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CURA reporter

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Computers and Public Service

For several years CURA has been actively involved in the development of computer-based information systems to aid public decision-making. Part of this process has been the exploration of computer capabilities and the flexibility with which they can be used. Through this investigation it has become apparent that the computer is a tool that can facilitate tasks which might otherwise be prohibitive because of time delays or cost. This issue of the CURA REPORTER highlights some of the ways CURA has applied computer technology to public concerns. William J. Craig, Assistant Director of CURA, has acted as CURA's technical consultant on each of these projects.

Managed Growth:
Proceedings from five community workshops on the issues of Managed Growth for the Twin Cities Metropolitan Area.

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COMPUTERS CAN SERVE THE PUBLIC INTEREST

Computers and computerized information systems are tools which can be useful to almost everyone. In addition to the more well known technical applications, computers can be employed in a variety of capacities to support non-technical projects. Computers can be appropriate tools whenever a need exists for:

1) handling large amounts of data;

2) performing complicated mathematical computations; or

3) performing repetitious calculations.

If a work program can be laid out in a straightforward, step-by-step methodology, the computer can crank away yielding answers far faster than any human with an abacus, slide rule, pencil or pocket calculator; these answers may be numbers, statistics, graphs or maps.

Since computers are machines, however, they can only perform exactly what they have been told to do. Through computer programs written by trained personnel, the functions required to produce the desired product are translated into computer-readable instructions. Although more complex tasks may require individually-tailored programs, many "on the shelf" packages have been prepared to provide basic types of information with a minimum of effort.

The set-up costs of preparing the methodology, the program and the data for computer processing are often substantial. For this reason, the computer is used most efficiently when it is fulfilling one of the three needs listed above. A crucial element, then, in determining when to use a computer is an evaluation of the suitability and complexity of the task by a computer specialist. Within the academic community, for instance, computers are used for administrative work, instruction, and research in both *hard* and *soft* sciences.

Computers are available for use in virtually every institution of higher education within Minnesota and within many secondary systems. The Minnesota Educational Computer Consortium (MECC) provides many institutions with access to a computer. The State Colleges and the University each have their own systems and several schools have independent computer systems. Most of the work described in this issue of the *Reporter* was done on the University Computer Center's Control Data Corporation Cyber 74 computer. Two projects used a POP-8 minicomputer.

The purpose of this issue of the *Reporter* is to indicate the ease with which these resources might be tapped and put to use in a variety of cases. In the first section on developing information systems, the goal is to show that even complex systems can be tackled on the computer if enough effort is applied; and, indeed those systems could only be handled workably on the computer.

All computer projects discussed have had some contact with the CURA office. Their work covers a wide, but not complete, range of the types of tasks which computers can support. The projects themselves range from elementary to complex. They range from simple support functions to major tasks. In this issue of the *Reporter* these projects are dichotomized into two categories:

1) developing information systems and

2) supporting computer tasks.

DEVELOPING INFORMATION SYSTEMS

CURA has the responsibility for two developing information systems: Rapid Analysis Fiscal Tool (RAFT) and Minnesota Land Management Information System (MLMIS). The RAFT project is building a fiscal data base and modeling system to aid in making decisions about Minnesota fiscal operations. MLMIS is working to build a similar system for aiding land-use decision making. Both projects are building information systems which will eventually be turned over to appropriate state agencies. The research and development of these systems is being undertaken at the University with funds provided by the state for that purpose.

RAFT
Rapid Analysis Fiscal Tool

The Rapid Analysis Fiscal Tool Project (RAFT) originated under the auspices of the Upper Midwest Council and the Citizens League in 1966. In 1970 CURA assumed responsibility for RAFT's development. The first issue of the *Reporter* carried an earlier article on RAFT.

The monies supporting RAFT have come from the Ford Foundation and the Information Resources Development Fund of the State Department of Administration.

RAFT is a computerized representation — a model — of the existing state-local government fiscal situation in Minnesota.

The model consists of two basic components: 1) a file of detailed fiscal data (updated regularly) including valuations, levies, tax rates, revenues, expenditures and other information on school districts, municipalities, townships, counties, regional development commissions and the state itself, along with selected social and economic indicators; 2) a computer system to manipulate this data, including a representation of the existing laws and formulas affecting local government revenues and expenditures, specifically designed to permit the testing of possible policy changes in these laws and formulas.

This system will permit rapid analysis of the effect of proposed changes in tax laws and formulas on the fiscal situation of local governments and show the impact on representative taxpayers in different localities in the state. It will also provide up-to-date information about the relationships among localities as to relative tax burdens and spending levels.

Any two situations combining data and policies can be compared in one computer operation with two kinds of effects being measured: 1) the effect on the individual units of government; and 2) the effect on the taxpayer in those localities. In addition, relationships can be shown between the fiscal effects of certain policies and various geographic, economic and social characteristics of different localities.

