, conduct research and special studies dealing with local government issues and opportunities, and administer financial assistance programs.
* These functions are performed by providing information, data, and service.

RESOURCE PROFILES

* A statistical data base summarizing the use and development of the state's physical resources.
* Profiles consist of data trend lines, rankings, comparisons, and economic production factors.
* Data is provided by state, federal, and private records and is available at several levels of geographic resolution.
* Computerized "user friendly" access allow the public to easily obtain the information they want.

ACCESS TO LMIC PRODUCTS AND SERVICES

LMIC serves land managers and planners as:

* A data center providing geographic information about Minnesota's natural resources and demographic characteristics.
* A computer center that offers rapid and flexible analysis of this information for use in planning and mapping studies.
* A graphics center that produces high quality maps as well as statistical summary reports and displays.

LMIC offers a wide range of technical assistance:

* Training in the use of LMIC's computer mapping and data analysis capabilities.
* Consultation regarding the purchase or use of computer equipment related to geographic analysis and display and large text data bases.
* Assistance in using LMIC's DATANET line for remote data retrieval.
* Consultation with project managers regarding the application of LMIC information and computer software to your planning managing activities.

LMIC is a service bureau offering a wide range of contract data analysis services such as:

* Land use and environmental planning analysis
* Statistical analysis
* Data base development
* Environmental assessment studies

COMPUTER MAPPING AND ANALYSIS

* LMIC maintains the Land Management Information System (MLMIS), a statewide computerized data base of natural resource information (e.g. geology, soils, landform, land cover) and cultural information (e.g. land use, population, infrastructure, political units).
* MLMIS data can be mapped and tabulated for site, community, regional, and state-scale studies. Completed and ongoing LMIC studies include:
  - -Land use planning studies for several metropolitan communities.
  - -Parcel mapping for the City of Blaine, Anoka Co.
  - -Mapping and tabulation of 1980 Census data for the Metropolitan Council and other interested state and local agencies.
  - -Erosion and sedimentation analyses for several important watersheds.
  - -Sanitary landfill siting study for Itasca Co.
  - -Master planning for the Minnesota River Valley Wildlife and Fish Refuge.

OTHER TYPES OF GRAPHICS

* LMIC offers an extensive variety of additional display tools, including:
  - -Pie charts
  - -Bar graphs
  - -Line graphs
  - -3-dimensional perspectives
  - -Color slides of maps and business graphics
  - -Cross-sectional diagrams

For additional information about LMIC services, contact:

LMIC
Room LL65, Metro Square Building
7th and Robert Streets
St. Paul, Minnesota 55101
(612) 296-1211

Station #1

ON-LINE DATA SYSTEMS:

DATANET
TERMS

DATANET (WORK)

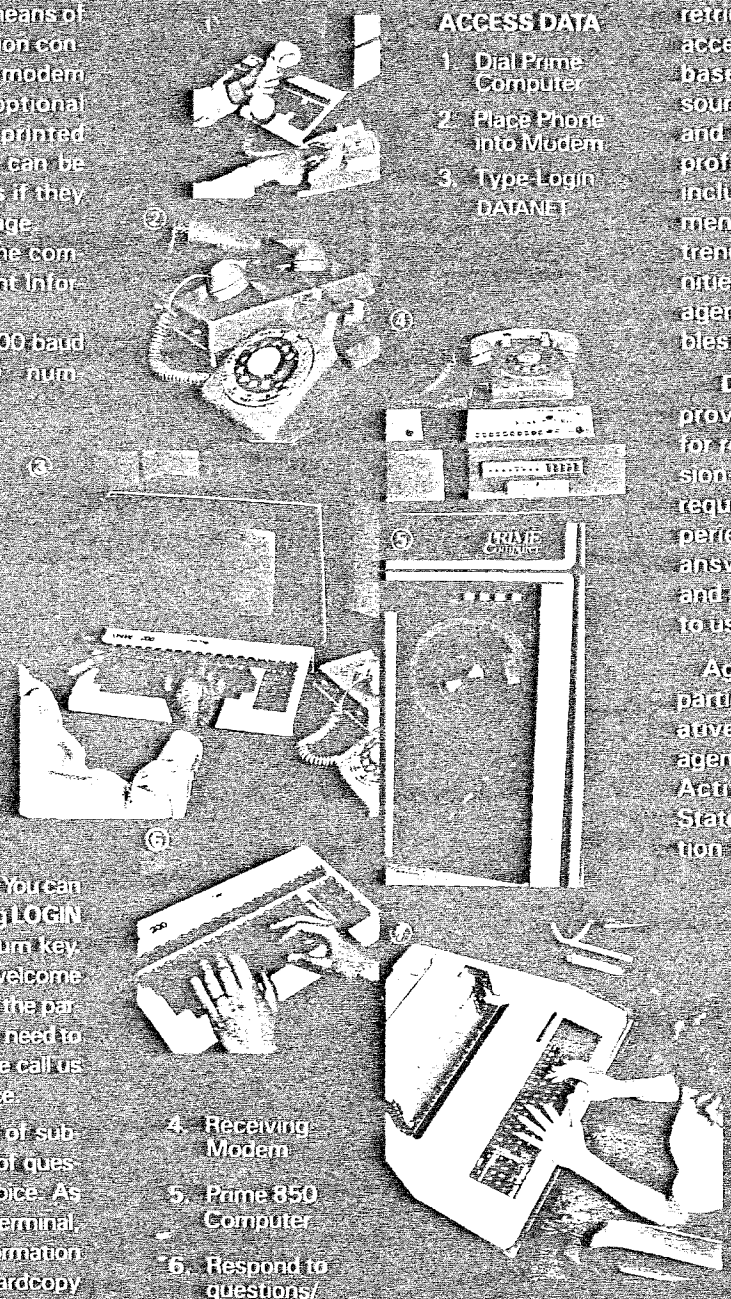
The Resource Profiles can be accessed from any location by means of a remote work station. A station consists of a video terminal and modem (telephone hook-up) or an optional typewriter-like terminal for printed copy. Most micro-computers can be used as remote work stations if they have a communications package.

To access data dial the Prime computer at the Land Management Information Center.

- Dial (612) 297-2617 for 300 baud modems. A BAUD number reflects the speed at which data is sent to your terminal. Set your terminal at half duplex.
- Dial (612) 297-3848 for 1200 baud modems. Set your terminal at full duplex.

When you receive a steady high-pitched tone, place the telephone into the modem. Push the return key and wait for the computer to respond with **LOGIN PLEASE**. You can now access the profiles by typing **LOGIN DATANET** and pushing the return key. You should receive a friendly welcome message. If you have problems, the parity settings on your terminal may need to be reset. If you need help, please call us at (612) 296-1211 for assistance.

Users will be shown a menu of subjects and prompted by a series of questions to display data of their choice. As an option to the visual display terminal, printed copies of the profile information may be obtained by using a hardcopy printer. Resource Profiles is one of a growing number of automated data bases available from LMIC's **DATANET** service.



1. Dial Prime Computer
2. Place Phone into Modem
3. Type Login DATANET
4. Receiving Modem
5. Prime 850 Computer
6. Respond to questions/ prompts
7. Optional Hardcopy printer

HOW TO ACCESS DATA

DATANET is an on-line information retrieval system that provides easy access to a series of automated data bases on Minnesota's natural resources, population, development, and economic activity. Community profiles and technical assistance are included for local units of government. Data describing conditions, trends, comparisons, and opportunities have been summarized from agency records into abbreviated tables and short reports.

DATANET was created to improve accessibility of information for researchers, planners, and decision-makers, and use of the system requires no previous computer experience. An interactive question-answer format of subject listings and prompts make the system easy to use.

Agencies and programs currently participating in **DATANET**'s cooperative effort to improve data management include the Trend Analysis Activity (Resource Profiles), the State Water Management Information System (SWIM), the Office of Local Government's Government Information Network (GIN), the State Auditor's Fiscal Health Program, and the Office of the State Demographer. The **DATANET** system is currently funded by the Planning Agency, and access is free to the user. At some time in the future, though, a fee or subscription may be charged, in order to maintain the data base and provide additional data and programming features.

For more information on **DATANET**, contact:
COMPUTER ACCESS HELPLINE – (612) 296-1211
MENU & INQUIRIES – (612) 296-2559

AGRICULTURE Agricultural land base • Planted and harvested acres • Production levels • Green Acres enrollment • Metro Ag Preserves • Land in farms • Grain storage • Food processing employment • Farm loan foreclosure • Farmland value

WETLANDS State Water Bank Program • Federal Water Bank Program • DNR Wildlife Management Areas • USFWS Waterfowl Production Areas • USFWS National Wildlife Refuges • Annual acreage protected • Program costs • Method of protection

LAND OWNERSHIP Federal lands owned, by administrative unit • State lands owned, by administrative unit • Public land acquisition trends

FORESTRY Quantity of forest products • Volume of forest products • Pulpwood production by species and county • Projected forest land base through 2030 • Producer Price Index for forest products

MINERALS Quantity of mineral production • Value of mineral production • Production and shipment of iron ore • Sand/gravel and limestone production • Mining employment • Mining sites and prospects • MN/DOT gravel pit inventory

URBAN DEVELOPMENT Municipal land area • Municipal annexations and detachments • Township boundary detachments • Registered rural subdivisions • Sales of registered rural lots • Residential, commercial, industrial building activity • Building permit valuation • EPA sewer and water needs survey

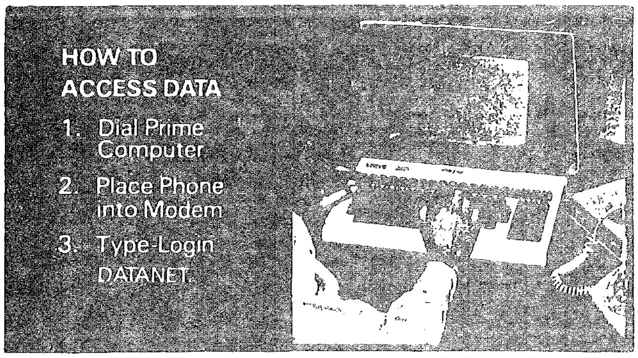
DEMOGRAPHICS 1980 population • 1970-1980 population change • Population density • MCD land area • Housing counts • Housing count changes • 1970-1980 Household type • Age, sex, and race characteristics • Marital status of household

DATANET ON-LINE INFORMATION

DATANET OVERVIEW

DATANET is an on-line information retrieval system that provides easy access to a series of automated data bases. Data describing conditions, trends, comparisons, and opportunities have been summarized from agency records into abbreviated tables and short reports.

