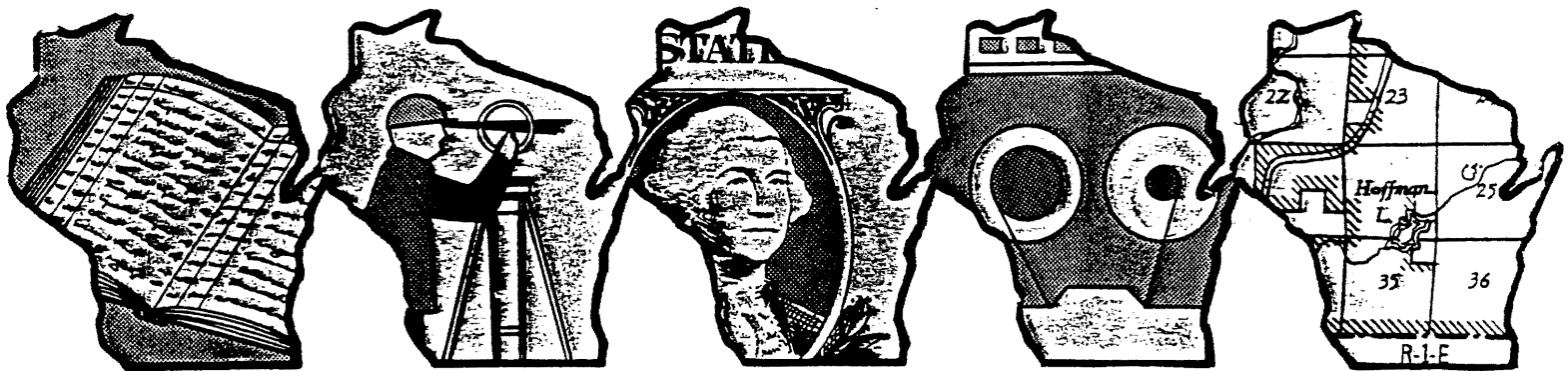


LAND RECORDS the cost to the citizen
to maintain the present
land information base
a case study of Wisconsin



LAND RECORDS:

THE COST TO THE CITIZEN TO MAINTAIN THE PRESENT LAND INFORMATION BASE: A CASE STUDY OF WISCONSIN

**Sponsored by the Council
of State Governments**

**Funded by the
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Resource and Land Investigations (RALI) Program**

**Project Conducted by the State of Wisconsin
Department of Administration
Office of Program and Management Analysis
1 West Wilson Street
Madison, Wisconsin 53702**

in conjunction with the

**University of Wisconsin-Madison
Institute for Environmental Studies
Environmental Monitoring and
Data Acquisition Group
WARF Building
Madison, Wisconsin 53706**

January 1978

ABSTRACT:

LARSEN, BARBARA, et. al.

1978. **Land Records: The Cost to the Citizen to Maintain the Present Land Information Base, a Case Study of Wisconsin.** Madison: Department of Administration, Office of Program & Management Analysis. (1978) 64 pp.

The report documents the costs to the citizen of Wisconsin to collect and maintain land records for the state during fiscal year 1975-76 for all federal, state, regional, and local governmental units which are responsible for producing, collecting, and maintaining records about the land. Definitions are provided.

In addition duplication between and within governmental agencies is identified. Past and present Land Records Systems in the state are reviewed; problems with present systems are discussed, conclusions are reached, criteria for improvement are recommended, alternatives are presented, recommendations are offered and implementation strategies are provided.

The research procedure is described and the associated expenditure data is included in the Appendices.

KEY WORDS:

Land records, land information, citizen costs, property records.

July 6, 1978

Mr. John Torphy, Secretary
Wisconsin Department of Administration
Room 211, One West Wilson Street
Madison, Wisconsin 53702

Dear Mr. Torphy:

We are pleased to present the attached report on Land Records: The Cost to the Citizen to Maintain the Present Land Information Base--A Case Study of Wisconsin. As you know, this project was conducted by the Department of Administration through the sponsorship of the Council of State Governments and the U.S. Department of Interior's Resource and Land Investigations Program.

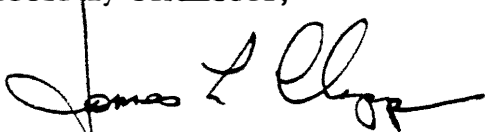
This report is the result of joint effort between the Department of Administration and the University of Wisconsin. It demonstrates that Wisconsin state government and the University of Wisconsin still cooperatively strive toward resolution of difficult and pervasive state issues.

In this report we have presented not only our goals and the ideal as we see it, but have offered also some practical and incremental steps for reaching those goals. In our opinion, this is a landmark study. It is our hope that decision-makers on all governmental levels will find it useful.

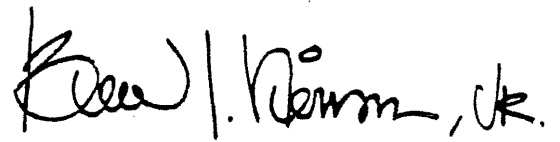
We assume total responsibility for the contents of this report, including the research, findings, conclusions, and recommendations.

We greatly appreciate the extensive cooperation and assistance we received during the study from town, village, city and county officials as well as from officials in state agencies, utility companies, regional entities, and federal programs.

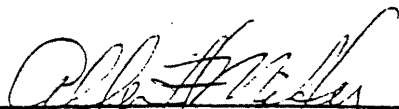
Respectfully submitted,



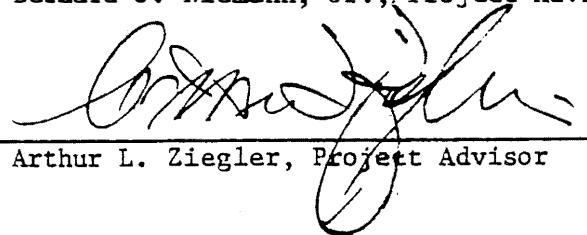
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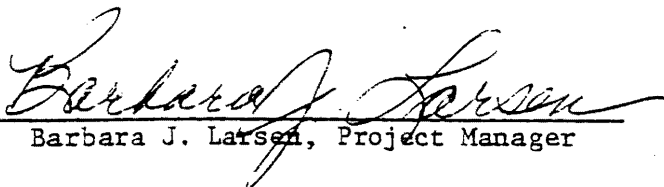
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PREFACE

The Resource and Land Investigations program (RALI) of the U.S. Department of the Interior (U.S. Geological Survey) has been concerned about the availability of adequate land use data and land information within government for land and resource planning and management. * As part of this concern, RALI funded a project with the Council of State Governments to identify problems with the Geological Survey's mapping and data collection and dissemination systems for the purpose of making recommendations for improving federal responsiveness. State governments were to be case studies. Texas, Connecticut and Wisconsin were selected.

Wisconsin as a case study differed from the other two states: it was itself to report the costs associated with obtaining and maintaining governmental information about land. As with the other two states, Wisconsin was to identify problems with and suggest improvements in land data production and dissemination. This Wisconsin case study is officially called "Land Records: The Cost to the Citizen to Maintain the Present Land Information Base, A Case Study of Wisconsin." For convenience it will be referred to in this report as the "Land Records Project."

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*RALI Sponsored Publications, Resource and Land Investigations, Geological Survey,
U.S. Department of the Interior, April 1977.

ACKNOWLEDGMENTS

The Land Records Project manager wishes to acknowledge the considerable administrative and research assistance of the Wisconsin Department of Administration and the University of Wisconsin-Madison's Institute for Environmental Studies. Faculty from the Institute's Environmental Monitoring and Data Acquisition Group (EMDAG) were members of the project's advisory committee and assisted greatly in the development of this report. The State Cartographer and a representative of the Office of State Planning and Energy also contributed to the project as participants and as advisory committee members.

The Land Records Project staff expresses sincere thanks to the many governmental and utility company officials who gave so generously of their time during the extensive interviews and consultation process. The project staff is particularly grateful to the University of Wisconsin-Extension's Survey Research Laboratory for assistance in sampling methodologies and to the numerous county-based University of Wisconsin Extension Agents who helped project staff gather data from local government officials.

The project manager specifically acknowledges the assistance received from the Department of Administration's Demographic Services Center and Administrative Services Division, and thanks the many other departmental and University staff for their help in producing the report. The cover was designed by Jeannine Schonta.

B. Larsen
January 1, 1978

THE WISCONSIN CASE STUDY

I. EXECUTIVE STATEMENT OF THE WISCONSIN LAND RECORDS PROJECT

The Resource and Land Investigations Program (RALI) of the U.S. Geological Survey, Department of Interior, and the Council of State Governments have long recognized that there are problems with the way various levels of governmental agencies collect, display, and maintain information about this country's land. Dramatic changes have occurred in the technology for both gathering and displaying this information, such as digitization of land data for computer storage and electronic production of maps. These agencies are aware that government managerial systems have not kept pace with the technological improvements.

Problems related to technological improvements involve the great amount of data being generated in more sophisticated ways and placed on maps and charts. However, agencies at each level of government independently go to great expense to compile and display the data often without knowledge of or regard for what others are doing, planning or have already done. Seemingly, everywhere in the U.S. land data are being gathered, developed, and manipulated without a correlated plan for reducing cost, for avoiding duplication of effort, or for exchanging information laboriously compiled.

All this activity occurs but without a resultant, composite picture of what is happening physically to the land and to its tenure. No common base of information has developed about land — its political or ownership boundaries, its surveyed markers and accurate measurement, its profitability, its physical characteristics, its use or economic potential. Many recent studies done by RALI and the Council of State Governments, and documented in the Wisconsin Case Study, show this perception to be correct.

The Council of State Governments, as part of this research effort, submitted a proposal to the U.S. Geological Survey to seek ways of improving federal responsiveness to state land information efforts. Two states, Texas and Connecticut, were selected to demonstrate how they coordinate land data and data products among state agencies and with federal agencies. A third state, Wisconsin, was selected to do an independent

study that would document the costs of land records compiled by state, local, and federal governments.