A representative example of RAFT's capabilities is the Homestead Credit Study done for the Tax Study Commission during the 1973 legislative session. The study was an evaluation of the amount of property tax relief generated by changes in the rates for homestead credit. RAFT provided three outputs for this study. The first indicated what homestead credit would be paid at sample house values for all 4000+ taxing jurisdictions in the state. The second output was a report on the total cost to the state of homestead credit under the proposed changes in the credit rate, as well as the present costs. The final output was a report on the dollar amount of relief generated by homestead credit under proposed policies for each of the 2000+ municipalities in the state.

In all three of these reports, the present homestead credit system was compared directly with a proposed alternative system. It is important to note that even though only one alternative was actually tried, the tool is capable of testing any number of other possibilities without any re-writing of the programs. The Commission could have just as easily tested three proposals as one.

The reports themselves illustrate some of the options available to the user via the programs that present the results of an analysis. The amount of credit can be compared under present and proposed policies by ranking the jurisdictions according to credit received. The change in credit for a given jurisdiction can be measured as a percentage under present and alternative systems. A statistical summary of the results can also be generated. In addition, this particular study made use of the property tax model to obtain the amount of credit paid for sample house values.

A second example of RAFT capabilities is the study done for the Citizen's League that compared property taxes paid during the current year with taxes paid in the previous year for selected taxing jurisdictions in the metropolitan area. RAFT had done this study in 1973 and 1974 for the League. This is a good example of the use of the property tax model. The analysis is entirely performed by the model and accurately reflects recent legal changes, such as the new homestead credit rates. This ability to accurately reflect legal changes and yet still compare net effects underscores the flexibility of the tool.

The project has completed a study of the property tax classification system for the Tax Study Commission. This is an example of the tool's application to studying fundamental changes in the tax system. To date, twelve different proposed class structures have been tested for all counties, selected cities, and statewide. More alternative systems will be studied. The report on each proposed system indicates the changes in taxable value, the changes in taxes paid in the jurisdiction, the changes in homestead credit received, and the effect on sample house values for both agricultural and non-agricultural property. Sample output is shown in Figure 1.

These three samples of RAFT's performance show the diverse nature of the analyses to which the tool can be applied. One of the illustrations, the Homestead Credit Study, is an example of fine tuning a complex part of the property tax system. The Citizen's League Comparative Tax Study shows the tool's use in evaluating effects of the tax system over time, even though the system may change. The Classification Study is an application of RAFT to fundamental changes in the structure of taxation. The uses the tool has already been put to exemplify the flexibility of RAFT. The speed and accuracy of the tool make possible the consideration of many alternative policies.

The future direction of RAFT includes the expansion of the tax alternative analysis function, the improvement of county-state fiscal data collection, and the establishment of

this large area involves collection and analysis of extensive amounts of quantitative data that must be easily processed and readily retrievable. A systematic computer aided approach has become a key part of ARDC planning operations.

The range of uses for the computer has grown with developments of both state and local importance. Land-use planning for the region requires information on the resources that currently exist. The Minnesota Land Management Information System (MLMIS) has used the Arrowhead as a pilot for collecting soils, forest, ownership, water and road orientation, and zoning information in addition to their original land-use information. Access of this data will become an evaluation tool for a regional outlook and an analytic base for land-use conflicts that develop.

Other types of data are also valuable for regional planning. One key source of information has been census tapes that the Minnesota Analysis and Planning System (MAPS) has provided on the University of Minnesota Computer. There are other computer data bases which exist such as the Rapid Analysis Fiscal Tool (RAFT) and the DNR Recreation Inventory which ARDC hopes to access in the near future.

Locally, the ARDC has instituted a system of coding zoning permit information as a means of evaluating where land-use conflicts may be occurring. This system is not fully developed at present but work is continuing so that computer analysis and mapping of development pressures will be possible. In addition, data is being collected for analysis on projects such as the Voyageurs Planning Area study, the Lake Superior Erosion Damage Survey and the Lake Superior Coastal Zone Management Program.

The computer is valuable in these uses because it allows for rapid analysis of large volumes of information. In most cases the University of Minnesota Cyber 74 has been used through the terminal located at the University of Minnesota, Duluth. The flexibility of the analysis and research tools available on the University computer has made this the most advantageous system to access. With the new point plotter (see figure 2) that is available and the ease of using the University system, every use to date has provided significant results for use in ARDC planning efforts.

BLACK INCOME

CURA's Office of Intercultural Programs (OIP) is involved in a wide variety of activities dealing with expansion of educational and employment opportunities for racial minorities. A later issue of the *Reporter* will cover these activities in greater detail.

One of the major activities is exploration into types, depths, causes, and effects of racial discrimination in Minnesota and especially in the Twin Cities Metropolitan area. The results of these explorations provide both goals and a rational operating framework for constructing affirmative action programs.

Most of this exploration involves a tremendous amount of data synthesis. Some work has involved much graphics. Because of this, the computer has been used to aid in analyses.