The surrounding lists illustrate the data variables that are part of the system, in progress, or could be developed with the cooperation of other agencies. DATANET was created to improve the accessibility of information for researchers, planners, and decision-makers. DATANET is currently free to users but will transfer to a subscription basis beginning in the summer of 1984.



AVAILABLE DATA

A. Agriculture

1. Land area of cropland and pasture, 1967 and 1977. (S)
2. Harvested acres for Minnesota's principal crops, 1972-1981. (S)(C)
3. Planted acres for Minnesota's principal crops, 1972-1981. (S)(C)
4. Yield for Minnesota's principal crops, 1972-1981. (S)(C)
5. Production for Minnesota's principal crops, 1972-1981. (S)(C)
6. Land in Green Acres program by county, 1981 and 1982. (S)
7. Land in Metropolitan Agricultural Preserves, 1981. (S)(C)
8. Land in farms, number and size of farms, 1955-1981. (S)
9. Grain storage for corn, wheat, soybeans, barley and oats, 1972-1982. (S) - Quarterly data.
10. Employment in food processing. (S)
11. Federal Land Bank farm loan foreclosures. (S)
12. Estimated average annual erosion, 1977. (S)
13. Soil and Water Conservation treatment needs. (S)
14. Cropland Productivity (modified by climate). (C)

B. Minerals

1. Value of production of non-fuel minerals, 1972-1981. (S)(C)
2. Production and shipments of usable iron ore, 1971-1981. (S)
3. Quantity of production of non-fuel minerals, 1971-1981. (S)
4. Number of mines and value of production of sand and gravel and crushed limestone, 1981-1980. (C)
5. Sand and gravel production number of mines, and value of production. (C)
6. Leading mineral in value of production. (C)
7. Crushed limestone production, number of mines, and value of production. (C)

C. Forestry

1. Value of forest products, 1971-1980. (S)
2. Quantity of forest products, 1971-1980. (S)
3. Producer price index for forest products, 1960-1980. (S)
4. Pulpwood production by species, 1971-1981. (S)
5. Pulpwood production by county, 1973-1981. (S)(C)
6. Projected forest land base, 1982-2030. (S)

D. Urban Lands

1. Rural subdivisions, 1974-1982. (S)(C)
2. Changes in municipal land area due to boundary changes. 1974-1982. (S)(C)(M)

E. Land Ownership

1. Department of Natural Resources land ownership, 1974-1981. (S)

G. Wetlands

1. U.S.F.W.S. National Wildlife Refuges. (S) - Acreage.
2. Federal Water Bank Program. (S) - Acreage and cost.
3. National Wildlife Refuge system. (S)
4. U.S.F.W.S. Waterfowl Production Areas (S) - Acreage and cost.
5. State Water Bank Program. (S) - Acreage and cost by program option.
6. DNR Wildlife Management Areas. (S) - Acreage and cost.

H. Lakes (SWIM)

1. Physical and Development Characteristics by lake.
2. Fish Stocking Information by lake.
3. Summary of permit applications and approvals by lake.

DATA IN PROGRESS

A. Demographics - 1980 Census (Scheduled Completion June, 1984)

Population

1. Population count
2. Density
3. Land area
4. Housing count
5. Households
6. Persons per household
7. Median age
8. Median household income
9. Age by sex
10. Race of persons
11. Spanish origin
12. Median age by sex
13. Household by size and type
14. Household type for persons under 18
15. Household type for persons 65 +
16. Persons in group quarters
17. Households by type, race, children
18. Households by type of households
19. Persons living on farms

Employment

1. Employment by industry
2. Description of workers
3. Travel time to worker
4. Average travel time to work
5. Means of transportation
6. Work location
7. Employment sectors for workers
8. Labor force status of women
9. Labor force status by sex
10. Veterans status and period of service
11. Years of school completed

Housing

1. No. Year-round units
2. No. Condominium units
3. Occupancy status
4. Persons per room
5. No of units in structure
6. Age of householder
7. Urban and rural housing units
8. Number of rooms
9. Age of structure
10. Value and no. of owner units
11. Mean and median value
12. Value and no. renter units
13. Median and mean gross rent
14. Housing costs as % of income
15. Mortgage status and monthly costs
16. Type of heating fuel
17. Source of water
18. Status of plumbing facilities
19. Type of sewage disposal

Income

1. Family and household income
2. Per capita income
3. Household income type
4. Family income by race
5. No. workers in family
6. Income as % of poverty level
7. Poverty status by family type
8. Presence and age of related children
9. Race by poverty status
10. Poverty status by age
11. Poverty status of families
12. Poverty status of non-families
13. Family income/spanish origin

B. State Auditor's Municipal Finance Data (Scheduled completion July, 1984)

1. Taxable valuation
2. Value of building permits
3. Gross retail sales
4. No. sales records
5. Per capita income
6. Median age of population
7. % population school age
8. Annual revenue
9. Expenditures for police
10. Expenditures for fire
11. Expenditures for refuse
12. Expenditures for sewer and storage
13. Expenditures for social services
14. Expenditures for highways
15. General fund balance
16. Revenues from state
17. Revenues from federal
18. Revenues from county
19. Intergovernmental revenues
20. Revenue from fiscal disparities
21. Bonded indebtedness ratios
22. Budget overruns
23. Fringe benefits
24. Employer contributions to fringe
25. Levy rate
26. Levy limit
27. Short term liabilities
28. Deferred pension liability
29. Funding of fixed assets
30. Funding of capital projects
31. No. and change in municipal employees
32. Change in municipal expenditures
33. Earnings on investments
34. Interest cost as % of own revenue
35. Incidence of revenue shortfalls

C. State Grants and Loans (Scheduled completed May, 1984)

1. Grant and loan description
2. Size of grant or loan
3. Eligible jurisdiction
4. Eligibility criteria
5. Contact person

POTENTIAL DATA

Data variables that could be entered in the future

Economic Indicators

1. Consumer price index
2. Total retail sales
3. Mortgage rate
4. Total non-farm employment
5. Total employment
6. Services employment
7. Manufacturing employment
8. Trade employment
9. Construction employment
10. Government employment
11. Number unemployed
12. Unemployment rate
13. Weekly hours, manufacturing
14. Hourly earnings, manufacturing
15. Mining employment
16. Number unemployed
17. Housing permits, total
18. Housing permits, single-family
19. Housing permits, 2 - 4
20. Housing permits, 5 + units
21. Cash receipts from farm marketing
22. Cash receipts from crops
23. Cash receipts from livestock
24. Wage and salary disbursements
25. Farm proprietors' income
26. State unemployment insurance
27. Sales taxes, gross receipts
28. Individual income taxes

EPA Wastewater needs

1. Summary of category needs
2. Facility population/projections
3. Flows/concentrations/monthly average
4. Collectors/interceptors/force mains
5. Discharge location

(C) - County Data

(S) - State Data

APRIL 1984

TERMS

YOUR TEXT ON OUR TERMS

TERMS is the acronym for Text Entry, Retrieval, Manipulation, and Searching. This new software package was created for the Land Management Information Center's (LMIC) Prime 850 computer system by LMIC programmers to handle large files composed principally of text. Databases using this software can be created and accessed through the Service Bureau of LMIC by both state and local units of government and private agencies.

TERMS is a good choice for text files that contain a large number of keywords which cannot be easily coded. TERMS works by cross-referencing entries through a concordance. The concordance is an alphabetical index of words and their locations within the database. This feature enables extremely fast searching. Instead of actually reading the database line by line to find the word being searched for, TERMS consults the concordance and retrieves only the appropriate entries.

TERMS software lets you define an electronic input form for each database which will automatically prompt you for data entry. TERMS uses logical sequences of commands in simple English to perform complex searches.

TERMS databases are:

* easy to use
* rapidly searchable
* accessible 24 hours a day
* accessible with a modem through most terminals and popular micros
* adaptable to diverse data
* linked to the powerful capabilities of the Minnesota Land Management Information System
* backed by a user friendly staff
* very inexpensive to build and maintain
* designed to handle free text searching
* applicable to any kind of textual information

TERMS software can be used to format and search any text information that follows a consistent format. Examples include:

* calendars-of-events
* biographies
* species inventories
* bibliographies and publication abstracts
* item descriptions - collections of illustrations, lists of historic structures, museum collections
* genealogical information
* resort and restaurant guides
* facilities descriptions
* directories
* inventories

For more information contact: Janeen McAllister (612-296-2073)

Station #2

SYSTEMS FOR WATER INFORMATION MANAGEMENT (SWIM):

Lakes data base

Ground water information summary

SYSTEMS FOR WATER INFORMATION MANAGEMENT

Gathering and using timely and reliable data on the state's water and land resources is a key to efficient and effective water resource management.