In addition to the documentation of land records, Wisconsin was asked to estimate the per person and statewide costs of compiling land records, to identify problems with existing land record collection and maintenance procedures, and to provide alternatives and recommendations for improvement of land records.

The definition for *land records* as used in this project is: "Those spatially-related documents that record governmental interest in the physical, legal, and environmental aspects of the land—whether in, on, above, or under the surface of the earth." (See text for a more complete definition.) In this project, the costs of these records include expenses for collecting, storing, maintaining and updating land data and documents.

The Wisconsin case study is the only known research in this country that has documented minimum annual government expenditures for compiling land records.* Our study results show the approximate annual expenditure for land information and records at each level of government. The report estimates the amount spent per Wisconsin citizen to support the land record systems on each level of government. The figures cited below do not include the extensive land record expenditures made in the private sector. Such private costs include title searches, abstracting updates, legal fees, and data collected by construction, mining or forest product companies. This study does include expenditures by some public utility companies.

SUMMARY OF EXPENDITURES

(1) In 1976, local governments in Wisconsin spent an estimated \$9 per state resident, or \$41,117,989 for land

* See article discussing the surveying and mapping potential of various countries: A. J. Brandenberger, "Economic Importance of Urban Surveying and Mapping," *Plan: The Town Planning Institute of Canada* (Special Issue), circa 1970.

records. In addition, utility companies spent an estimated \$2.30 per Wisconsin resident or \$10,679,954 for land records statewide.

(2) Wisconsin state agencies, in Fiscal Year 1975-76, expended at least \$11,582,818 or about \$2.50 per citizen for information about land resources. This is nearly two and one-half percent of the amount spent that fiscal year on management of the Wisconsin environment.*

(3) Federal agencies, in Fiscal Year 1975-76, spent a minimum of \$15,349,545 in public funds or about \$3.30 per Wisconsin citizen to collect, store, and display information about this state's land resources.

(4) In total, Wisconsin residents paid approximately \$17 each or \$78,730,306 in 1976 for information about the state's 35 million acres of land. These figures translate to roughly \$2.25 per acre.**

SUMMARY OF FINDINGS

What kinds of governmental land record systems are Wisconsin citizens getting for their annual investment of \$17 per capita? Our researchers found serious difficulties with existing systems.

At the county level, a form of land registration remains essentially unchanged from the 1800's. Transfer or division of lands need not be registered with the county Registrar of Deeds and often is not filed with county tax lists. Even private and public actions affecting a piece of property, such as real property settlements in divorce cases, estate and inheritance restrictions, and governmental zoning and development plans, may be filed with separate county offices. This lack of uniform recordation with a single governmental office may unduly aid the profitability of private title insurance firms, abstracting companies, real estate and bank legal firms, and mapping companies that specialize in land ownership maps. The landowners, as property taxpayers, often employ these professionals to help interpret the ownership and political information about their lands — information that is secured by those firms from government records. Thus, this system results in a double payment by the citizen.

At the state and federal levels of government, many different agencies collect a great deal of raw data about characteristics of the land, water and air. These might include soil types, surface water quality, geologic forma-

* According to the 1976 Annual Report from the State Bureau of Financial Operations, in 1975-76 state agencies spent a total of \$4,722,528,845; of that amount \$472,522,622 was spent on the environment.

** The expenditure per income taxpayer would be at least twice that or \$34, since the number of residents filing income tax returns for 1976 was just over half the total state population.

tions, and forest cover. Regulatory and planning decisions are made on the basis of these data. Oftentimes these data are presented on such a broad scale that it is unclear whose lands are actually affected. The floodplain management programs exemplify the fallacy of attempting to regulate from a nonspecific information base. Generally, we found that local governments could not determine if all, or which parts, of individual properties were classified as being within the 100-year floodplain boundaries.

Many governmental agencies regulate and collect basic land information for the multitude of activities that occur on the land—each separately collecting only enough information to meet its legislative charge. There is no single government entity to “bank” the assorted data for broader use; nor is an entity responsible for assuring that the data can be compared or integrated. Thus government unintentionally collects again and again the same basic information about essentially the same areas of land.

CASE STUDY VIEWPOINT

A primary goal of the Wisconsin Case Study was to document the public dollars spent on land records in the hope of spurring governmental action to improve how those dollars are spent.

A second goal was to propose actions that would meaningfully address the core of the governmental problem with land records. We believe that disparate, piecemeal efforts are ineffective with land — our most basic resource. Long-term cooperative, intergovernmental efforts are required to change significantly such historic, traditional governmental activities as how land information is collected, displayed, recorded, and maintained.

These recommendations are made with our conviction that government has long been remiss in providing accurate collection, display, recordation, and integration of information about land. A concept basic to the Land Records Project is that land documents should be as multi-purpose as possible.

Another underlying premise is that a common base of information should be equally available to all who make land-related decisions, whether those decisions are personal, economic, or regulatory. Project members also believe that information should be collected and stored as close to the location of the land as possible. Local governments make tough, day-to-day decisions about land: they need complete, accurate, and easily accessible land information. On the other hand, state and federal governments need to provide clear and coordinated policy guidelines and data collection and mapping standards.

We advocate a strong intergovernmental effort to produce a truly effective system of land records. We recog-

nize that these recommendations cannot be implemented overnight. The state seems to be the most logical entity to lead this large, intergovernmental task.

RECOMMENDATIONS

The above premises, and the criteria for and benefits of a modern land record system (described in the text of the report), led the Wisconsin land record researchers to the following conclusions for all governmental levels and to the following recommendations for each level of government. These suggestions for governmental action were adjudged by the Land Records Project members to most comprehensively and directly address the issues and problems of governmental land records reported in this study.

A. Overall Conclusions

1. Land data collection should be at the lowest possible governmental level that has the technical ability to collect it accurately and efficiently.
2. Land data should be aggregated up from that lowest level to the higher levels of government.
3. Standard-setting for land data collection and display should be at the higher levels of government, to assure effective compilation and comparison among jurisdictions.
4. Each level of government — and each agency on each level — should be able to overlay or otherwise interrelate their land information, the usual method for doing this being a geographic reference system that is mathematically based.
5. Land information should be accessible and usable by all governmental agencies and levels.
6. One governmental entity on each level should be responsible for land records management and land information improvements.
7. Publicly held information about the land should be easily accessible to citizens, under uniform confidentiality standards consistently applied.

B. State Recommendations

1. Historically, the state has been delegated the authority for protecting and administering the land. It follows then that the state is the logical level of government to create an office called "State Registrar of Land Information."
2. The primary duties of the State Registrar should be to:

- a. promote effective, efficient and compatible land records systems among state agencies and, to the extent possible, among governmental levels;
- b. set standards for state, regional, and local government mapping and land data collection efforts;
- c. provide guidance to those county offices with major responsibility for land information, i.e.: Register of Deeds, County Surveyor, County Tax Lister and County Abstractor, if any.
- d. serve as the focal point for land and census information and as a review authority for state and federal agencies wishing to conduct land data collection or mapping efforts in Wisconsin; and
- e. provide the Wisconsin Legislature and Governor with requested land information and report on the improvements made and remaining in governmental land records systems;

3. A Land Records Council should be established to advise the State Registrar on technical and policy matters and to assist in setting standards for land data collection, display and maintenance.

4. Wisconsin state government should consolidate the land records functions that are related but dispersed among different state agencies and organizationally locate them within the Office of State Registrar of Land Information.

5. All state and federal agencies passing restrictions on Wisconsin lands should file that information with the State Registrar for transmission to counties.

C. Local Recommendations

1. County government would eventually be the primary access point for publicly held land resource information, as well as census information.
2. County government would then maintain and feed into a statewide, mathematically based, geographic reference system, subject to state standards;
3. County governments should consider creating a Registrar of Land Information (a logical expansion of the Office of Register of Deeds) to include the county surveyor's office and that of the tax lister and county abstractor, if any.
4. Each County Registrar of Land Information would be responsible for the efficient acquisition, storage, maintenance and retrieval of land information and census data and records within the county.
5. County and town government offices and special purpose districts with land information or restrictions on lands would then file that information or restriction with the County Registrar of Land Information. (Municipalities over 20,000 population may establish their own central office for land information; however, any restrictions

on lands beyond their boundaries would be filed with the County Registrar.)

D. Federal Recommendations

1. One entity on the federal level should be created or charged with responsibility for setting federal land record standards.
2. Consistent land information and display standards should be set among and within federal agencies, and between the federal government and state government. Wherever possible, standard-setting authority and data collection authority should be delegated to state government with guidelines for further delegation if appropriate.
3. Wherever technologically feasible, this federal entity should establish cooperative agreements with states or with local governments to do, for example, survey control work, land mapping and/or remonumenting of section corners, under state or federal guidelines.
4. Any federal agencies that impose restrictions on the use of lands should file those restrictions with the State Registrar of Land Information for transmittal to the appropriate county office.
5. A single federal entity should be responsible for land information and should encourage other federal agencies and state governments to examine their land records systems and to make improvements in their base of land information.
6. The federal land office should provide state and federal agencies with technical assistance and funding for land record improvements. It should have appropriate authority to set standards for land data collection and display.

The following paragraphs suggest strategies for implementing these recommendations.

IMPLEMENTATION

Recognizing that implementation of these recommendations should be a phased, cooperative effort, the Land Records Project members recommend that an intergovernmental and multidisciplinary committee for implementation be established by the State Department of Administration. This committee should consider, at least, the suggestions listed below, and it should draft legislation for consideration by the Wisconsin State Legislature. Suggestions should be offered for implementing the local and federal level recommendations.

A. Organization. Because of the complex nature and in-

tergovernmental impact of this land records charge, the State Registrar of Land information could be a separate entity or could be housed in an existing neutral, stable government agency that is presently without major land regulatory or advocacy responsibilities. The agency should have the requisite high-level authority and visibility to deal effectively with the Legislature, the Governor, and with other state, local and federal agencies.