One such study is in its initial stages. It is a study of minorities in the criminal justice system. The data includes recent information from some 7,000 court cases and 900 corrections cases. The purpose is to determine whether there is any significant difference in the treatment of racial minorities in this system.

Another study used the 1970 Census of Population to examine income differences between the population of the Twin Cities SMSA (5-county Standard Metropolitan Statistical Area) and its Afro-American component. The populations were stratified first by sex and industry, then by sex and occupation. In most cases blacks were found to be overrepresented in the lower income categories even though they were working in the same occupation or industry.

The results of this study seemed significant. The problem was to present them in a way which would be both understandable and convincing. Graphical presentation seemed to provide an answer. Figure 3 shows the percentage distribution by race of males employed in the industrial classification of Public Administration.

The program to produce this graph and the graph itself were prepared by the Social Science Research Facilities Center. Were only a few graphs to be prepared, hand drafting would have been cheaper and simpler to prepare. But the number of graphs needed was large enough to dictate computerization. The programmer needed just over 1/2 man-day to write the program and then any number of graphs could be prepared for a small marginal effort.

The results of these various studies are being used to develop OIP strategies. They are also being presented publicly to make public

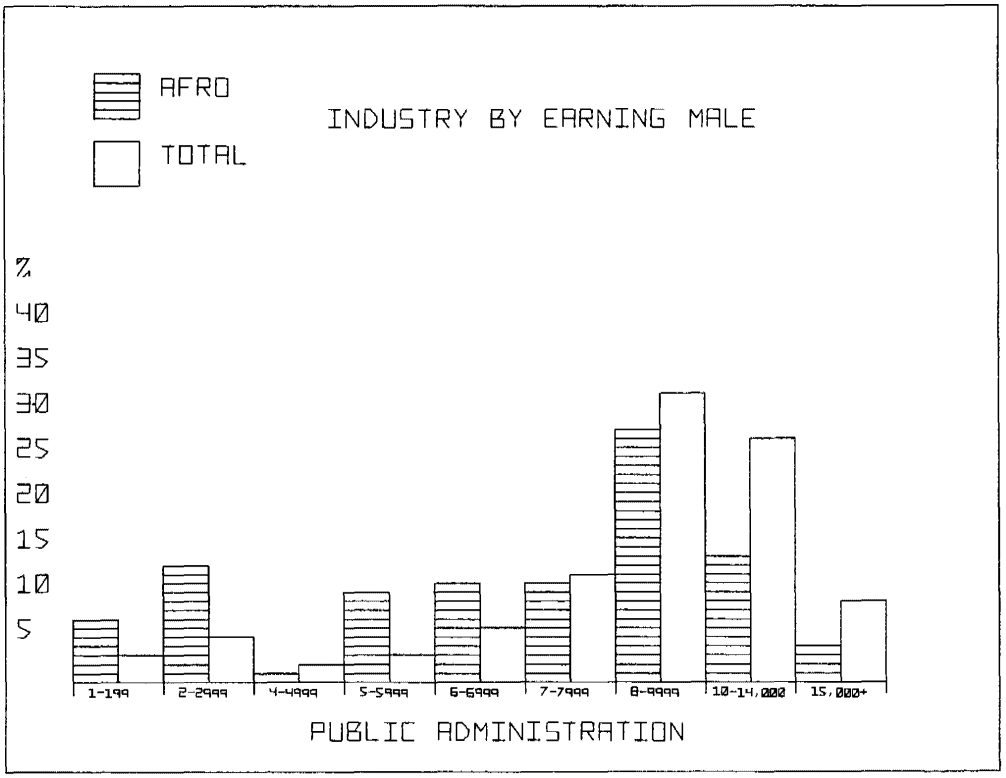


Figure 3

officials, educators, and employers aware of the continued problems of prejudice and the need for more work to solve these problems.

COUNTY HOUSING PROFILES

CURA has operated the Office of Planned Residential Development and Housing Research for two years. A central concern of the Housing Office is providing data pertaining to housing which can be useful in dealing with Minnesota's housing problems and planning future housing and housing-related activities. By initiating and coordinating housing and housing-related research and studies, it helps to focus University resources on community and statewide housing programs and problems.

One of the keys to resolving housing problems in the state is information. Information that will provide state officials with an accurate picture of state problems. Data that can substantiate the requests of local officials for assistance in solving local problems.

Much of this information is contained in the Federal decennial Census of Housing taken in conjunction with the Census of Population. The Census, however, has an overwhelming amount of information. More than can be digested or used by most people who need to use it. Through *THE COUNTY HOUSING PROFILES*, the Housing Office attempted to reduce the vast amount of information from the Census to understandable proportions which would allow regional and state comparisons to be made.

The profiles consist of a series of tables and graphs showing some of the more significant housing data from the 1970 Federal Census for each county in Minnesota. Comparisons were made with regional and state data; fifteen different data items are mapped by county for the state. These latter include such data as: percentage of urban and rural farm and nonfarm housing units, percentage of owner-occupied units, average number of persons per unit, rents, values, age of housing structure, household income, availability of plumbing and heating facilities, etc.