The objective of the state of Minnesota has been to develop water management information systems based on the concept of separate but coordinated systems, housed in individual agencies and linked through consistent standards and identifiers to serve as a central clearing house for interagency communication. The purpose of SYSTEMS FOR WATER INFORMATION MANAGEMENT is to provide that communication function so data consistency and compatibilty can be maintained.

The Systems for Water Information Management concept was an outgrowth of a major statewide planning effort which resulted in the preparation of a "Framework Water and Related Land Resources Plan" in 1979. An advisory group, made up of such agencies as the Department of Natural Resources, Pollution Control Agency, Environmental Quality Board, Minnesota Department of Health, Water Planning Board, Minnesota Geological Survey, and the U.S. Geological Survey, has guided SWIM directions since its inception.

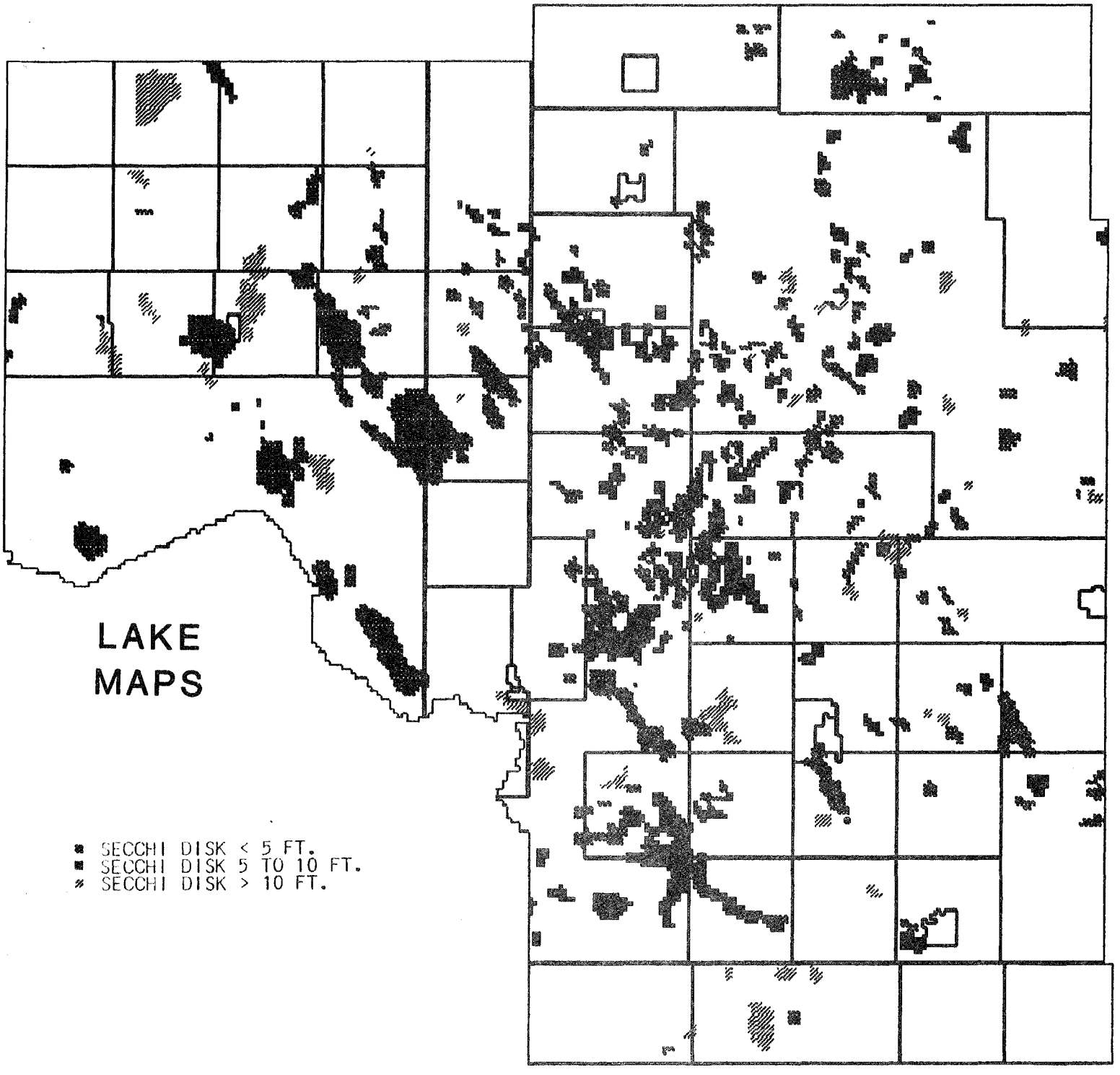
In 1982, a SWIM Coordinator position was created by the Legislative Commission on Minnesota's Resources (LCMR). SWIM was housed at the Land Management Information Center because of LMIC's extensive computer mapping, analysis, and data base management capabilities. Under the direction of agency-staffed SWIM advisory committees, the SWIM position has been used to coordinate water resources projects at LMIC and to address a number of water resources information needs.

The Systems for Water Information Management group to date has developed three major overview systems. The first SWIM interagency product was a Catalog of Water Data Collections (SWIM Catalog). The SWIM Catalog is accessible in its short form through LMIC's public access lines. A more detailed version can be accessed at LMIC by an INDEX data search.

In 1981 a Lakes Summary Data Base was created, which summarizes computer-based information on Minnesota lakes included in the DNR Bulletin 25 Lakes Survey. Information available includes lake location, development, physical characteristics, and fisheries. The system provides state managers, decision-makers, agency personnel and the general public with easy access to information about Minnesota's lakes. The Lakes Summary Data Base is housed on the PRIME 850 minicomputer at LMIC, and is accessible through LMIC's public access system.

SWIM has also been involved in the design and development of two other summary systems: a Ground Water Information Summary System and a Stream Information System. The Ground Water Information Summary (GWIS) assembles well location, aquifer, description, and usage information from several agencies' data systems. The Stream Information System is in a preliminary design stage, but will likewise merge computerized data files from different agencies for improved river and watershed management.

The SWIM Coordinator position was also created to assist with the coordination and integration of water resources projects. As a result of this objective a number of state projects have received technical assistance or information from SWIM. These projects have included acid precipitation studies (PCA), water use data base development (DNR-USGS), hazardous waste siting studies (PCA), lakeshore suitability analysis (DNR), erosion/sediment yield modeling (PCA-USDA), and studies of ground water contamination potential (EQB).



Secchi disk readings (indicating water clarity) for lakes in Itasca County
(source: Lakes Summary Data Base and Lakes 40-acre data)

SWIM-LAKE SUMMARY DATA FILE

Lake name: WILMAR DNR Division of Waters lake number 34- 180
Primary county: KANDIYOHI Secondary county: KANDIYOHI
Lake WILMAR is in 1 counties
Location: Township 119 Range 35
Watershed MINNESOTA RIVER-HAWK CREEK Status: (meandered lake)

PHYSICAL CHARACTERISTICS
Ecological type MARGINAL LAKE
Size of lake: 761 Acres
Shorelength: 3.9 miles.
Maximum depth: 8.0 Median depth: 0.0
Lake contour map is not available

DEVELOPMENT CHARACTERISTICS
Seasonal residences in 1967: 60
Permanent residences in 1967: 34
Resorts in 1967: 0
Public accesses in 1980: 0
Shoreland zoning classification: GENERAL DEVELOPMENT

WATER CHEMISTRY FOR LAKE WILMAR
Secchi disk reading (water clarity): 3.0 feet.

FISH STOCKING DATA FOR LAKE WILMAR

YEAR	TYPE OF FISH	AGE	AMOUNT
-----NONE AVAILABLE-----			

SUMMARY OF DNR PERMIT
APPLICATIONS ISSUED OR DENIED AS OF JUNE 1981 FOR LAKE: WILMAR

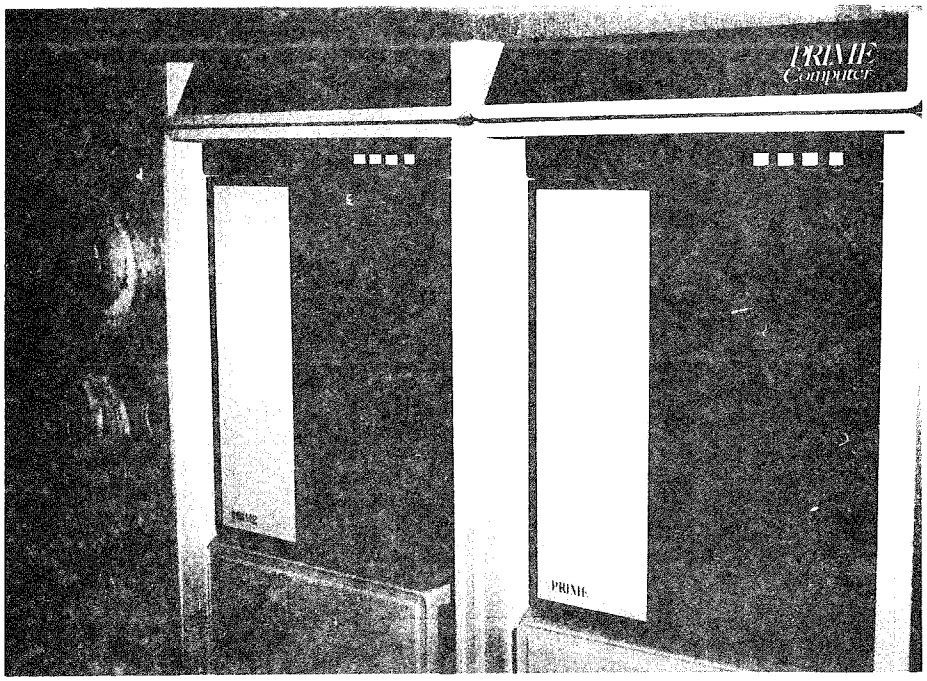
PERMIT TYPES:	NUMBER ISSUED	NUMBER DENIED
PUBLIC (PROTECTED) WATERS PERMITS		
Culvert/Bridge	1	0
Excavation	4	0
GENERAL APPROPRIATION PERMITS		
Temporary projects	2	0
Irrigation	2	0

Station #3

COMPUTER SYSTEM AND OUTPUT DEVICES

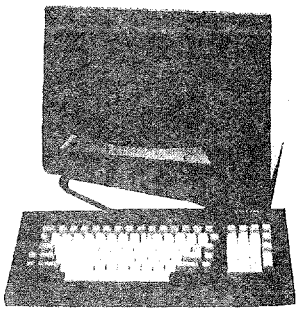
COMPUTER SYSTEM

Our computer system is a Prime '850' Super-Mini computer, with two central processors (brains). The central memory capacity is 4 megabytes of data, plus the 900 megabyte capacity of the three disk drives. For long-term storage and interchange of data, two tape drives are available. Over 800 2400 ft. of magnetic tapes are now in LMIC's tape library, some in off-site storage. Located in our computer room are modems that allow up to 16 users to connect to our system by telephone.