In the opinion of the Land Records Project members, several existing state agencies meet many of these qualifications. The Office of Secretary of State, for example, has a long tradition of land administration and records safeguarding; the Secretary is one of three Commissioners of Public Lands and the Office is charged by statute with the safekeeping of all documents relating to state-owned lands.

On the other hand, the Department of Administration has statutory authority to provide interagency services and to reduce overlapping state services; its statewide planning staff already has been active in land data inventorying and coordination. Lastly, the Department of Local Affairs and Development has a local government focus and has statutory authority for promoting certain intergovernmental plans and programs.

The Land Records Project members believe that several state entities should be combined with the State Registrar to both strengthen the new function and to consolidate fragmented but related state activities. Primarily, these offices include the State Cartographer (at the University of Wisconsin-Madison), the State Geologist and the Geological and Natural History Survey (at the University of Wisconsin-Extension), and the Plat Review Section (at the State Department of Local Affairs and Development).

Other functions that could logically be consolidated with the State Registrar include: the land data coordination and inventorying activity at the Office of State Planning and Energy, Department of Administration; the state lands inventory effort at the Bureau of Facilities Management, Department of Administration; the Geodetic Services Unit at the Division of Highways, Department of Transportation; and the water resources planning functions at the Department of Natural Resources. The Demographic Services Center at the Department of Administration should work closely with the State Registrar for Land Information.

The above entities function as basic land information-gathering and mapping services or as coordinators for parts of land records in Wisconsin. Those programs remaining in state agencies and having a major impact on the amount and form of land data collected and mapped should work closely with the State Registrar to insure consistency and compatibility of the records and to reduce duplication of effort among agencies.

B. Role. The State Registrar should perform the following specific functions: 1) Monitor the Cadastral Mapping Project underway in Racine County (funded by Coastal Management Program of the U.S. Housing and Urban Development Department); 2) Monitor the RESPA program (Real Estate Settlement Procedures Act) under the U.S. Department of Housing and Urban Development; 3) Analyze the merits of the remonumentation proposal of the Wisconsin Society for Land Surveyors; 4) Monitor and implement the Wisconsin Land Use Information System (WLUIS) now in the test and evaluation stage at the University of Wisconsin-Madison; 5) Do budgetary and program reviews to make improvements in the state's land information base and land records systems; and 6) Analyze statewide and intergovernmental issues of land information gathering and display, and make recommendations to the Governor, State Legislature, and federal government.

A Land Records Council should be established to assist the State Registrar in setting standards for land data collection and mapping. Primary functions of the Council would be to:

- advise on standards for mapping and for data collection;
- recommend criteria for confidentiality of land records;
- assist in implementing the concept of County Registrars of Land Information; and
- establish subcommittees to analyze specific land record issues and make recommendations.

The Land Records Council should be created under the general statutory provisions of Chapter 15, *Wisconsin Statutes*, and specified under the appropriate program chapter. Members should have appropriate technical, administrative, or academic backgrounds and should represent the private sector, county and municipal governments, and state government, including the University of Wisconsin System.

The State Registrar of Land Information should have appropriate technical, administrative, and academic quali-

fications. The position should be in the unclassified civil service.

The Land Records Project recommendations are consistent with the premises of the citizens' Commission on State-Local Relations and Financing Policy (Harry L. Wallace, Chairman; *Final Report*, January 1977) for greater local government responsibility, flexibility, and responsiveness. The Land Records Project members specifically support that Commission's recommendations for a state-level Land Review Board.

C. Funding. Acting Governor Schreiber has suggested a \$62 million WISCONSIN FUND to improve the environment and preserve and acquire lands for recreation. A logical, basic aspect of this fund, in the opinion of Land Records Project members, is improvement of the overall land information base.

Portions of the "701" comprehensive planning funds from the U.S. Department of Housing and Urban Development might also be used to support the effort to improve the land information base and to reduce duplicative activities of governmental agencies. Or, the U.S. Department of Interior might be approached to help fund the suggested land records improvements, an area traditionally of great importance to that agency.

A percentage of the registration fees paid by the Engineers and Land Surveyors in Wisconsin might also provide some funds for upgrading and integrating land records. Other in-state funding sources might include a tax on mining or utility companies, a portion of the forestry mill tax funds, or a portion of the real estate transfer tax paid by citizens whenever they buy or sell land.

Any existing state program that is transferred to the State Registrar's Office logically would be expected to bring along its operating funds.

The reader now has seen our summary of findings, our statement of research assumptions, and our detailed recommendations and implementation strategies. The following section of this report describes the conclusions that formed the basis for the recommendations.

II. CONCLUSIONS

With the assumption that our reader was introduced to the Wisconsin Land Records Project in the preceding Executive Statement, we are beginning the in-depth report of the Wisconsin Study with our detailed conclusions.

When we examined the existing mechanisms and efforts designed to improve the land information system (or systems) in Wisconsin and in the nation, a series of problems were identified that plague attempts to organize efficiently the variety of land records and information. The problems are categorized as land data or record accessibility, aggregation, integratability, duplication, confidentiality and institutional structure.

A series of examples were chosen to highlight the problems of collecting, maintaining and using land records and information. Some general conclusions can be drawn from the examples and the problems they represent:

- Public and private decisionmaking at all levels is hindered by a lack of knowledge about the land. Wisconsin's agencies do not know all they should about the land. What is known by individuals or agencies cannot be easily related to what others know.
- The problems have no easy solutions. The citizen or the agency official has no one to turn to for answers to all the questions about the 35,000,000 acres in Wisconsin, or about a particular acre.
- Access to what is known is restricted. This is frequently the result of incompatible formats for the various files of land data. Often the records are incomplete or scattered throughout several government agencies.
- The land records systems that do exist are inefficient. Frequently the basic information about a particular piece of land is collected several times. There is no common description of the land itself that is used by all groups concerned with land information.
- At present, citizen and agency needs for land information are satisfied minimally, at best. The question is: Can the current system adequately respond in the near future to increasingly complex and demanding questions of land use and land tenure?

A. Criteria for Land Records Improvement

In the judgment of the Land Records Project members, several criteria which must be considered in any serious effort to improve the land records situation. Meeting

these criteria will provide the individual, the local government, the state, and the nation with the necessary tools to face the land related issues of the future.

These criteria are large-scale maps, an accurate geographic base, quality control of records, decentralization of record collection, responsiveness to citizen needs, a stable records institution, maintenance of public information, standardization of records, and gradual implementation with an established goal.

1. Large Scale maps are needed for integrating land information. The growing need for integrated land records and information must be met by a system capable of handling a variety of information on a large scale, from the survey base to title transfer. This means that fieldwork, data resolution, and information presentation must be consistent with the level of land decisionmaking, that of the individual proprietary parcel. This process requires maps at scales significantly larger than those generally available in the United States.

Governments now generate some large-scale maps for specific geographic regions and for specific purposes. We contend that large scale maps can and should be used for many government purposes, from zoning and planning, to identifying forests and wetlands, to locating taxable parcels and historic features. Scales that we believe large enough are 1" = 400' (or a ratio scale 1:4800) and 1' = 1000' (or a ratio scale 1:1200), which are scales that can be easily converted to metric measurements. (Urban mapping would, of course, be a much larger scale).

To provide large scale maps for an entire region or for the state will require concerted effort by several governmental jurisdictions. Money for the multi-purpose, large scale maps might come from that saved through elimination of duplication and lack of separate mapping and information gathering.

2. A standard geographical base would make it easier to integrate land information. A survey control base is needed to create an integrated land records and information system. The survey or ground control base (such as monumented section corners whose coordinates have been determined) supports a geographical coordinate system. This system permits spatial reference of all land data to identifiable positions on the earth's surface. It can be used to form a common index for the land

records and resources information when that information contains a coordinate reference to the earth's surface.

The survey base must be designed to meet the most stringent spatial requirements to be imposed upon the system. For example, property owners, developers, or contractors might want to establish or determine the location of property boundaries, rights-of-way, or utility lines within a possible error of inches or fractions of an inch. A highly accurate survey base can make such precise measurements possible. Also, as land values and competition for the use of land increase, the acceptable amount of measurement error could become smaller. Therefore, not only present, but future requirements must be established.

Maintaining the survey base must also be considered, since portions of the survey base will be lost each year if adequate maintenance is not provided.¹ The establishment and maintenance of the surveying base must be institutionalized at a government level consistent with these accuracy requirements, probably the county level. Recent improvements in surveying technology can provide the means of establishing the necessary survey base at an economical cost.

3. Quality Controls or standards are needed for information going into an integrated land record system.

An important characteristic of an integrated land information system is providing records and documents that indicate both spatial accuracy and information validity. It is not sufficient to develop a system that more quickly acquires and processes bad information. Some standards are required for data and information to be accepted into the system. This does not necessarily impose criteria for identifying acceptable data. Rather, the data itself should carry the qualifications or limitations on how it can be used. Responsibility for assigning limitations may reasonably rest with the unit that introduces the data into the system.

4. To be most responsive, land information should be accessible and decentralized.

The problems with current governmental land information are decentralized. Information should be available to the citizen at the county or municipal level. Responsive information systems minimize the time required for individual access to the information. As data elements of a land information system approach the parcel level, the information available to the citizen becomes simpler to understand, as does its ramifications. The current growth in small computer technology is compatible with the utility and responsiveness of a decentralized system.

5. The land documents generated by the system need to be responsive to citizen needs.

To meet the multiple requirements of land transfer, assessment, planning, management, and environmental protection, an effective land records and resource information system must serve individuals as well as agencies. The citizen and

legislator, as well as the agency official and the entrepreneur, are becoming concerned with the comprehensiveness and quality of land information. As a result of citizen and legislative concern, a set of requirements could evolve that would provide for simple access to the system. The individual could go to a place that constitutes an "information store" and get prompt answers to questions about a particular piece of land. An information store concept also might allow user fees to support the system and to monitor the value to citizenry of the products generated by the land information system. The relative use of various land information products could be identified and evaluated during budgetary and program reviews.