All of this data was available on computer tape at the Minnesota Analysis and Planning System (MAPS) of the Agricultural Extension Service on the St. Paul campus. The tables and graphs were designed manually for a single county using data primarily from the fourth-count Census tapes. A programmer was then hired on a short-term basis to write a program to generate profiles for each county by computer. The tables, graphs and maps were printed by computer, reduced and reproduced in quantity. Figure 4 is a sample computer map from the map supplement to the publication. County profiles were distributed to a large number of public officials including appropriate county officials, Regional Commissions, and members of the State Legislature. Copies of *THE COUNTY HOUSING PROFILES* and related state maps are available from the Office of Planned Residential Development and Housing Research, 1515 S. 4th St., #32, Minneapolis, Minnesota 55455. Telephone: 373-5865.

AVTI ENROLLMENTS

The Research Coordinating Unit of the College of Education sponsored a study of future enrollment in Minnesota's 33 area vocational technical institutes (AVTI). The information is needed by state planners in the Department of Education as a part of basic management information for their long-range planning purposes. Specifically, these planners are now faced with the evaluation of a $78,000,000 building program for the next biennium. Probable long-range demand for such capital investments at the different AVTIs making requests was evaluated in large part through the anticipated enrollments to be accommodated in facilities at these locations.

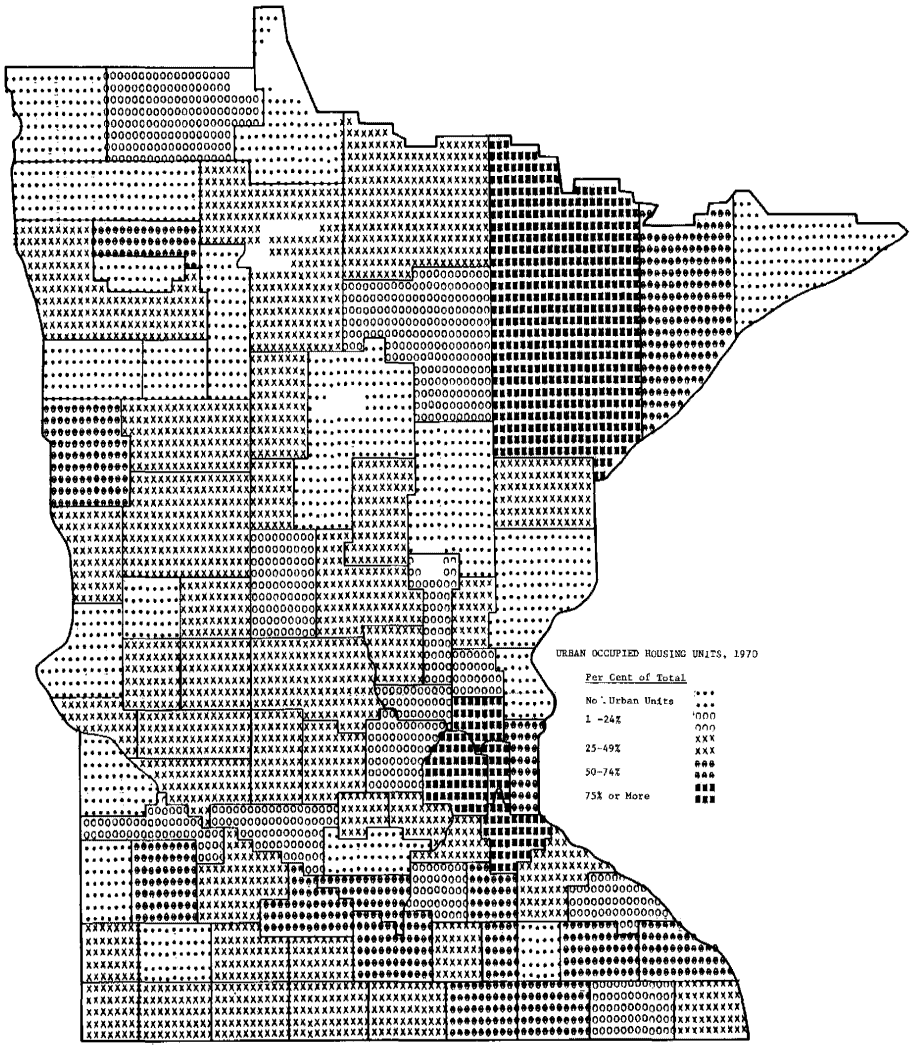


Figure 4

CURA provided 3 man-days of programming assistance and the necessary 15 dollars of computer time and supplies in the development of the 18 year enrollment projections generated for each of the AVTIs as a part of the enrollment study. The enrollment projection method involved gathering several recent years of AVTI enrollment data for each of Minnesota's 87 counties. Future enrollments were projected from past enrollment patterns and projected high school graduates. Three different sets of assumptions were used to account for demand projection based on: continued current enrollment conditions, the number of hard applications received, and the number of persons with soft applications or expressed interest in enrolling. Three sets of enrollment projections for the next 18 years for each of the 33 AVTIs from all of the 87 counties were generated on this basis. The quantity of data required to develop these projections could only have been handled by a computer in the few months available to complete the study in time to meet legislative deadlines.