OUTPUT DEVICES

CATHODE RAY TUBE
(CRT) TERMINAL

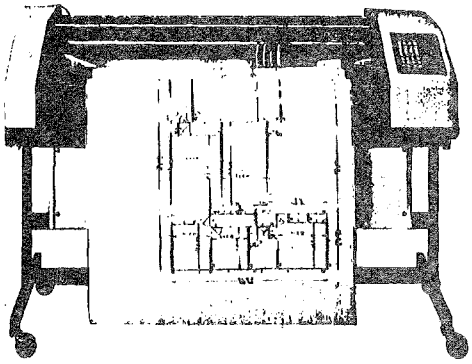


for visual display

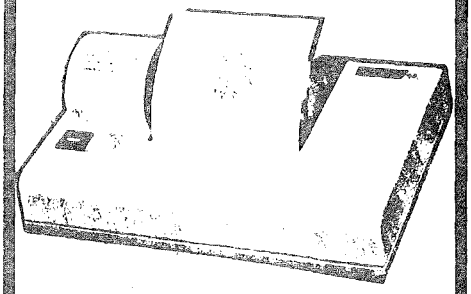
After data is entered and analyzed the resulting information can be displayed in map and/or tabular form using a number of devices. Some of these display tools can function in color and black & white mode. Both polygon and grid cell data can be displayed on each of the plotters. The need for a variety of display equipment is due to the various capabilities in terms of speed, precision, hard copy vs. video, and work map vs. printing original.

PRINTERS AND PLOTTERS

PRINTER

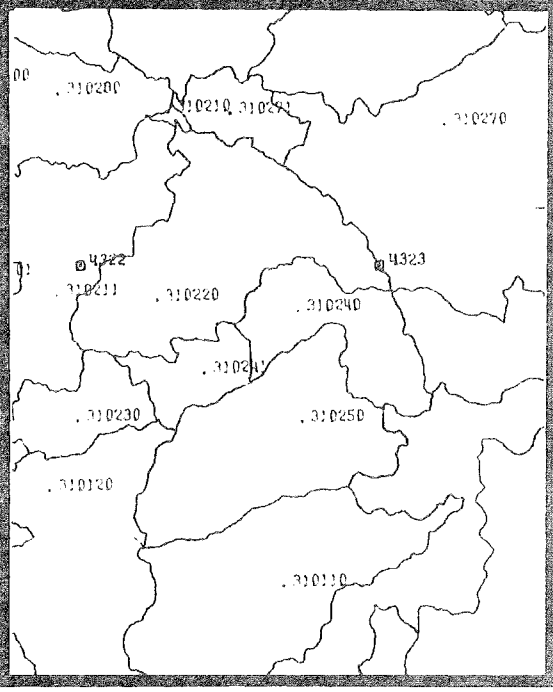


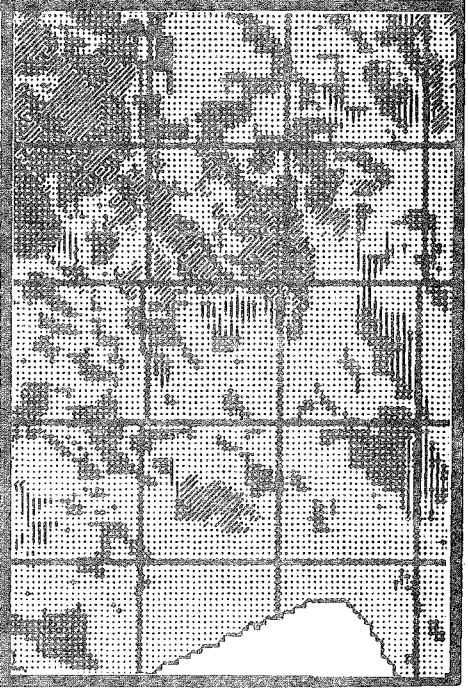
PEN PLOTTER



ELECTROSTATIC
PLOTTER

N =	5	CAP.	RATE
3 Spring Creek t			49.
STANDARD DEV.			4.
VARIANCE			21.
N =	3	CAP.	RATE
3 Spruce Grove t			14.
STANDARD DEV.			2.
VARIANCE			7.
N =	4	CAP.	RATE
3 Sugar Bush tow			29.
STANDARD DEV.			7.
VARIANCE			53.
N =	7	CAP.	RATE
3 Two Inlets tow			12.
STANDARD DEV.			0.
VARIANCE			0.
N =	1	CAP.	RATE
3 Walworth towns			60.
STANDARD DEV.			4.