6. Land information offices should be both institutionally visible and stable.

An integrated land records and information system need not imply a centralized land data bank. A citizen may get answers to questions about a piece of land from a single place that has compiled and integrated information from various governmental agencies. The Register of Deeds, the Tax Assessment office, the Planning and Zoning offices, and the Departments of Natural Resources or Revenue are some of the county and state agencies that basically would retain their traditional roles in the land records process. Thus essential stability is retained, as is the intergovernmental relationship. Once a common index for land information is established, and as computer technology progresses, these traditional repositories of land information can be linked electronically to provide rapid access to the information. Visible, decentralized "information stores" can be located in accessible public places in the county and could have computer terminals and trained personnel to assist citizen access to publicly held information about land.

7. Safeguards are needed to distinguish private or confidential information from public information.

The problem of confidentiality can be met if the land record system is defined to include only that information that is public. Public information should be accessible and correctable by the individual. Confidential information remains the possession of agencies traditionally responsible for such information. This information can be segregated and protected from the common and accessible land records and information system. In some cases aggregations of specific and confidential information may be introduced into the public record, but the specific information remains confidential and separate.

8. An integrated system of land information must have clear standards for collecting and recording data.

Standards for the collection, maintenance and representation of land data are essential. Many of these standards must be established on a national or statewide basis to insure integratability. Among these are standards for mapping, filing and recording land records. Because a common index depends upon a survey base, it is appropriate that standards for land survey and sec-

tion corner monumentation be at least of a statewide nature. This does not necessarily demand a single standard but could imply a series of well-defined standards, each appropriate to a particular local jurisdiction. Some standard setting can remain at the local level. For example, the form of land title documents may remain a matter of individual option. Local controls need to be sufficiently coordinated to insure introduction of the document into the common index.

9. Changes to governmental land information systems must be sequential. The development and implementation of any comprehensive land information system must proceed gradually. This is true both in regard to the elements in the system and to the geographic area covered by the system. Fully implementing or phasing-in the system within any geographic area may take several decades. Gradual, phased implementation is necessary, too, because the legislative and budgetary processes of local, state, and federal governments tend to address short term, readily identifiable problems rather than long-range, intergovernmental improvements. Implementing a comprehensive land information system requires foresight, commitment, and cooperation among our legislative and agency officials.

B. Description of Modern Land Records System

A vision of the world with a modern land record system is needed. This is an attempt to characterize such a world.

Publicly held land information should be close to and accessible to the citizens. The landowner, the governmental officials and citizens who must make decisions that affect land should be able to go to a convenient office to get answers to questions about the land. Within consistent confidentiality standards, one should be able to request and receive publicly held information about a particular piece of land or be told precisely where that information is. A clerk at the land information office should have the means to identify the appropriate piece of land and to provide an accurate response, in a reasonable time, and at a reasonable cost.

As now, the actual land documents may be scattered through the files of many repositories of public land data at several levels of government. For example, the information itself could be held by the Register of Deeds, a local tax lister, the zoning administrator, the regional planning commission, the county or city clerk, the county surveyor, and one of several courts, any one of several other government districts (such as the police and fire, sanitary, school or inland lake), any one of several state or federal agencies responsible for land data, and others.

Our visionary land record system allows all of these offices to be connected with one another through modern technology, in the form of electronic data processing. If

desired, the system could be housed in a conveniently located central office. When these offices use a common index for their land data, it will be possible to relate and to retrieve all the information by computer. Access can be provided at an office in the county courthouse. In densely populated areas more decentralized offices may be desirable.

An integrated land information system aids government officials as well as other citizens. These officials can serve taxpayers better when they have adequate, accurate information. State and local agencies can work together toward the same end, serving taxpayers and running their programs as cheaply, quickly, and effectively as possible.

An integrated land record system carries the notion that data gathering by various government levels would be cooperative and not duplicative.

Land decisions (public and private) must come from an adequate knowledge about the land. A perceived erosion of local control over land decisions may be the result, in part, of inadequate information systems. Those officials who represent the citizenry in land decisions do not always operate with all the information they need. They may be forced to rely on information provided to them by private groups with special concerns.

While the focus of this paper has been on the public agencies, it remains true that an integrated land records system also would provide information needed by private groups. In particular, title insurance companies, abstractors, and lawyers can benefit from such a system. The benefits should be reflected in lower costs for real estate transactions.

With our present legal and political system, disputes and issues may be settled under conditions where the parties do not have access to the same basic fund of information. When public information about land is involved, this right to access should not be proportional to the investment made in obtaining the information.

C. Benefits of a Modern Land Records System

There are several intangible benefits that derive from an integrated land information system. First, the system provides the needed foundation to regulate from an informed basis. The integrated system can work to hold together, in a rational whole, the often divergent public land regulatory schemes. This is possible because the system can provide the clearer picture of the full effect of land-related decisions and activities.

Second, the system can be an aid to economic development. Private individuals and companies may consider themselves advantaged when they know as soon as possible what effects a development will have on the physical character of the land and on the social and political

structure of a community. These firms and individuals are thus better able to avoid the resultant problems or meet the concerns directly, as they choose. Government also needs adequate land information in the early stages of proposed developments. This would assist in public analysis and regulation of certain developments, as well as reduce private investment in controversial activity such as siting for power plants.

Third, this system can be a major tool and can contribute to a more effective campaign for energy conservation. The full impact on environmental and energy resources can be more fully assessed with an expanded knowledge of proposed land activities. Environmental assessment programs tend to be rather specific in their concern with such things as air, water, and solid waste. Often environmental impact reports are prepared quickly for a particular place without full attention to a project's use of and impact upon energy resources in the region.

Fourth, a land records system that satisfies the criteria discussed in the previous section will help overcome the institutional problems plaguing those who use our present land information systems. An integrated land information system would allow departure from the traditional governmental focus on specific problems toward a more holistic approach to land problems.

Fifth, a modern system of land information will provide a better foundation from which to make the value judgments that are the bases for decisions to create a desired future world. The value of a system which seeks to satisfy the need for information cannot be measured simply by quantitative analysis. It is inherently beneficial to have a system that leaves options open, especially when that system provides information from which to make value judgments.

Specific benefits will likely result from an integrated land information system. These include:

- 1) Many state, federal and local dollars will be saved by improving governmental methods for collecting, storing, and displaying land information.
- 2) The land data and products that result from integrated information will be more relevant and useful to citizens and public officials than existing unintegrated data and products.
- 3) More informed—and thus more effective—public decisions are made possible by an integrated base of information about land.
- 4) Duplication among agencies and among levels of government—as well as incompatibility of products—will be reduced through the assignment of authority for resolving land records problems (such as lack of standards and quality control) to one governmental entity on the federal level and one on the state level.

5) Dollar savings will be possible and necessary in product sales and distribution, map production and cartography, research and development, and remote sensing technology.

6) Gaps in the land information system, and duplication in data collection, would become readily apparent with a comprehensive and unified approach that stores parcel-related information and indexes all regional and research information according to a standard format accessible manually or by remote computer terminals.

7) Advanced manual systems would serve the needs of small municipalities, towns, and counties as well as prepare them for eventual computerization; development of such manual systems could precede computer development as a means of establishing information needs.

D. Existing Structures

An analysis of existing governmental structures reveals that on no level is any one entity responsible for integrating and consolidating records about land. The foci of this institutional analysis were the state and county governmental levels. As outlined previously, the Wisconsin case study researchers concluded that the higher levels of government should set land record standards with the actual data collection and distribution occurring (whenever possible) at the lower levels. The state, as the primary interface between federal and local governments, should have an agency that could accomplish land records improvement and integration among governments. Does such an agency exist? What characteristics should it possess to be effective in unifying land records systems?

The land records project researchers settled on eight institutional requirements at the state level that are important to a land records agency:

- 1) Standard-setting authority in land information
- 2) Statutory authority in land records
- 3) Neutrality/objectivity (not regulatory or advocative)
- 4) Independence
- 5) Land records mission (primary responsibility)
- 6) Relationship with local and federal governments
- 7) Statewide/interagency perspective
- 8) Budget review authority

No single state entity meets all of these criteria. Those coming closest are the Office of Secretary of State, the Office of State Cartographer, the Department of Admin-

istration, and the Department of Local Affairs and Development.

record fragmentation and functional overlap among existing state structures and among state, federal and county levels of government.

The following matrix highlights some examples of land

EXAMPLES OF OVERLAPPING LAND RECORD FUNCTIONS AMONG STATE AGENCIES AND LEVELS OF GOVERNMENT.																				
	COUNTY-WIDE MAPPING (Not all-inclusive; some mapping excluded i.e.: geologic, highway)							CLASSIFICATION/INVENTORYING						AERIAL PHOTOGRAPHY		STANDARD SETTING FOR LAND DATA COLLECTION	REVIEWS			
	Tax	Public Lands	Agricultural Lands	Wetlands	Open Space	Soil	Erosion Potential (Slope) & Non-Point Source Pollution	Utility	Forest Crop	Agricultural Crop	Vegetative Cover	Land Use	Soil Survey	Wetlands	Public Ownership		Selected Sites	Statewide	Subdivision Plat	Review
STATE AGENCIES																				
ADMINISTRATION																				
Bur. of Facilities Mgmt.		X													X					
Office of State Planning & Energy		X			X						X		X	X	X	X				
AGRICULTURE			X		X				X										X	
HEALTH & SOCIAL SERVICES																			X	
LOCAL AFFAIRS & DEVELOPMENT			X														X	X		
NATURAL RESOURCES		X		X		X		X					X	X	X	X	X	X	X	
PUBLIC SERVICE COMMISSION							X										X			
REVENUE	X																X			
SECRETARY OF STATE																				
TRANSPORTATION															X	X			X	
UNIVERSITY OF WISCONSIN																				
State Geologist						X													X	
State Cartographer																			X	
Cartographic Lab.		X			X	X														
Soil & Water Conservation Bd.						X	X							X						
FEDERAL AGENCIES																				
AGRIC. STAB & CONSERV. SERV.									X						X				X	
BUR. LAND MGT.														X					X	
ENVIR. PROTECT.						X									X				X	
FISH & WILDLIFE				X									X		X	X			X	
FOREST SERVICE								X							X	X			X	
NATIONAL AERONAUTICS & SPACE ADMIN.													X		X	X				
SOIL CONSERVATION SERVICE			X	X		X			X				X		X				X	
US ARMY CORPS				X									X		X				X	
US GEOLOGICAL SURVEY															X				X	
COUNTY GOVT.	X		X		X	X	X	X	X		X	X			X				X	
REGIONAL PLANNING COMMISSIONS		X			X						X				X					
TOTALS	2	5	4	4	5	4	5	1	3	4	0	3	2	6	4	12	7	13	5	4

KEY: An "X" indicates actually compiling the land record. We have not included "X's" for those agencies using these land records.