The three sets of AVTI enrollment projections were provided, graphed, and passed on to the AVTI planners in the Department of Education in rough form. In this case the computer prepared all of the data and the graphing was done by hand. These results will appear in a formal report of the study. This report will probably go to the Legislature sometime early in 1975. The long-range implications of the enrollment projections suggest general health for the AVTIs (especially compared to the troubled future for colleges) with a few exceptions. These exceptions will be the focus of concern in redistributing programs, and hence enrollments, among AVTIs in the next few years.

SECCHI DISC PROJECT

The Limnological Research Center of the University of Minnesota coordinates and conducts research on the history and behavior of lakes. Its members include faculty and graduate students in the regular teaching departments of geology and the biological sciences. Much of the research involves the nature and behavior of lake organisms and their environment. Recently much effort has been applied to current problems caused by pollution and human land use practices. Projects have been undertaken to survey and classify Minnesota lakes according to their limnological characteristics. Such characteristics include biological populations and water chemistry. The Secchi Disc Project, which involves substantial citizen participation, has been established to survey water transparency in a large number of Minnesota lakes.

Participants in the program perform a lake-quality test with a simple instrument called a Secchi disc. This is a flat white disc 8 inches in diameter that measures transparency of lakewater. The disc is attached to a calibrated cord and lowered over the side of a boat. The depth at which it is no longer visible is recorded as the Secchi disc transparency.

Water transparency is measured because it can help lake scientists understand some of the biological activities in lakes. There are three factors that normally determine water transparency:

1) the amount of silt, or small particles, suspended in the water,

2) the amount of colored, dissolved chemicals that may color the water yellow or brown, and

3) the population of tiny green plants — *algae* — that grow in all lakes.

Generally, algae are most important. Away from shore in a lake of reasonable depth, changes in algal populations cause most fluctuations in water transparency. Since algae are an important part of all lakes, observations of water transparency are significant. Algae are green plants that are the food source for many small aquatic animals which in turn are the food for game fish. They are also sensitive indicators of several kinds of water pollution and other lake problems. Over the years a *decrease* in water transparency might mean an *increase* in algal population caused by an increase in nutrient inflow, which often accompanies inadequate sewage disposal and modified land drainage.

Project information is handled by computer because of the ease it provides in storing and manipulating large numbers of data. The computer was used to format and list the data with simple tabulations. This single program was prepared by CURA in less than one day. In addition a program was designed and prepared at the Social Science Research Facilities Center, on the West Bank campus, to graphically summarize the data for each lake. Figure 5 is a sample of that output for Crystal Lake. The programs were prepared in less than 1/2 man-day. Operating costs run only a few cents for tabulation and graphs for each lake were prepared in about 20 minutes each on a slow Calcomp plotter.

There are several objectives that this project is expected to achieve: 1) It should test the value of gathering natural resource data through citizen observations; 2) It should increase public awareness in matters of water quality; 3) The information gathered will be used to compare lakes throughout the state in order to locate unusual or problem lakes; 4) The information will serve as a baseline with which to compare future changes.

Project results should be useful in identifying lakes of exceptional water transparency, lakes of noticeably poor transparency, and lakes with changing transparency. More detailed investigations will be able to identify lakes for which protection or restoration should be considered.