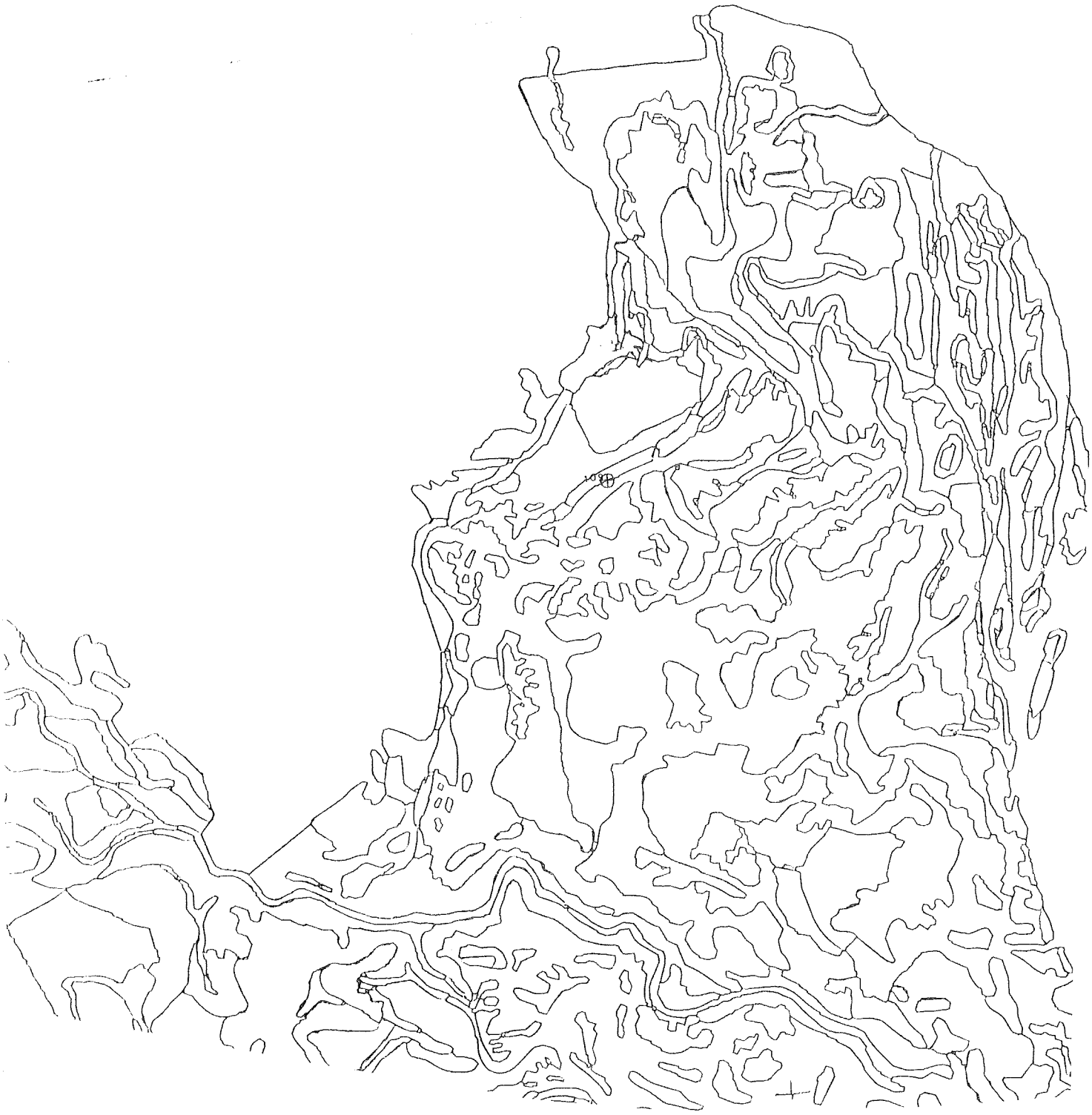




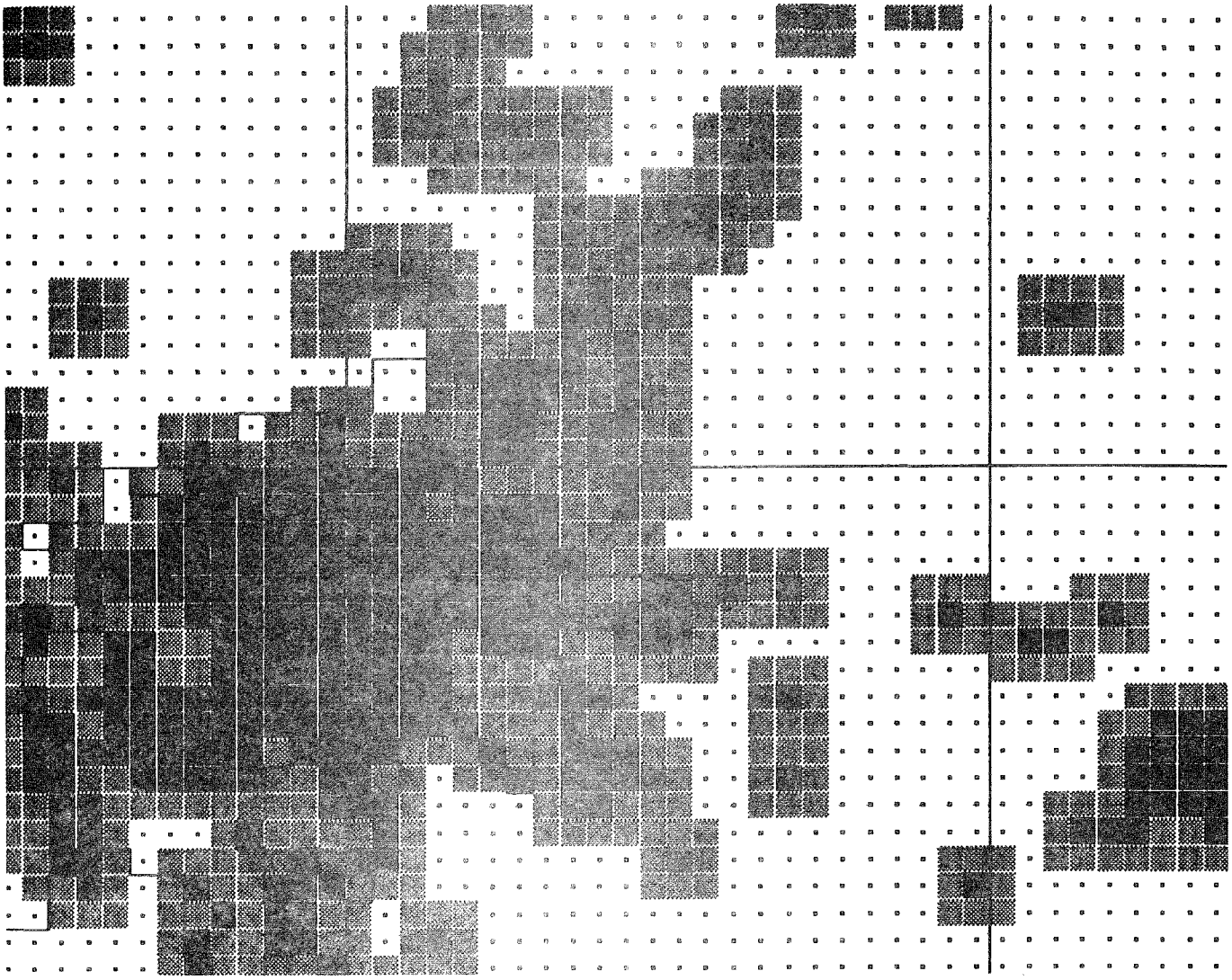
PRINTER

27	HENNEPIN	P	HAMEL	612	55340	98	0	0	0	0
79	WABASHA	C	HAMMOND	507	55938	68	0	0	0	0
75	STEVENS	C	HANCOCK	612	56244	49	48	47	0	0
87	YELLOW MEDICINE	C	HANLEY FALLS	507	56245	85	0	0	0	0
8	BROWN	C	HANSKA	507	56041	87	0	0	0	0
49	MORRISON	C	HARDING	612	56364	30	0	0	0	0
67	ROCK	C	HARDWICK	507	56134	69	0	0	0	0
13	CHISAGO	C	HARRIS	612	55032	34	0	0	0	0
85	WINONA	P	HART	507	55971	82	0	0	0	0
24	FREEBORN	C	HARTLAND	507	56042	77	0	0	0	0
14	CLAY	C	HAWLEY	218	56549	1	6	0	0	0
20	DODGE	C	HAYFIELD	507	55940	79	0	0	0	0
87	YELLOW MEDICINE	C	HAZEL RUN	612	56247	85	0	0	0	0
65	RENVILLE	C	HECTOR	612	55342	31	64	0	0	0
54	NORMAN	C	HENDRUM	218	56550	1	0	0	0	0
56	OTTERTAIL	C	HENNING	218	56551	29	6	7	0	0
58	PINE	C	HENRIETTE	612	55036	34	0	0	0	0
26	GRANT	C	HERMAN	612	56248	47	0	0	0	0
69	SAINT LOUIS	C	HERMANTOWN	218	55811	17	0	0	0	0
32	JACKSON	C	HERON LAKE	507	56137	71	70	0	0	0
77	TODD	C	HEWITT	218	56453	29	23	6	7	0
69	SAINT LOUIS	C	HIBBING	218	55746	14	0	0	0	0
1	AITKIN	C	HILL CITY	218	55748	12	13	0	0	0
49	MORRISON	C	HILLMAN	612	56338	30	0	0	0	0
67	ROCK	C	HILLS	507	56138	69	0	0	0	0
2	ANOKA	C	HILLTOP	612	55421	98	0	0	0	0
58	PINE	C	HINCKLEY	612	55037	34	0	0	0	0
14	CLAY	C	HITTERDAL	218	56552	1	20	6	0	0
26	GRANT	C	HOFFMAN	612	56339	28	0	0	0	0
73	STEARNS	C	HOLDINGFORD	612	56340	60	59	35	0	0
59	PIPESTONE	C	HOLLAND	507	56139	69	0	0	0	0
24	FREEBORN	C	HOLLANDALE	507	56045	79	77	0	0	0
76	SWIFT	C	HOLLOWAY	612	56249	32	47	0	0	0
21	DOUGLAS	P	HOLMES CITY	612	56341	29	28	0	0	0
45	MARSHALL	C	HOLT	218	56737	2	0	0	0	0
27	HENNEPIN	C	HOPKINS	612	55343	98	0	0	0	0
28	HOUSTON	C	HOUSTON	507	55943	95	0	0	0	0
16	COOK	P	HOVLAND	218	55606	16	17	0	0	0
86	WRIGHT	C	HOWARD LAKE	612	55349	31	0	0	0	0
69	SAINT LOUIS	C	HOYT LAKES	218	55750	15	0	0	0	0
82	WASHINGTON	C	HUGO	612	55038	99	0	0	0	0
35	KITTSON	C	HUMBOLDT	218	56731	18	19	0	0	0
22	FARIBAULT	P	HUNTLEY	507	56047	89	0	0	0	0
43	MCLEOD	C	HUTCHINSON	612	55350	31	63	0	0	0
59	PIPESTONE	C	IHLEN	507	56140	69	0	0	0	0
27	HENNEPIN	C	INDEPENDENCE	612	55359	98	0	0	0	0
31	ITASCA	P	INGER	218	56631	12	13	0	0	0
19	DAKOTA	C	INVER GROVE HGHTS	612	55075	99	0	0	0	0
18	CROW WING	C	IRONTON	218	56455	10	9	25	26	0
38	LAKE	P	ISABELLA	218	55607	16	17	0	0	0
30	ISANTI	C	ISANTI	612	55040	98	34	0	0	0
41	LINCOLN	C	IVANHOE	507	56142	84	0	0	0	0
32	JACKSON	C	JACKSON	507	56143	71	0	0	0	0
1	AITKIN	P	JACOBSON	218	55752	12	13	0	0	0
17	COTTONWOOD	C	JEFFERS	507	56145	71	0	0	0	0
18	CROW WING	C	JENKINS	218	56456	8	9	0	0	0
70	SCOTT	C	JORDAN	612	55352	98	0	0	0	0
34	KANDIYOHI	C	KANDIYOHI	612	56251	31	32	0	0	0
35	KITTSON	C	KARLSTAD	218	56732	18	2	0	0	0
40	LE SUEUR	C	KASOTA	507	56050	75	76	0	0	0
20	DODGE	C	KASSON	507	55944	79	80	0	0	0
31	ITASCA	C	KEEWATIN	218	55753	14	0	0	0	0
79	WABASHA	C	KELLOGG	507	55945	68	0	0	0	0
35	KITTSON	C	KENNEDY	218	56733	18	19	0	0	0
21	DOUGLAS	C	KENSINGTON	612	56343	28	50	0	0	0
25	GOODHUE	C	KENYON	507	55946	79	0	0	0	0
76	SWIFT	C	KERKHOVEN	612	56252	31	55	57	54	0
9	CARLTON	C	KETTLE RIVER	218	55757	27	17	0	0	0
22	FARIBAULT	C	KIESTER	507	56061	77	0	0	0	0
73	STEARNS	C	KIMBALL	612	55353	58	0	0	0	0
1	AITKIN	P	KIMBERLY	218	56431	26	0	0	0	0
47	MEEKER	C	KINGSTON	612	55326	58	0	0	0	0
69	SAINT LOUIS	D	KINNEY	218	55758	14	0	0	0	0
52	NICOLLET	P	KLOSSNER	507	56053	67	0	0	0	0
38	LAKE	P	KNIFE RIVER	218	55609	16	17	0	0	0