While this matrix is somewhat imprecise, it does give a gross indication of the similarities and overlaps in land records functions on several levels of government. Responsibilities for land records are again fragmented among several agencies at the county level, the primary responsibility for land records resting with the Register of Deeds, the Tax Lister/or Abstractor and the County Surveyor.

Each county office except these three has a "counterpart" office at the state level—some "sister" agency that provides guidelines or direction. For example, the County Highway Commissioner operates under Wisconsin Department of Transportation guidelines (which itself operates under federal D.O.T. standards) and the County Zoning Administrator responds to standards of the State Department of Natural Resources and the Department of Local Affairs and Development.

To whom at the state level does the County Surveyor or Register of Deeds turn for technical guidance or for methods improvement? Long ago when the state delegated authority to the counties and to the private sector

for land registration and measurement, it did so without vesting overview authority in any state entity. Out of necessity many private and county surveyors have sought guidance from the Office of State Cartographer, created in 1973 to coordinate governmental map making. The state has been remiss too long; accurate, compilable land information is important to citizens and to their representatives in government.

The task remains to identify who should accept the state's responsibility for providing guidance to those county offices with the important but awesome burden of keeping track of changes in land ownership, of subdividing and identifying owned parcels, of recording pertinent governmental restrictions on land use, and of making mapped information compatible with that of other governmental units and jurisdictions.

After highlighting the study's recommendations and conclusions in the first sections of this document, we will resume usual reporting format. The next section of the report presents background to the study (definitions, related issues, review of literature) and, from there, the report details the study findings.

III. BACKGROUND

A. Definitions

Land planning, management, assessment, transfer, and regulation involve some form of data gathering and integration. There are a series of terms used by various groups to express these data gathering and data integration processes.

The terms *land information system*, *geographical information system*, or *resource information system* are relatively new and often are used interchangeably with *land records* and *multi-purpose cadastre*. The addition of the word *system* to the description connotes the use of computer technology and relatibility of various data elements.

The term *land records* includes governmental data required, collected and maintained for real estate and taxation, land transfer, environmental protection, and land use and resource planning and management. Also included are some land record activities by utilities. The term *documents* refers to the form in which land-related data are most commonly used. These documents usually include the following types: maps, plats, inventories, logs, microfilm, publications, field notes, magnetic tape reports, and questionnaires. (See Appendix A for the complete definition.)

Within this case study and within this document, *land records* are those spatially related documents that record governmental interest in the physical, legal, and environmental aspects of the land—whether in, on, above, or under the surface of the earth.

B. Reasons for the Case Study

In recent years an increased concern has been expressed by private citizens and public officials in agencies at all levels of government about the inadequacy and cost of land records in this country. This includes the procedures for comprehensively obtaining, maintaining, and integrating useful information for planning, managing, assessing, transferring, and regulating land and its related resources.

The expectations for an effective land records system as viewed by our project members include the following:

- That any restrictions on the use, size, ownership and value of the land purchased or about to be purchased

are available to buyers and sellers;

- That information about the location and physical characteristics is accessible from the public records;
- That government has established common standards by which land data and records can be shared and aggregated from one level of government to another;
- That socio-economic data, such as work force characteristics about a particular place, can be integrated with physical data about the land;
- That public records are maintained in such a way that citizens have access to whatever information governments have about their land parcels, subject to certain confidentiality standards uniformly applied;
- That government is using land record dollars in a cost-effective manner;
- That the various units of government do not duplicate to any significant degree each other's land information gathering activities; and
- That government's various land record collectors and maintainers have developed institutional linkages that promote efficient and shared use of land information.

The deep concern by many persons that taxpayers were not getting their "dollar's worth" prompted the initiation of this research project. In addition to documenting the public dollars spent by Wisconsin citizens to produce and maintain information about the land, we were asked to identify problems with existing systems and to provide alternatives and recommendations for improving land records systems.

The expectations, as listed above, could be restated as "the problems." The hypothesis of this research is that these expectations are not being met with today's governmental land records systems.

The complexity of these problems is shown in the following situation. Several groups or agencies need information about the same resource. The single-mission focus of these groups, the lack of coordination between them, and their vertical organization often lead to expensive, duplicative and unintegrated data products. These products have evolved in this form not because of any inherent desire to accumulate or restrict information, but because the government or program responsibilities have been single-purpose or single-resource oriented.

The electrical transmission engineer, for example, sees little similarity between his land record needs and those of the tax assessor while, in fact, there is considerable similarity. The end result is multiple, vertically structured record gathering with no single group able to muster sufficient economic and human resources to meet their common information needs adequately.

The circumstances just described have broad implications for significant issues that need consideration. These issues are closely tied to environmental decisions, rising governmental costs, citizen rights and citizen access to public information, as well as the equitable distribution of state and federal support. The issues specifically affect the federal, state, and local governments; the utility companies; and some private industries.

C. Intergovernmental Land Record Issues

Some states may be plagued with larger land issues than those found in Wisconsin but the following seven examples illustrate a few of the pertinent issues or crises facing our governments. Detailing these issues should clarify our broad definition of land records and help the reader understand how a modern system of land records could assist in resolving these issues.

1. Farmland Preservation Act

In 1977 the Wisconsin State Legislature passed legislation providing for the preservation of certain farmland, using income tax credits and refunds and direct appropriations as the incentives and implementing agents.² Other states such as Massachusetts recently have passed similar legislation.³ Initiative for inclusion in the Wisconsin preservation program comes from the individual farm owner.

Determining what farmland areas are eligible for inclusion is a responsibility of the local government (i.e., county, city, town or village). To be eligible a farmer must have a stated amount of income from farming. In addition, the county must have a certified agricultural preservation plan in effect, or the prospective land must be in an area zoned for exclusive agricultural use.

For farm areas to be included in the preservation plan or be zoned for exclusive agricultural use, the following considerations must be used:

“. . . (b) The productivity and viability of the land for agricultural use.

(c) The predominance of agricultural use of the land.

(d) The inclusion of all contiguous lands which are in single ownership.

(e) Whether the property is eligible farmland.

(f) Consistency with the county agricultural preservation plan.

(g) Other criteria established by the local governing body consistent with the agricultural preservation purposes of this chapter.”⁴

In addition, provisions in the Act call for the preparation of “County agricultural preservation plans (that) shall be based upon . . . surveys, studies and analyses of agricultural use and productivity, natural resources and open space, population and population density, urban growth, housing and the character, location, timing, use and capacity of existing and future public facilities . . . County agricultural plans shall . . . include . . . statements of policy regarding preservation of agricultural lands, urban growth, the provision of public facilities and the protection of significant natural resource, open space, scenic, historic or architectural areas.”⁵ The maps which accompany the plan are required to include agricultural areas to be preserved, areas of special environmental, natural resource or open space significance and, if any, agricultural transition areas.

Along with the above land record collection and integration requirements of counties, the Wisconsin Secretary of Agriculture, Trade and Consumer Protection in cooperation with others is to prepare maps that locate lands which should be considered for preservation because of their agricultural significance. The maps are first to be prepared where the greatest probability exists for removing lands from agricultural use, where areas of high agricultural quality exist, and where lands are of high agricultural importance. The maps to be prepared by the department are to be based upon soil surveys, aerial photography, site surveys, and documents that locate existing agricultural zoning.⁶ Also, by 1981 the Secretary, as part of the State Open Space Land Report, must prepare a report and make recommendations to the legislature on the effect of preserving agricultural lands.⁷

Thus, the Wisconsin Farmland Preservation Act requires various units of government to acquire, aggregate, and integrate considerable amounts and different types of land records. The types of land records needed, at a minimum, include soil surveys, natural resource distribution maps, land use documents, existing and proposed zoning restrictions, property records and economic conditions. The successful implementation of the Act implies that there are institutional linkages that allow for the flow and sharing of various land records, that existing land records are accessible, and that records can be obtained and integrated in a cost-effective manner.

What are the prospects that in fact the Act will meet the legislature's expectations? In our judgment the Wisconsin legislature will be disappointed in 1981. Local units of government will be disgruntled because they again have been asked to implement a land management program without a meaningful amount of state assistance in developing the necessary information base. The legislature will be disappointed because the Secretary of Agriculture, Trade, and Consumer Protection will not be able to

accurately describe the statewide effect of the Act because of the varied planning and mapping interpretations used at the local level and because of the incompleteness and incompatibility of the existing land information products.

For example, counties often will find that large scale soil maps are not available or are not accessible due to the extensive lag time in publication by the U.S. Department of Agriculture. Secondly, if ground water supply is an important consideration in determining agricultural potential, public records are likely to be unavailable or inaccessible because well logs (an important source of ground water information) are compiled and filed at the State Department of Natural Resources in a manner that makes them difficult to integrate with other land records.