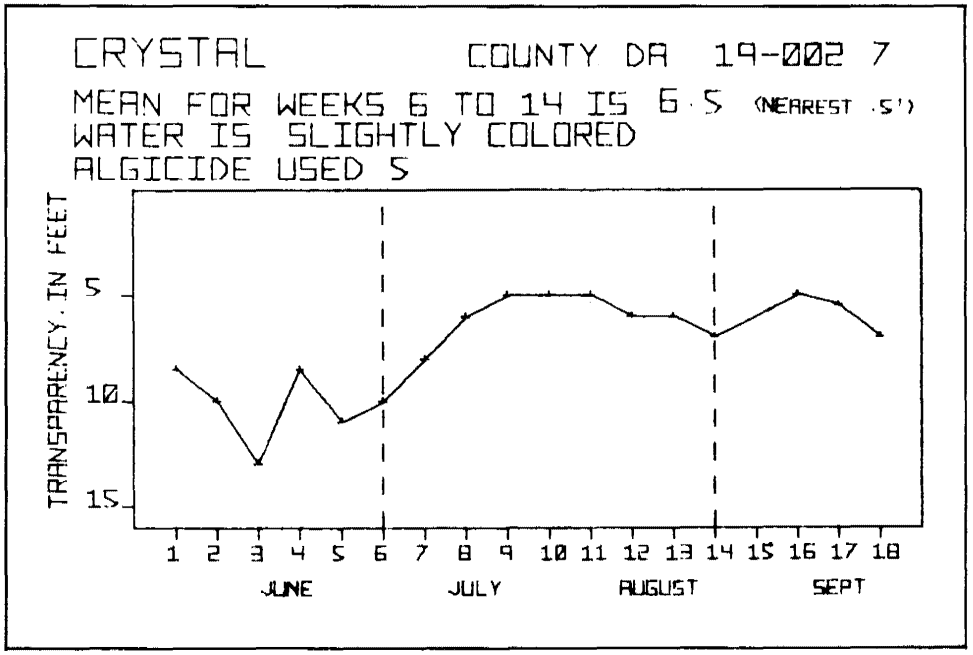


Figure 5

Additional information is being added to make the data base useful to decision makers. Each parcel record will have information on the county zoning, land form geology, soil type, and road frontage for that parcel. Within the state's forested counties, forest cover type will be included.

The wide ranges of land-use opportunities and conflicts in the Arrowhead portion of northeastern Minnesota have made this region the first priority for collecting the additional information. Since one of the major land uses in that portion of the state is mining, information on bedrock geology, mineral potential, and the presence or absence of a Copper-Nickel lease have been added for this region. (Other regions of the state may also have special data items pertinent to their specific problems.) Virtually all information for the Arrowhead region has already been added to the data base.

Getting such data into the computer is a significant task, but not as difficult as getting it back out in a meaningful and useful form. Itasca county has been the pilot area for testing analytical theories and output techniques. Figure 2 is an interpreted soil map of the county. The map shows, in grey tones, the productivity of the soil for forage crops. The darker the tones, the more productive the soil. The MLMIS data contains the soil type for each parcel. Productivity ratings of each soil type in terms of total digestible nutrients were made by the Soils Department at the University. The map was produced at the University Computer Center on an electrostatic dot-plotter. The computer program to produce the map was obtained from a local non-profit firm, Earth Systems Research Inc. The actual cost of producing this map on the computer was under three dollars.

Most of Itasca county is presently forested. Were prices for agricultural products to increase substantially faster than other goods and services, some pressure may develop to force this forested land into agricultural land. The darkest portions of Figure 2 would be the most productive land to convert to forage crops. But factors other than inherent capability need to be considered in determining the *suitability* of each parcel for conversion. Data concerning accessibility to highways, current land use, zoning and ownership supplements the base productivity information to indicate which parcels might be the most reasonable to convert under these circumstances. This is but one situation where a land-base resource system might be of use to decision makers.

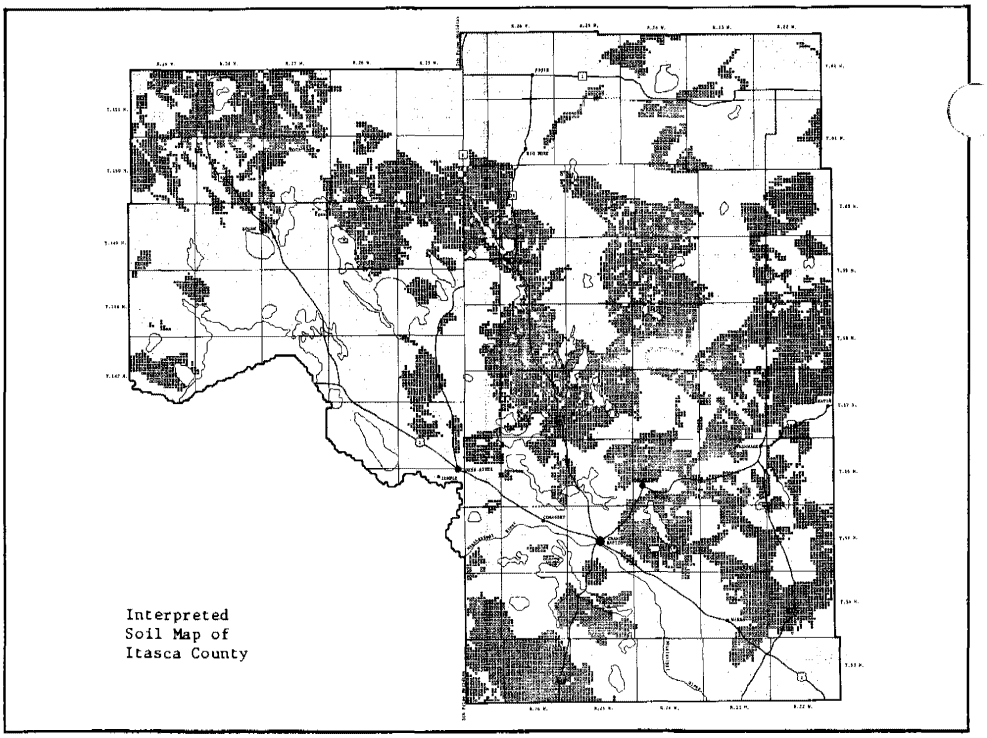


Figure 2

A very large amount of analytical and technical work remains to be done. MLMIS is working with public agencies such as the State Planning Agency, other state departments, and the Arrowhead Regional Development Commission (see that heading in this issue) to assure the applicability of the data and the system to real world problems. Where additional data is needed to deal with a problem, data coding standards must be developed and collection strategies devised. MLMIS is working with various data experts such as the Soil Conservation Service and various University departments to assure the integrity of the data base. Data entry, storage, manipulation, and output techniques must be further developed. The task is large, but necessary if we are to deal with our land in a rational way.