PEN PLOTTER



ELECTROSTATIC PLOTTER



LAND USE / LAND COVER

SYMBOL	COUNT	PERCENT	ACRES	LEGEND
	0	9148	86.6	366920.0	OTHER
	1	947	9.0	37980.0	BUFFER ZONE
	9	465	4.4	18649.0	WATER, MARSH, URBAN OR TRANSPORTATION

Station #4

IMAGE PROCESSING:

DeAnza

Data analysis

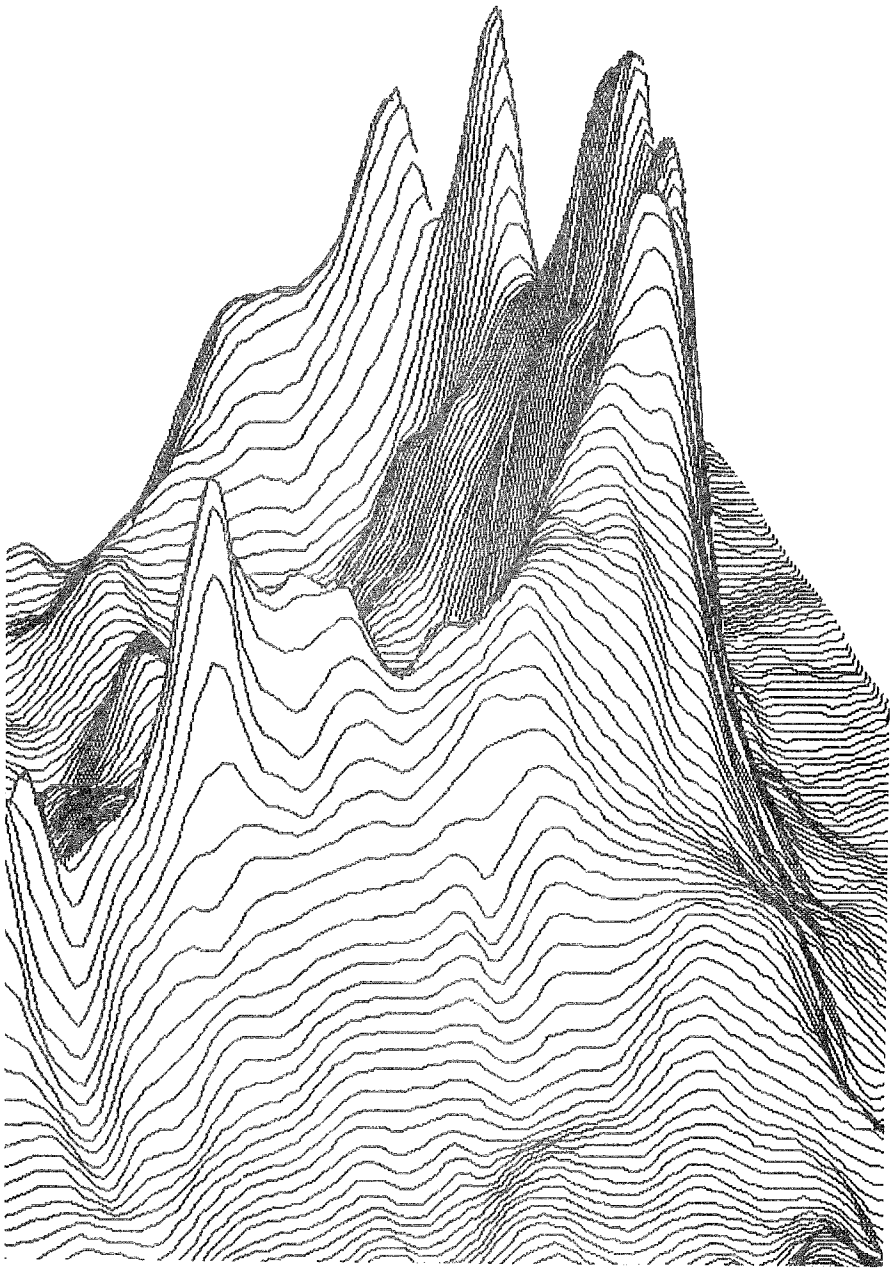
Data display

IMAGE PROCESSING

The DeAnza IP5524 Image Array Processor consists of a high resolution color monitor with seperate red, green, blue channels of 256 bits each, duel cursor, joystick, and color look-up tables. While this device is being used for the analysis of LANDSAT data, it can also be used to display grid cell data from the MLMIS data base as well as update the grid data. Also, it is possible to display vector files after being processed by ARCPLOT. Because the DeAnza has tremendous coloring capabilities, nearly 16 million choices, as well as text writing capabilities, it has also become an important device for preparing presentation graphics usually in the form of 35 millimeter slides.

GRID CELL

VECTOR



EPPL

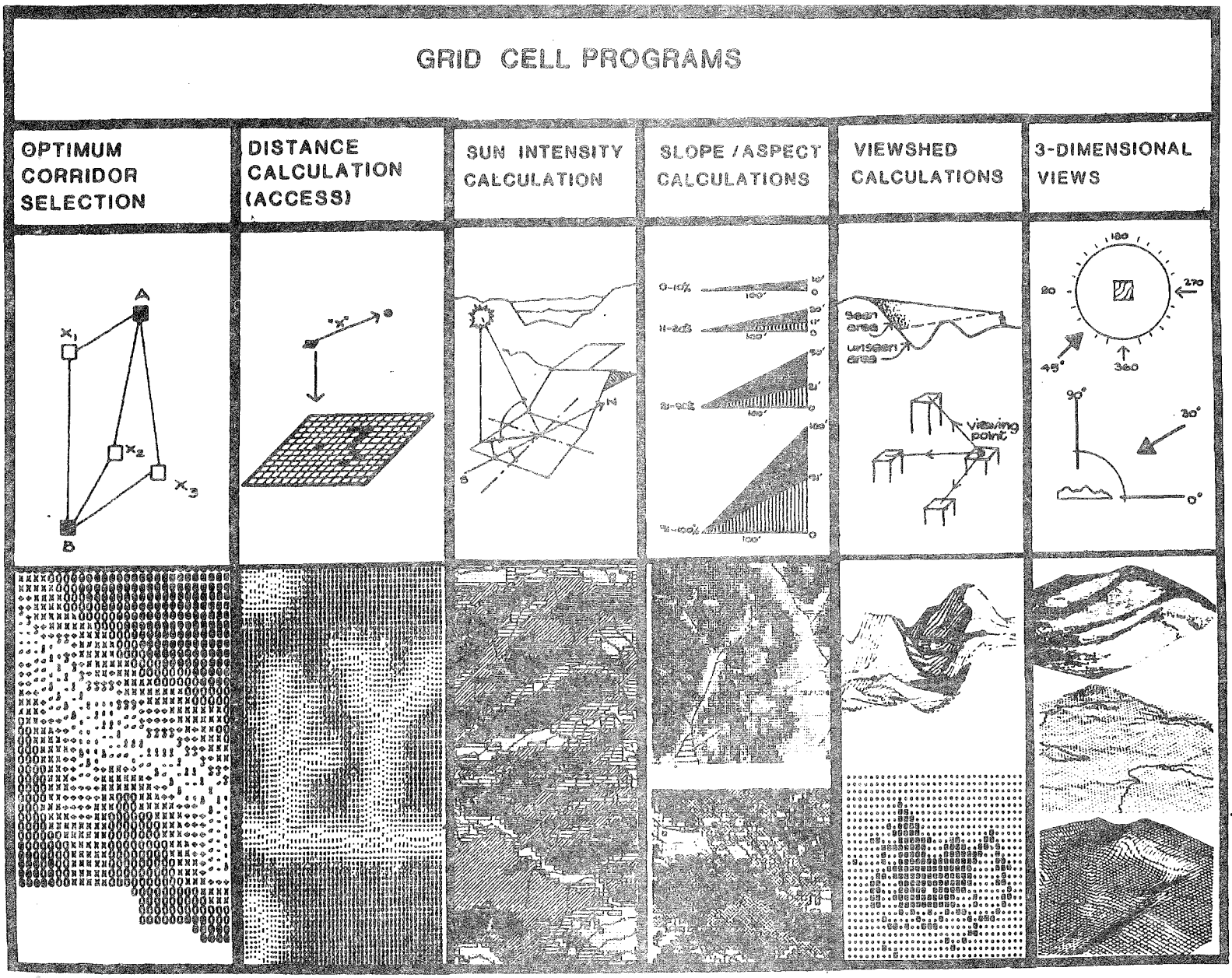
(ENVIRONMENTAL PLANNING AND PROGRAMMING LANGUAGE)

AN INNOVATIVE GRID GEOGRAPHIC INFORMATION SYSTEM LANGUAGE

Grid or raster processing techniques are used by many environmental analysis systems for their cost effective capabilities. Minnesota has developed the Environmental Planning and Programming Language (EPPL) for use with its Land Management Information System. EPPL includes spatial analysis commands and multi-variable modeling techniques and contains several innovations that significantly enhance grid cell processing. The language is a translator, or "pre-compiler", which compiles user defined commands into a FORTRAN IV program optimized to only process the desired commands. EPPL data files combine run length and raster storage techniques which optimize storage, affording a 60% reduction in the disk space needed to maintain the Minnesota data base. EPPL also has the capability to mix FORTRAN code or subroutines with the standard commands for maximum flexibility. EPPL is fully interfaced to all major GIS related software capabilities: polygon processing, image processing, and digital elevation modeling. The power of this language allows the Minnesota Land Management Information Center to respond to a variety of requests for environmental data in an efficient manner.

GRID CELL PROCESSING

Grid cell analysis can be done in a very cost effective manner. Data resolution can range from small 50 meter cells to large 5 kilometer cells. The same programs are applied to do single variable and multi-variable analysis. The examples listed below are selected applications for routines that use spatial analysis models on environmental topics. Models are developed as required for a planning project using modules of these basic analysis routines.