Lastly, spatial accuracy is essential to any local mapping effort. This accuracy is not assured except in a few Wisconsin counties because of the lack of adequate "ground control," the tying in of a map to known physical monuments. The lack of accuracy in mapping owned parcels creates an obvious legal and taxation problem.

On a national level, the U.S. Department of Agriculture (USDA) is in the process of determining prime and unique agricultural lands. This process could have a great impact on Wisconsin's Farmland Preservation program.⁸ Given that the individual farm property owner is the eventual unit of implementation, how will USDA's classification of lands meld with the state and local classifications? Are the criteria for inclusion compatible or similar? (Will a farmer have prime land in one case but not in the other? The legal ramifications are extensive.) Are the requisite federal, state and local collections of land records coordinated for reduced duplication? Will the resultant land records build upon each other and allow for integration of information? It does not appear so.

Governmental inability to assure that resulting land records are available, accessible, aggregatable, and integratable must diminish the potential for solving the important issue of agricultural land value. At a minimum the duplication and ineffectiveness of these institutions affects every taxpayer every year.

2. Irrigation of the Central Sands Region

Issues facing the State of Wisconsin and approximately ten county governments are the environmental, economic, and social costs of converting portions of the Central Sands Region to irrigated agriculture.

Irrigation in the Central Sands region has increased at an explosive rate in recent years. The same region that was formerly characterized as a marginal farming area with a boom-and-bust economy is becoming a key crop production region for the nation. Its close proximity to markets and its generally abundant supply of groundwater indicate it could maintain a stable, thriving agricultural economy for many years.

Along with these amenities, however, come a series of potentially adverse impacts that warrant careful attention before the current rate of conversion to irrigated agriculture progresses much further. Issues needing attention in the region include impacts on fish and wildlife habitats, wetland environments, and subregional declines in groundwater levels and streamflows.⁹

As the groundwater aquifer diminishes near the boundaries of the Sands region, the lands become much more susceptible to seasonal water fluctuations, making them questionable for conversion to irrigated agricultural use. Generally, the impacts of heavy irrigation on wetlands, groundwater levels, trout streams, and other wildlife habitats are known; the Wisconsin Department of Natural Resources has a statewide permit program for controlling the diversion of surface waters for irrigation if the diversions take away essential, non-surplus water.¹⁰ The 1976 drought, one of the most severe in Wisconsin's records, contributed greatly to the local and state alarm over potential groundwater depletion in portions of the Central Sands Region.

Other impact questions emerge. Converting county forest lands to private lands for agriculture and changing the land use from public recreation to private farming would bring high concentrations of fertilizer which may affect the potability of domestic water supplies in the Central Sands. This land use conversion also would bring with it drastic changes in local ownership patterns and in the region's social, economic, and political structure.

In order to understand the issues and propose solutions, as much land-related information as possible must be assembled and analyzed. However, existing records held by local, state and federal agencies are inadequate to address the complexity of the questions and the size of the region. For example, detailed soil maps are not available for the entire Central Sands region. These are essential for helping determine lands suitable for irrigation. Secondly, groundwater profiles exist for only portions of the region. More complete groundwater and geologic information would greatly assist in understanding the degree (and location) of irrigation that various sections of the region could tolerate. Lastly, who owns the land involved? What percentage is owned by government, by local residents, by corporate farm groups, by foreign investors? Planning and zoning groups must have this information to make informed decisions about land development and use.

Existing governmental records about these lands, then, are often incomplete, nonexistent, or inaccessible. For example, land ownership records that exist at the county level are filed by the various county units in ways so specific that it is virtually impossible to pull out the needed information.¹¹ The governmental records that are accessible generally are not compatible with one another; thus, their information cannot be easily integrated to yield a workable picture or map of the region.

3. Real Estate Settlement Procedures Act (RESPA)

In 1974 Congress passed RESPA to investigate reforms which would insure that real estate consumers throughout the nation are provided with greater and more timely information on the nature and costs of the settlement process. The reforms were to protect consumers from unnecessarily high land transfer charges caused by certain abusive practices that were discovered in some areas of the country.¹²

RESPA included provisions for the development and implementation of a model for the recordation of land title information to facilitate and simplify land transfers and mortgage transactions. The model was to reduce the cost and possibly develop a nationally uniform system of land parcel recordation. Also as part of RESPA, the Secretary of the U.S. Department of Housing and Urban Development (HUD) was required to report and make "recommendations on the ways in which the Federal Government can assist and encourage local governments to modernize their methods for the recordation of land title information including the feasibility of providing financial assistance or incentives to local governments that seek one of the model systems developed by the Secretary of HUD."¹³

As described the primary focus of RESPA is towards reducing land transfer costs and part of that reduction will be more cost effective land record procedures.

To make the land transfer records more cost effective will also require easier accessibility to existing land transfer records. This implies the introduction of information technology, standardization, and change in existing procedures. How could or will the State of Wisconsin and other states be affected by this legislation and the resultant recommendations?

Will national standards for land transfer or settlement records be established without state and local government involvement? Such records include title searches, title examinations, the provision of title certificates, title insurance, services rendered by an attorney, the preparation of documents, property surveys, the rendering of credit reports or appraisals, pest and fungus inspections, services by a real estate agent or broker, and the handling of the processing and closing on settlement.¹⁴

The Wisconsin Department of Revenue (DOR) is developing standards for tax maps using parcel (property) boundaries as the mapping base. Will federal standards for property surveys assist DOR in developing and implementing standards? Some local units of government (i.e., Racine County and the Southeast Regional Planning Commission) already are using the Wisconsin State Plane Coordinate System as the basis for property surveys and property transfer descriptions. How will the federal standards affect this local activity? Will the federal standards be so general as to be meaningless and

thus not foster compliance, or will the federal standards be so different that yet another type of record keeping is imposed upon state and local governments?

Could RESPA provide an opportunity for integrating land records in Wisconsin and in other states? If there are federal appropriations for assistance and incentives to adopt model land transfer systems, is this the time to seek statewide improvements in how land records are collected and maintained? For example Racine County may be eligible for a HUD/RESPA demonstration grant. How will the state monitor this activity?

4. Mining of Metallic Minerals

Because of certain geologic conditions in portions of Wisconsin, unique and economically valuable metallic minerals have been discovered. These discoveries resulted in considerable legislative interest and the passage of various forms of mining laws. These laws have focused upon taxation issues¹⁵ as well as reclamation issues.¹⁶ In respect to land records some important questions have emerged:

Who owns the mineral rights?

In some cases, who actually holds the ownership and extraction rights to the minerals is in doubt because of the poor and incomplete procedures utilized over the years by some local governments in maintaining property records.

Who has access to the mineral right records?

The task of searching the ownership records is cumbersome, time consuming, and expensive. Even though recorded ownership information is public, many times the records remain confidential because only those individuals and companies who have the necessary legal and financial resources can actually determine ownership of the mineral rights.

Who is going to maintain the many land records developed during the ensuing mining reclamation period?

A recent law clearly established that the Department of Natural Resources monitor the reclamation procedures and maintain the appropriate associated land records.¹⁷ Will these records become a system unto themselves or will they be integrated with geologic records and shared with other state and local agencies? Also, who will be responsible for maintaining and monitoring the records that describe and represent the secondary or neighboring land impacts?

Most of the potential metallic mining areas in Wisconsin are located in regions with low population and where few land use and land resource records are available. This makes it difficult to assess the primary and secondary

effects of proposed mining operations. Some of the land records necessary for this assessing are provided by the mining company itself as required by law. An agency review tends to focus upon the specific mining operation; however, the greatest social, economic, and environmental change will likely occur beyond the boundaries of the actual mining operation. Who will provide the records noting these changes? As mentioned, who will maintain and update these records? Who will standardize them among the various record keepers to insure that the records can be integrated, and thus allow comprehensive understanding of local, regional, and state-wide impacts of the mining?

5. Wetlands Identification and Management

During the past few state legislative sessions, various groups have sponsored legislation to protect wetlands. The protective legislation is still pending and interest in wetlands continues. The Wisconsin Legislature recently passed Assembly Bill 794 (Wetlands Mapping) which is awaiting the Governor's signature. Federal legislation has passed recently that reduces the U.S. Army Corps of Engineers' jurisdiction over dredging and filling operations in the nation's wetland environments.¹⁸ It allows wetland regulation to become the responsibility of the states. This federal legislation, plus the state's long-term interest in these environments (coupled with the U.S. Fish and Wildlife Service's interest in completing the National Wetland Survey) have strengthened the initiatives for a comprehensive state wetlands mapping program to begin in 1978.

From the standpoint of land records, this wetlands inventory will have several positive aspects. The state initiative will use as its mapping base the statewide aerial photography obtained at a uniform scale (1:20,000). The photos to be taken in the summers of 1978 and 1979 are the result of coordination and joint financing by several state agencies and the U.S. Forest Service. Local governments are expected to use the photo products also.

Another positive aspect of state to federal aggregation is presently being explored by federal and state representatives. Before state wetlands mapping at 1:20,000 begins, standard classification systems may be adopted that will allow the U.S. Fish and Wildlife Service to obtain their records as the result of aggregating the state records. Aggregating from the most intensive record user (State) to a more general user (Federal Agency) is an important concept if cost effectiveness and intergovernmental sharing of land records is to be improved. Recent evidence indicates, however, that the map standards of the two federal agencies (Forest Service and Fish and Wildlife) are considerably different and that the states coordinated flight will not meet both federal agencies' needs.

A concern, however, is the land record duplication that

is about to occur in Wisconsin. The U.S. Department of Agriculture, through the SCS, is in the process of identifying and locating prime agricultural lands. The U.S. Fish and Wildlife Service is following similar procedures to map and classify wetlands. Since many existing and potentially productive farming operations now use or will use wetlands, there will be overlap in record keeping and in data-gathering efforts.