TASKS SUPPORTED BY COMPUTER

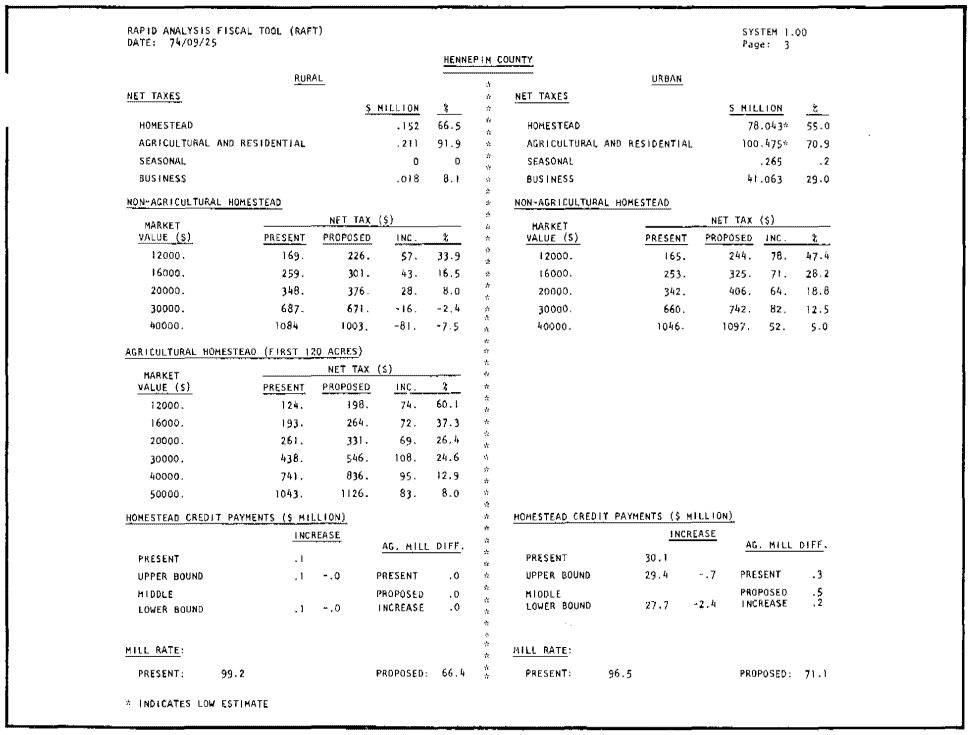
In each of the following examples, an office with a larger goal made use of the computer to complete a specific task. Typically those offices had no internal computer "experts". They came to the CURA central office looking for minor assistance and were aided directly or sent to persons who could provide more help.

Each of these projects was attempting to do something unique. Although these projects were too complex to use "on the shelf" computer packages, they were achieved on the computer with relative ease. CURA became involved in these projects because each project deals with a topic important to Minnesotans.

REGIONAL PLANNING INFORMATION SYSTEM

By executive order, every Minnesota county is contained within one of 13 regional development areas. Region 3, the Arrowhead Region, contains 23% of the state's area. Its commission is the oldest and most active in Minnesota. The staff is also the largest in the state. The following is a report of the work of that staff to develop a regional information system.

The Arrowhead Regional Development Commission (ARDC) is currently developing a Regional Planning Information System to aid planning for the seven county Northeastern Minnesota area. Planning for



RAPID ANALYSIS FISCAL TOOL (RAFT)
DATE: 74/09/25

SYSTEM 1.00
Page: 3

HENNEPIN COUNTY

RURAL

NET TAXES

	$ MILLION	%
HOMESTEAD	.152	66.5
AGRICULTURAL AND RESIDENTIAL	.211	91.9
SEASONAL	0	0
BUSINESS	.018	8.1

NON-AGRICULTURAL HOMESTEAD

MARKET VALUE ($)	NET TAX ($) PRESENT	PROPOSED	INC.	%
12000.	169.	226.	57.	33.9
16000.	259.	301.	43.	16.5
20000.	348.	376.	28.	8.0
30000.	687.	671.	-16.	-2.4
40000.	1084	1003.	-81.	-7.5

AGRICULTURAL HOMESTEAD (FIRST 120 ACRES)