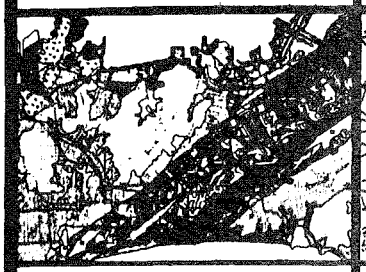
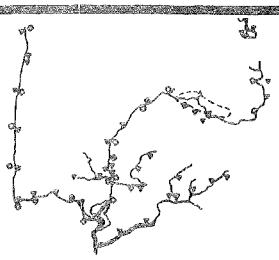
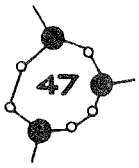
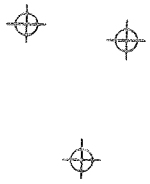
Station #5

GRAPHIC INPUT TECHNIQUES:

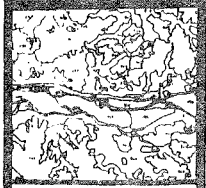
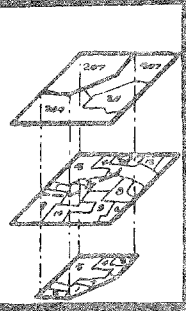
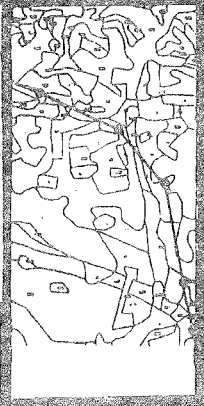
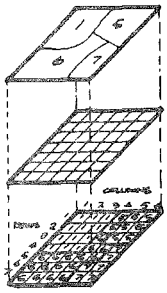
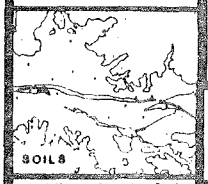
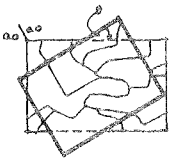
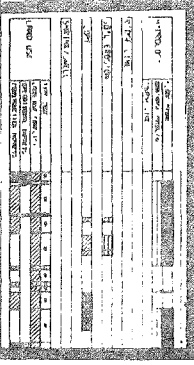
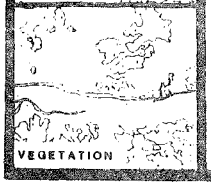
Digitizing

Scanning

EXISTING MAP DATA

POLYGON MAPS	LINE MAPS	POINT MAPS
		
MAPS OF HOMOGENEOUS GEOGRAPHIC CLASSES (I. E. SOILS, GEOLOGY)	LINEAR FEATURE MAPS (I.E. FAULTS AND ROADS)	POINT FEATURES (I.E. ARCHAEOLOGICAL SITES)
		
PIC ENTRY (POLYGON, INTERSECTION, CHAIN)	LINEAR FEATURES	POINTS

POLYGON DATA PROGRAMS

DROP LINE PROGRAM	POLYGON OVERLAY	ROUTE EVALUATION	POLYGON DISPLAY	COORDINATE CONVERSION TO GRID
 ORIGINAL TERRAIN UNIT MAP				
 SOILS	COORDINATE ROTATION / TRANSLATION		AUTOPLOT	
 SLOPE				
 VEGETATION			POLYPLOT	AUTOMAP

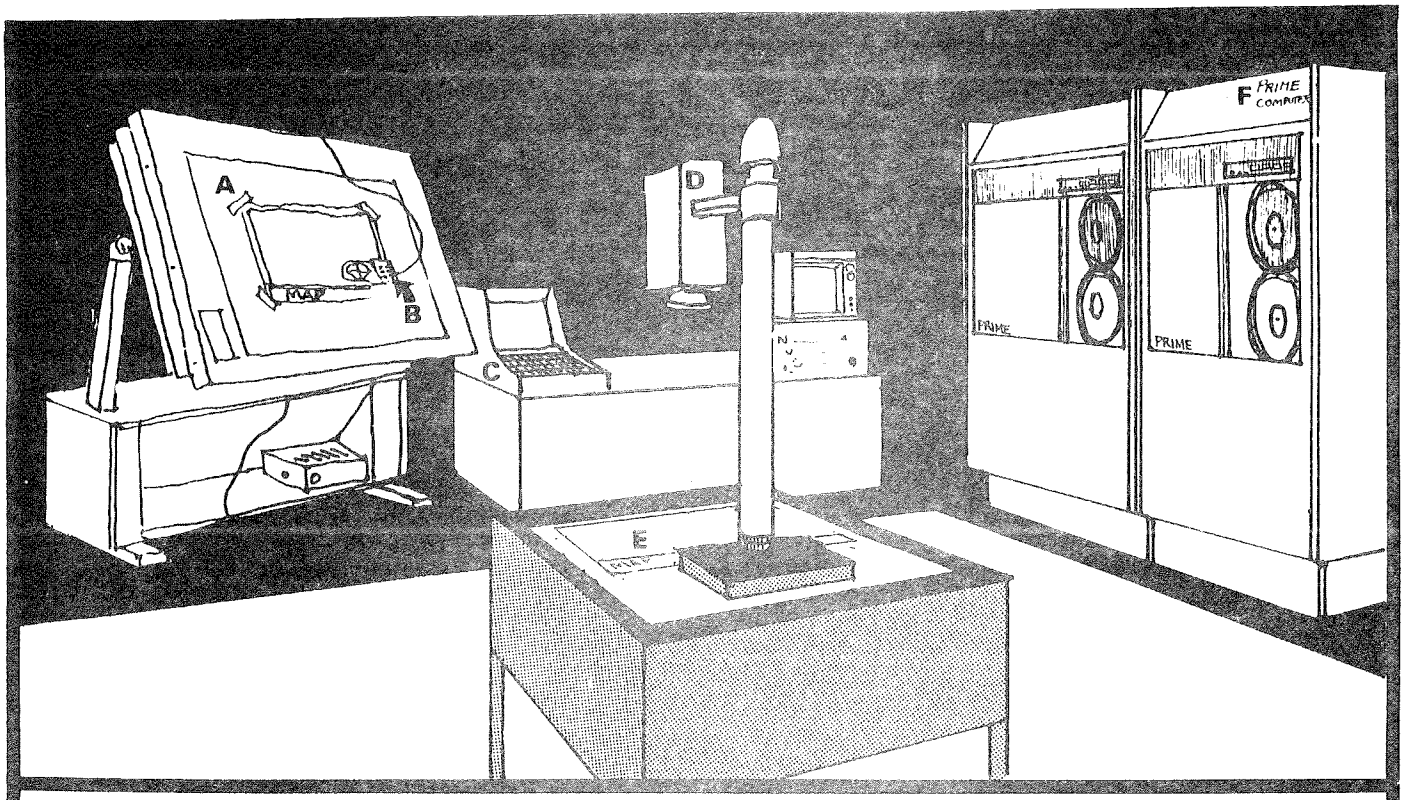
ERSI Graphics

DIGITIZING STATION

The capture of point, line and polygon data from a map takes place at this location. The manuscript data map is brought from the map preparation station and is taped securely to the digitizing table. A moveable cursor is then used to record locations on the map, using an electronic coordinate grid built into the table to reference each location with respect to the entire map area. As these features are entered, they are automatically displayed on the accompanying graphic display terminal. This is helpful in checking the accuracy of the data entry in the initial stage and allows for interactive entry and updating. If an item is entered incorrectly it can easily be deleted and reentered in its correct form. Once all of the information has been entered, it is stored in a series of files on the PRIME computer and is ready for processing to meet specific project needs. This data can be used for any number of projects and can be updated or modified at a digitizing station at any time.

SCANNNING STATION

The scanning station functions under the same principle of recording data by referencing a grid as does the digitizing station. In this technique of capturing data, a high contrast map (light background and dark line work) is placed on a back-lit table and a stationary camera scans the map a section at a time, recording the location of all the dark lines. As each section is scanned, it is diplayed on a black & white monitor. This information is the stored on the PRIME computer. The scanner is used solely for initial data entry and any editing of the lines must be done manually at a digitizing station. This scanning procedure is a very quick method of entering data and eliminates a substantial amount of digitizing time.



GRAPHIC INPUT STATION

A. Digitizing Table
B. Cursor
C. Graphic Display Terminal
D. Scanner–Stationary Camera
E. Scanner–Back–Lit Table
F. Prime 850 Super Mini–Computer

Station #6

LAND MANAGEMENT INFORMATION CENTER PRODUCTS:

LMIC Data displays
Horizons

SUMMARY FROM

"MINNESOTA PUBLIC LANDS, 1983"

SECTION 1 - FEDERAL LAND

In the late 1700s and early 1800s, the federal government acquired control over virtually all of the land which was to become the State of Minnesota. In the 1800s the federal government granted away nearly all of this land to private individuals, corporations and some 16 million acres to the State.

At present slightly over 1 million acres of the orginal federal land remains under the control of federal agencies - nearly all of it administered by the Forest Service, the Bureau of Land Management and the Corps of Engineers. In addition, federal agencies have acquired over 2.2 million acres of land in Minnesota since the early 1900s. Thus federal agencies administer over 3.4 million acres, some 6.7% of the State's total land area.

SECTION 2 - STATE LAND

State land ownership began with the creation of the Minnesota territory in 1849. Two sections of land in each township were granted to the State by the federal government. This and later federal land grants resulted in over 16 million acres of land being transferred into State ownership. Lands were granted to promote railroad construction, to reclaim swamplands, and to support public schools, internal improvements and the University. Initial policy for the State lands was to sell them into private ownership for cash. By 1912, only approximately 2.6 million acres of these orginal land grants remained in State ownership.