6. Native American Land Rights

During the nineteenth century, title to Indian reservation land was held in trust by the federal government for the entire tribe. Individuals did not receive title to specific parcels. Near the end of the century, a federal policy was initiated that sought to remove as many tribes as possible from reservation status. Consistent with this objective, the Indian Allotment Act of 1887 was passed. This law made it possible to assign property rights to specific parcels of reservation land to individual Indians. However, a provision of the law retained federal trust over these parcels for a 25-year period from the date of the allotment. Not until that period had expired would the individual Indian receive a fee simple interest in the land. The allotment process began in Wisconsin in the 1890's. Frequently, large numbers of allotments were executed at the same time. Records of these allotments were filed in the Register of Deeds Office in the various counties.

In 1906 Congress passed a law that permitted elimination of the 25-year trust period. The law provided for a Certificate of Competency for individual Indians. With the issuance of this certificate the individual Indian became the fee simple owner of his allotted parcel. The parcel was then subject to county taxes. However, these certificates were issued individually and frequently the proper documents were not filed in the Register of Deeds Office.

To complicate the title record further, Congress empowered the President to issue an executive order which extended the original 25-year trust on allotted land for an additional ten years. This was also done on an individual basis. Again, recording problems were encountered. Finally in 1934, Congress established an indefinite extension of the trust over allotted land.

The result is a confused ownership record for some land that originally was part of an Indian reservation. In some cases parcels are not properly part of county tax roles.

7. Energy Planning

The passage of the power plant siting law in 1975 (Wisconsin Assembly Bill 163) and the resultant administrative code¹⁹ gave the Public Service Commission (PSC) considerable authority to review projected energy plans of electric utilities. This resultant authority may well be

sufficient to plan effectively for Wisconsin's electric energy needs. However, it is not clear that the information base is sufficient to adequately assess the environmental effects.

The administrative code calls for considerable collection of several types of land records to be used to analyze various proposed plant sites and transmission facility locations. For example, the utilities are required to provide land records that define the impact area, existing air quality, existing water quality, and existing land use.²⁰ Included in the land information requirements are residential concentrations, agricultural production, forestry production, recreation, open space lands (scientific areas, wetlands, significant wildlife habitat) and location of known historical or archeological sites.²¹

Analysis of proposed transmission facilities requires similar information. This includes glacial or surficial geology, topography, general soil associations, major water resources including wetlands, general vegetation cover, soil association, general land use areas, areas of public ownership, and population density.²²

In order to record and display the required information, the utilities need to provide a set of maps. A detailed set of instructions have been developed by the PSC with the assistance of the State Cartographer.

On the surface the requirement that this information be collected seems to be a good idea. However, the only statewide topographic base is the USGS 1:250,000 mapping series. Does this scale provide a reasonable base from which to evaluate the ten-year utility plan? What environmental impacts can really be understood from that scale, given that minimum mapping units are many times larger than the proposed energy facility? Even if the utilities are conscientious about their task, how and from where will they obtain the required information? Will they basically redraft existing sources such as the Office of State Planning and Energy's small-scale map series? If not, how will the utilities determine sources?

For example, a Wisconsin utility in its planning for a substation and small facility was unaware that DNR and the National Park Service had purchased a land parcel site for inclusion in the Ice Age National Reserve. The site consists of a unique geological feature plus a site for observing the glaciated and unglaciated landscape. The construction of the substation in close proximity to the Reserve has placed transmission and distribution lines adjacent to the Reserve thereby reducing the scenic view. Thus, the purpose of this small but unique and important resource was compromised.

This example may not be typical but the utilities have been placed in the unenviable position of having to integrate records between agencies who themselves are much more familiar with the availability and location of land records.

Summary

The land issues facing Wisconsin probably reflect those facing other states. The issues are not simple and their resolution requires a willingness to act by both citizens and their public officials. Improving how land records are collected and maintained will not in itself resolve these seven issues; however, at a minimum, improved land records will make the task easier.

The following sections describe the involvement and highlight the thinking of other groups that have wrestled with land record problems over the years.

D. Review of Literature

During the 1960's and 1970's, land records systems in the United States were being discussed and reviewed almost continuously. Many diverse organizations have investigated the land records situation from varying viewpoints. These organizations include the American Bar Association, U.S. Office of Management and Budget, Economic Research Service of the U.S. Department of Agriculture, Council of State Governments, American Congress of Surveying and Mapping, U.S. Department of Housing and Urban Development, U.S. Department of the Interior, and several state governments and academic organizations.

Considerable research effort has been invested by these organizations. However, while the problem of land records is now in sharper focus than in past years, generally speaking, a workable solution for improving land records has not been implemented. To cite briefly some of these attempts:

1. Federal

During the 1960's the U.S. Bureau of the Budget issued a series of A-16 circulars to encourage federal coordination of its many surveying and mapping activities.²³ In 1973 the Office of Management and Budget issued a 195-page report of the work of the Task Force on Mapping, Charting and Geodesy.

The Federal Mapping Task Force identified three disturbing phenomena related to federal land mapping and measuring programs.

"One is the significant growth in uncoordinated, noncumulative, single-purpose surveys and mapping which benefit only one user agency and are therefore inefficient. The second is a growing mass of unmet national needs for products and data. The third is the inability of the (mapping, charting, and geodesy) community as now organized to deal efficiently and responsively with these growing and changing requirements."²⁴

During the early 1970's when federal land use legislation

appeared imminent, the U.S. Department of the Interior, through its Office of Land Use and Water Planning, developed a series of working papers on land record issues.²⁵ The Council of State Governments has continued to conduct studies on how various states and federal agencies have cooperated in integrating land records.²⁶

2. Legal

The Alabama Law Review,²⁷ American University Law Review,²⁸ American Bar Foundation,²⁹ Indianapolis Law School,³⁰ and Wisconsin Law Review³¹ have published articles during the last twenty years on land-related records and data.

3. Symposia

Many national conferences and symposia on land records and information have been held throughout the 1950's-1970's. Several noteworthy, recent conferences are:

- (1972) "Conference on Land Identifiers—the Problems, Prospects, and Payoffs" (CLIPPP); Atlanta, Georgia.³²
- (1975) "North American Conference on Modernization of Land Data Systems" (MOLDS); Washington, D.C.³³
- (1975) "Data Needs and Data Gathering for Areas of Critical Environmental Concern," a symposium sponsored by the National Science Foundation; Madison, Wisconsin.³⁴
- (1976) "User Requirements for Land Records and Resource Information Systems," a symposium held at Orono, Maine.³⁵

- Participants in the 1976 Orono symposium unanimously resolved that:

The general lack of commitment by the federal, state, county, and municipal governments to the development and maintenance of a modern land tenure and resources information system is a matter of urgent national concern, and we recommend:

"(1) That an agency of the Federal government and of each of the states and territories be designated to develop guidelines and standards for any and all systems of land-based information that are compiled or maintained using public funds, and to review all contracts and internal agency procedures for such work.

(2) That a research program be undertaken to document the costs of duplication and inefficiency in the existing arrangements of public agencies for developing and maintaining land-based information . . ."³⁵

- (1977) "Modern Land Data System (A Cadastre) —

A Simultaneous Solution to Three National Problems ASP - ACSM convention, Washington, D.C. The nearly 3,000 registered participants learned about the cadastre:

. . . to set up a modern system a set of procedures for data is necessary, complex and integrated data must be studied, ad hoc systems for continuing and integrate data must be considered, e.g., the census and energy Policy planning and objectives are vital . . . There need to be networking, communication, and varying degree of automation, and there must be multidisciplinary systems which will be part of an overall plan.³⁶

4. Other States

A representative sample of states that have research improvements in land records include: ALABAMA: The state is under court order and statutory direction to complete statewide land reappraisal by 1978. As a major part of this effort the Alabama Department of Revenue has prepared specifications for aerial photograph and property ownership maps.³⁷ COLORADO: In 1977 Colorado established the position of State Cartographer in the state's Department of Local Affairs and in 1975 established a Colorado Mapping Advisory Committee comprised of 9 state agencies, 8 local/regional members and 4 federal agency representatives. In addition Colorado law now directs that prior to January 1, 1981 each assessor is to have "full, accurate and complete maps showing the parcels of land" in the county involved.³⁸ OREGON: Oregon has approved a computer assisted mapping system (CAMS) for its urban - rural mapping element which will include geographically coded land parcel identifiers.³⁹ TEXAS: In 1976 Texas established the Texas Natural Resources Information System which is designed to link together 16 Texas agencies which hold related natural resources data files.⁴⁰

5. Wisconsin

Wisconsin was also active during this period. In 1972 the University of Wisconsin-Madison in conjunction with the Governor's Office (the Governor's Land Use Task Force) conducted the Faculty Land Use Seminar (FLUS).

One objective of the seminar was to develop recommendations for land records management.⁴¹ As a result of these recommendations additional study was undertaken by the State Planning Section, now the Office of State Planning and Energy.⁴²

In 1973 the Wisconsin Legislature established the Office of State Cartographer. This Office was to collect and distribute cartographic information, to coordinate cartographic programs within the state, and to consult with officials on all levels of government.

During the same period several state agencies used the experience being gained by faculty of the University of Wisconsin-Madison in the application of land data systems in location of highway and electrical transmission facilities.^{43 44} Through the University of Wisconsin-Extension the Critical Resources Information Program (CRIP), originally sponsored by the then State Planning Section, enlists local citizen participation in identifying land records.⁴⁵ At present the Office of State Planning and Energy maintains records that provide an overview of available natural and land resources data.⁴⁶

Considerable ongoing academic research is being done on land data problems. For example, the University of Wisconsin-Madison's Sea Grant Program is supporting research that helps in determining what local land record improvements are necessary to properly manage

the coastal zone.⁴⁷ The U.S. Department of Agriculture (through the UW-Madison's College of Agricultural and Life Sciences, in association with the Office of State Planning and Energy) is supporting research which provides the basis for improving management and integration of land records.⁴⁸ To date, these researchers have developed a set of interactive, user-oriented procedures for integrating various kinds of governmental land records.⁴⁹

In late 1977, the Wisconsin Society of Land Surveyors submitted to the Governor and to selected state legislators and agency heads a proposal for integrating land records through a statewide base mapping and ground control program. The proposal illustrated problems with existing land survey records and expressed concern about the cost and proliferation of mapping activities by state agencies.