MARKET VALUE ($)	NET TAX ($) PRESENT	PROPOSED	INC.	%
12000.	124.	198.	74.	60.1
16000.	193.	264.	72.	37.3
20000.	261.	331.	69.	26.4
30000.	438.	546.	108.	24.6
40000.	741.	836.	95.	12.9
50000.	1043.	1126.	83.	8.0

HOMESTEAD CREDIT PAYMENTS ($ MILLION)

	INCREASE		AG. MILL DIFF.	
PRESENT	.1			
UPPER BOUND	.1	-.0	PRESENT	.0
MIDDLE			PROPOSED	.0
LOWER BOUND	.1	-.0	INCREASE	.0

MILL RATE:

PRESENT: 99.2 PROPOSED: 66.4

URBAN

NET TAXES

	$ MILLION	%
HOMESTEAD	78.043*	55.0
AGRICULTURAL AND RESIDENTIAL	100.475*	70.9
SEASONAL	.265	.2
BUSINESS	41.063	29.0

NON-AGRICULTURAL HOMESTEAD

MARKET VALUE ($)	NET TAX ($) PRESENT	PROPOSED	INC.	%
12000.	165.	244.	78.	47.4
16000.	253.	325.	71.	28.2
20000.	342.	406.	64.	18.8
30000.	660.	742.	82.	12.5
40000.	1046.	1097.	52.	5.0

HOMESTEAD CREDIT PAYMENTS ($ MILLION)

	INCREASE		AG. MILL DIFF.	
PRESENT	30.1			
UPPER BOUND	29.4	-.7	PRESENT	.3
MIDDLE			PROPOSED	.5
LOWER BOUND	27.7	-2.4	INCREASE	.2

MILL RATE:

PRESENT: 96.5 PROPOSED: 71.1

* INDICATES LOW ESTIMATE

Figure 1.

a service institution. Tax alternative analysis already has a solid foundation in the Individual Tax Models. The property tax model was the basis for the Tax Study Commission's Homestead Credit Study and the Citizen's League Property Tax Study both mentioned above. Three other groups of models will build on this foundation. The Aids Models will determine the amount of federal/state aid that a unit of government will be receiving. The Budget Models will calculate the expenditure and receipts of a government unit while determining the amount they must levy. The Aggregate Models will determine the receipts which each government unit will receive from a particular tax.

MLMIS Minnesota Land Management Information System

The Minnesota Land Management Information System (MLMIS) project is building a management information system for land and related air and water, for the state of Minnesota. The goal of the project is to improve the process of making land-use decisions within the state. Financial support for the project has been provided by federal funds through the Upper Great Lakes Regional Commission and the Department of Housing and Urban Development; by state funds through the Minnesota Resource Commission, the State Planning Agency, the Minnesota Highway Department, the Minnesota Land Exchange Review Board, the Department of Administration, and the University of Minnesota-CURA; and by funds from the Rockefeller Foundation through a contractual arrangement with the University of Wisconsin.

This support base is indicative of both the broad interest in land-use planning in general and in MLMIS specifically. While legislators in Washington seem to be approaching the brink of distributing millions of dollars to the states to assist them to get their land-use planning efforts going, Minnesota has been creating a land-use planning program for years. MLMIS is an integral part of that program.

In his recent MLMIS publication, *Perspective on Minnesota Land Use-1974*, John R. Borchert describes the land-use problems facing the state. They fall mainly under five headings.

— Too much or too little land available for current development

— Timing of basic utility and street or road improvement

— Protection of natural or historical legacies

— Incompatible neighboring land uses

— Allocation of improvement costs to those who benefit or profit from them

These are the problems which the state must confront. Borchert's analysis indicates four basic remedial actions.

— Continuing inventory of resources, land use, land value, and land ownership with periodic summary, analysis and projection.

— Incorporation of performance standards into the definition of each land use category.

— Criteria for rating any parcel of land according to its suitability and priority for each major class of development or preservation.

— Criteria and priorities for public purchase of land to protect natural and historic legacies.

Each of these remedial actions implies 1) widespread information, continuously available, on accessibility and site conditions of all of the land resource and 2) regulations based on that current and widespread information about the land. Government is in the best position to collect and disseminate the information because of the multiplicity of data normally collected in connection with taxing, licensing, and permits. Government regulations based on that information are most likely to be credible, attainable, and subject to monitoring for performance and evaluation.

MLMIS is a land based information system which is striving to create the public information base called for above. Data has been collected using the Public Land Survey (PLS) by which the state was originally subdivided. Information relating to each quarter-quarter section (40 acre parcel) in the state has been put into computer readable form. With over 84 thousand square miles of land and water in Minnesota, 1.36 million records of data are available.

The following information has been recorded and is on computer tape for every parcel of land in the state. Information on land use as interpreted from 1969 high-level flight aerial photographs. A 1:500,000 scale color wall map showing the 9 coded categories of land use produced directly from computer printouts of this data. If a parcel touches water, that fact is noted. If a parcel is owned by the state or federal government, the controlling agency is indicated. And, county, minor civil division, and PLS locators are available to identify each parcel.

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