Starting at the end of the 1800s, the policy gradually changed to keeping land and mineral rights in State ownership. As early as the 1900s, the State began to acquire lands for conservation and other public purposes such as highways and state institutions. In the 1920s and 1930s, the State took title to several million acres (the so-called Conservation Area lands) when drainage bonds went forfeit for non-payment of taxes in 7 northwestern counties.

The State now administers approximately 5.6 million acres. This total represents just under 11.0% of the total land area of the State. Of the total, some 2.6 million acres (about 46% of the State land) remain from the original federal grants. Another 1.5 million acres (27% of the State land) came to the State from drainage bond forfeitures in the 1930s. The remaining 1.5 million acres have been acquired by the State during this century for various public purposes.

SECTION 3 - TAX-FORFEITED LAND

Shortly after Minnesota's settlement began, some land started going tax- forfeit for non-payment of taxes. Early State policy for these lands was to return them to the tax roles as soon as possible. During the agricultural recessions of the 1920s, the first major wave of tax forfeiture began. Legislative measures were passed to make it easy for the original landowners to regain their land. With the depression of the 1930s, an even larger wave of tax forfeiture was recorded. By 1944 8.1 million acres of land were tax-forfeit. In 1950 records showed that 9.4 million acres had been on the tax-forfeited list at one time or another.

Beginning in the mid-1920s, Legislative action was begun to transfer some this tax-forfeited land to other classifications. During the last 40 years, over half of the tax-forfeited lands have been disposed of, with a majority returning to the tax roles. In more recent times, fewer land sales have resulted in retention of administation and management of these lands by the counties. Thus, about 2.8 million acres of these lands remain in state ownership, but are administered by the counties. County Board action has placed nearly half of these tax-forfeited lands within "memorial county forests". This has occured in 14 counties. Most other tax-forfeited lands remain outside of county management units, but may be within State management units, such as State Forests.

SECTION 4 - METROPOLITAN COMMISSIONS LAND

Three Commissions in the 7-county Twin Cities metropolitan area administer over 9,000 acres of land. The Metropolitan Airports Commission (MAC) administers the Minneapolis- St. Paul International Airport and 6 regional airports in 5 of the 7 metropolitan counties. The Metropolitan Waste Control Commission (MWCC) administers over 1,600 acres of land. The Commission operates 14 waste water treatment plants with at least one plant in each metropolitan county. Plant areas range in size from 1.07 acres to 459.42 acres. The Metropolitan Transit Commission (MTC) administers about 60 acres in Hennepin and Ramsey Counties. These sites are used for bus garages, a bus overhaul garage, park and ride sites and a bus turnaround site.

SUMMARY

1985 PUBLIC LAND INVENTORY *

FEDERAL LANDS #

AGENCY	EST. ACRES	% FEDERAL LAND	% TOTAL LAND AREA
FOREST SERVICE	2,824,044	82.72%	5.52%
FISH AND WILDLIFE SERVICE	382,735	11.21%	0.75%
NATIONAL PARK SERVICE	133,455	3.91%	0.26%
BUREAU OF LAND MANAGEMENT	44,067	1.29%	0.09%
ARMY CORPS OF ENGINEERS	24,043	0.70%	0.05%
OTHER FEDERAL AGENCIES	5,831	0.17%	0.01%
TOTAL FEDERAL AGENCIES #	3,414,176	100.00%	6.67%

STATE LANDS

AGENCY	EST. ACRES	% STATE LAND	% TOTAL LAND AREA
NATURAL RESOURCES	5,279,743	94.02%	10.31%
TRANSPORTATION	239,554	4.27%	0.47%
MILITARY AFFAIRS	52,400	0.93%	0.10%
UNIVERSITY OF MINNESOTA	32,283	0.57%	0.06%
ALL OTHER STATE AGENCIES	11,924	0.21%	0.02%
TOTAL STATE AGENCIES	5,615,714	100.00%	10.97%

TAX-FORFEITED LANDS			
TOTAL TAX-FORFEITED	2,797,257	-	5.46%
METROPOLITAN COMMISSION LANDS			
TOTAL METRO COMISSION	9,248	-	0.02%
TOTAL FEDERAL, STATE, AND METROPOLITAN LANDS	11,836,375	-	23.12%
TOTAL LAND AREA IN STATE	51,205,760	-	100.00%

* SOME COLUMNS MAY NOT ADD DUE TO ROUNDING.

FEDERAL TOTAL DOES NOT INCLUDE SOME 29,000 ACRES IN WHICH THE BUREAU OF INDIAN AFFAIRS HAS INTEREST. THESE LANDS WERE NOT INCLUDED IN THIS STUDY.

FOR DETAILED INFORMATION, SEE THE APPROPRIATE SECTIONS IN THE TEXT.

PROJECT

MINNESOTA HORIZONS 1983

CLIENT

STATE LEGISLATURE

PRODUCT

MINNESOTA IN THE EIGHTIES REPORT
COLOR GRAPHIC AND TEXT PRESENTATION SLIDES

The Minnesota Horizons 1983 project was designed to take a fresh look at Minnesota's economy in order to sort out those factors most responsive to state initiatives. The three-day live telecast sessions featured guest experts lecturing on topics such as economics, history, population, energy, housing and natural resources. The presenters used color graphic slides to illustrate key issues to the legislators. Most of those slides were created by State Planning Agency personnel. In addition to providing presenter slides, agency personnel also created the special report, Minnesota in the Eighties.

The forty-four page Minnesota in the Eighties represented the first attempt by any state agency to create a four-color graphic report that accurately depicted aspects of Minnesota's economy. The total effort involved three sections within State Planning, two groups from the University of Minnesota, a private consultant, and the printer. (See attached schematic). Creation of the report occurred in the period from late October 1982, to early January 1983.

The presenter slides and color graphics report are the products of an exceptional effort that was accoplished in the face of often adverse conditions. Staff had to locate and learn to operate equipment and software. The weather was uncooperative, two of the season's more impressive blizzards impeded progress. A number of computer generated graphic image files did not survive a disk crash midway in the project and had to be re-created. Data collection entailed identifying, locating, summarizing, and graphically interpreting key inforamtion for inclusion in the report. The report went through numerous format revisions causing changes in focuses, keyling, and pagination. The original printer required replacement at the last minute, possibly due to an ongoing strike in the printing industry.

State Planning Agency personnel used the following hardware and software to create the graphic images used by the Horizon presenters and in the Minnesota in the Eighties report:

Hardware: VAX 11/780 Super Minicomputer (UCC)
DICOMED Image Recorder (A laser scanning process)
Tektronix 4025 Vector Graphic Terminal
Peripheral Hardcopy Device to the Graphic Terminal
300/1200 Baud Modem
Software: Tellagraf Business Graphic Package
VAX Operating System and File handling routines

The Horizons project represents the first attempt at providing color business graphic images to clients in a high demand situation with a "hi-tech" approach from beginning to end. LMIC recognizes that with the increase in data base file creation and usage, there also arises a need to succinctly and graphically depict information to users. Keeping in mind current and future needs to clients, LMIC is searching for a graphics software package that is both versatile and cost-effective.

MINNESOTA IN THE EIGHTIES

PARTICIPANTS & PROCESSES

STATE PLANNING AGENCY

DEPARTMENT OF ENERGY PLANNING AND DEVELOPMENT/DIVISION OF PLANNING**
(currently State Planning Agency - renamed & reorganized FY1984)

Roles & Responsibilities:

- Project Coordination & Report Architect
- Publication Data Research
- Formatted Publication Layout
- Produced Bulk of 35mm color graphic slides
- Administrative Assistance

Personnel: 10

Hardware: Tektronix 4025 graphic terminal with hard-copy peripheral device
1200 baud modem

Products: Publication and slides
Presenter slides

LAND MANAGEMENT INFORMATION CENTER (LMIC)**

Roles & Responsibilities:

- Technical Assistance
- Coordination with UCC*
- Remote interface with UCC*

Personnel: 1

Hardware: Prime 850 super mini-computer
Tektronix 4012 graphic terminal
DeAnza image array processor
Versatec 8122A plotter
300/1200 baud modem

Software: ARC 2-D polygon thematic mapping software
INFO dbms for data file manipulation

Products: Created 2-D map images on Prime computer, re-formatted for processing by VAX computer to produce high resolution 35mm slides using DICOMED laser image processor.
Presenter slides

OFFICE OF STATE DEMOGRAPHER

Roles & Responsibilities:

- Demographic data research
- Demographic publication slides
- Demographic presenter slides

Personnel: 3

Hardware: IBM PC
300/1200 baud modem
Tektronix 4025 graphic terminal

Software: Tektronix 4012 graphic terminal emulator

Products: Demographic slide images
Presenter slides

OTHER PARTICIPANTS

PRIVATE MARKETING (Consultant)

Roles & Responsibilities:

- Liasion with printer, broadcast media

Personnel: 1

Products: Cover page design

PRINTER

Personnel: 2

4-Color laser printing process for publication

UNIVERSITY OF MINNESOTA COMPUTER CENTER (UCC)
PROFESSIONAL SERVICES DIVISION
GRAPHICS GROUP

Roles & Responsibilities:

- Provided technical assistance
- User training
- Produced portion of publication graphics

Personnel: 3

Hardware: VAX 11/780 super mini-computer
DICOMED Laser 35mm film image recorder
RAMTEK color graphic terminal

Software: Tellagraf business graphic software package
VAX operating system Editor and file handling routines

Products: High resolution color 35mm slide film business graphics

**NOTE: Many of the roles & functions of these two sections have been consolidated into LMIC.

*UCC - University of Minnesota Computer Center

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