IV. THE CASE STUDY

A. Introduction to the Case Study

1. Assumptions

The preceding discussion indicates that many states have problems in properly managing their land records. The motivation for improving land records may be the scarcity or uniqueness of a certain natural resource in a state or the state's need to make property tax equitable. The Land Records Project members believe that good management of the land calls for reliable, qualitative and quantitative descriptions of the land resources. This study is predicated on the concept that land records will be improved; the questions remaining are how, and at what cost.

Many statements have been made attempting to express the present condition of land records in the various states. The timeliness, importance, and dimensions of the current situation were succinctly expressed by Associate Judge John E. Fenton, Jr. of the Massachusetts Land Court during the 1976 Land Information Symposium at Orono, Maine. He capsulized his concerns as follows:

1. How little both, qualitatively and quantitatively, the private, and to a lesser extent the public, sectors truly know about the land, one of our choicest natural resources.
2. That estrangement from full and accurate knowledge of the land diminishes our quality of life and the effectiveness of our government.
3. When knowledge of the land, its geographical location, its resources, its potential, its value, its controls, its ownership, its encumbrances, and its process of transfer are desired, (there is an) unreasonable imbalance that exists between access to quick, complete and authoritative knowledge and (its) inconvenience and costs.
4. That conceptually and practically, vehicles are available for constructive change, together with modern technology to help accelerate such change.
5. That fundamental change in the present land records system will beneficially result only from a confluence of continuing multi-discipline dialogue, cooperation and action premised upon the actual, not surmised, needs of users of the system and general public understanding and acceptance that the advan-

tages of what is proposed exceed the disadvantages of what is disregarded.

6. That meaningful reform will not come quickly, inexpensively or without conflict, but that the case for improvement and progress must be carried forward in thoughtful public discourse.⁵⁰

2. Study Objectives

a. Document Existing Costs

The primary objective of this case study was to document the present cost to gather and maintain land records in their present form. This cost assessment was to encompass the expenditures by all levels and agencies of government including the quasi-public sector such as utility companies.

Emphasis was given this objective for the following reasons:

Evidence of the existing investment in land records is necessary before the executive and legislative units of government will move with sufficient momentum to confront the problem with the scope and intensity necessary to resolve it.

Evidence is needed to communicate to the taxpayer and consumer the investment dimensions of the existing land records base.

Comparative data still needs to be compiled; this present research will identify current expenditures for maintaining what some call 18th-Century land record procedures. Cost and benefit information is still needed for implementation of more modern procedures.

b. Identify Land Records Problems

Types of land issues affected by the present condition of land records were to be identified. Specific problems with land records also were to be identified, such as duplication.

c. Provide Conclusions and Recommendations

Using our findings, we were to provide conclusions and recommendations to the Council of State Governments and also to those units of government that are involved and concerned with land records. We were to report the problems, possible alternatives, recommendations, and suggested implementation procedures.

The following chapters of this report explain costs, study methodology, describe the findings, and present examples of problematic land records.

B. Costs of the Present Land Records System

The project started with a practical definition of land records that included criteria and examples. Working materials included interview guides for each level of government, logs for recording responses and expenditures, and several informational packages about the project. Introductory letters to governmental and utility company officials were prepared and sent to administrative and program managers, with follow-up telephone calls.

1. Methodology

a. State

A poll of all state agencies identified those having land records. Several interstate groups such as the Minnesota-Wisconsin Boundary Commission were contacted, with only Wisconsin costs being calculated. Agencies that contained the majority of land records were the State Departments of Natural Resources, Transportation, Local Affairs and Development, Agriculture, Revenue and the University of Wisconsin System. In addition to on site interviews conducted by project analysts, budgets, program descriptions, and sample land records were examined. Related research papers and conference notes were examined and the authors contacted when possible.

Information was obtained for the fiscal year July 1, 1975 - June 30, 1976. Any recently completed major projects or upcoming major projects outside of this sample year were briefly described, and a cost estimate attached. (See Appendix C).

b. Local

To derive a state total for local government expenditures would have required data from 71 counties, many municipalities, and more than 1200 civil towns. Rather, a sampling procedure was developed with the assistance of the State Cartographer's Office and the University of Wisconsin-Extension's Survey Research Laboratory. The sampling element consisted of the civil town, any village or city that fell within or abutted it, and costs from the county and regional planning agency in which the civil town was located. Land records expenditures by the county and regional planning agency were prorated to reflect only the civil town's portion of county and regional spending.

The state (excluding the Menominee Indian Reservation and the City of Milwaukee) was divided into eight parts of equal population and again into eight parts of equal area. The two independent samples included sixteen civil towns, six villages, three cities, fifteen counties, and

eight regional planning commissions. See Appendix B for more detailed information.

University of Wisconsin-Extension agents assisted in locating offices concerned with land records and in setting up interviews with local officials. Project analysts interviewed town, county, city, and village officials as well as regional planning commission staffs.

c. Federal

Federal agencies likely to have land records were identified. Previous studies and publications served as guides. The Project Advisory Committee supplied names of persons within federal agencies. These people were contacted by telephone before the detailed project materials were mailed. Telephone interviews supplemented correspondence and in some cases federal representatives in the state or in the federal region provided the needed information. (See Appendix D).

d. Utility

Four major electric and gas companies, one large power cooperative, and two major telephone companies were contacted by telephone with followup letters detailing what information was requested.

Two firms declined to provide the information due to the difficulty of extricating the land record expenditures from other activities. Two did not respond at all. Two power companies and one telephone company, after direct consultation with the project manager, provided detailed estimations of their calendar year 1976 expenditures for land-related records. (See Appendix F.)

2. Research Constraints

The definition of land records is subject to interpretation. In addition, few budgets contain categories for land information activities such as mapping, charting, drafting, printing of maps, or natural resource surveys. These facts made it necessary to estimate expenditures. Program managers' estimates included percentages of staff time, administrative overhead, and direct costs attributed to land records.

Comments from program managers and other data users suggested that some documents are not used enough to justify their costs, while others are relied upon to an excessive degree. This study, however, is limited to identifying expenditures for the existing data and documents, regardless of volume of use.

An additional constraint is related to the expenditure information contained in the University of Wisconsin's educational and research programs. Most of these activities were excluded from the research since it was difficult to define what portion of the research was related to basic governmental functions in land-related areas. Costs

for land records describing the buildings, facilities, and land holdings of the UW System were obtained. Costs for governmental service programs such as the UW Cartographic Laboratory, State Cartographer, and the Geological and Natural History Survey were also gathered. The majority of the University's general research and teaching budget remains unexamined for possible land-records costs.

The degree of confidence in the local cost figures is high since county and town budgets are relatively "tight" and are closely tied to identified responsibilities such as tax listing, tax assessing, registration of deeds, zoning, planning and surveying. Cooperation from local officials was good. Though estimation was often necessary, cost figures from similar offices at different locations were reasonably consistent when compared with overall local budgets.

The degree of confidence in the state cost figures is moderate to high. However, problems of definition were greater and programs more complex with estimations often required. Federal spending, private sector contracting, and multi-year programs made the task more difficult. Cooperation was good, and project researchers estimate that the state expenditure figures are within 20 percent of "actual" costs.

The level of confidence in the federal cost figures was lower than our confidence in local and state figures. Some federal agencies were able to provide the desired information; others were not able to identify and estimate costs of their land-related information. Separating expenditures for Wisconsin from total federal spending was a difficult task because few federal agencies publish activity reports by state. Project researchers followed with additional phone calls, but in a few cases were unable to obtain figures. One federal agency, the U.S. Army Corps of Engineers, declined to participate, stating in their letter that "it would cost \$140,000 and six months to obtain the information you requested."

3. Governmental Expenditures

a. State Expenditures

Total 1975-76 land records spending by each agency was divided by the state's January 1, 1976 population of 4,623,357. According to the annual fiscal report for Fiscal Year 1975-1976, total state government expenditures for the sample year were \$4,722,529,000. Approximately 10 percent of this amount (\$472,523,000) went for environmental resources.⁵¹ State land records expenditures estimated through the Land Records Project were \$11,582,818 for that year, or approximately two percent of the environmental resources spending. (See Appendix C for details). Agency estimates for land record expenditures follow:

Agency	Estimated FY 75-76 Land Records Spending	Per Wisconsin Citizen
Administration	\$126,289	\$.03
Agriculture	311,550	.07
Local Affairs	1,156,811	.25
Natural Resources	4,389,461	.95
Revenue	535,733	.12
Transportation	4,219,147	.91
University of Wisconsin System	576,455	.12
Other	267,572	.06
Total	\$ 11,582,818	\$ 2.51

b. Local and Regional Expenditures

The total estimated expenditures for land records by Wisconsin's local governments for 1976 is approximately \$41,117,989, or \$8.89 per resident. This is an estimate of the 1976 expenditures for land records by civil towns, municipalities, counties, and regional planning commissions in Wisconsin, plus separately calculated expenditures for the City of Milwaukee. The sampling and statistical procedures used to derive this composite estimate are explained in Appendices B and G.

c. Federal Expenditures

Federal agency expenditures usually were not organized by categories such as land records or by state. High and low estimates were derived by project staff by supplementing agency-supplied data under this project with data from two related federal studies. (See Appendix D for details).

The estimating and averaging process used resulted in an approximate federal expenditure of \$3.32 per citizen during Fiscal Year 1975-76 (July through June).

d. Utility Expenditures

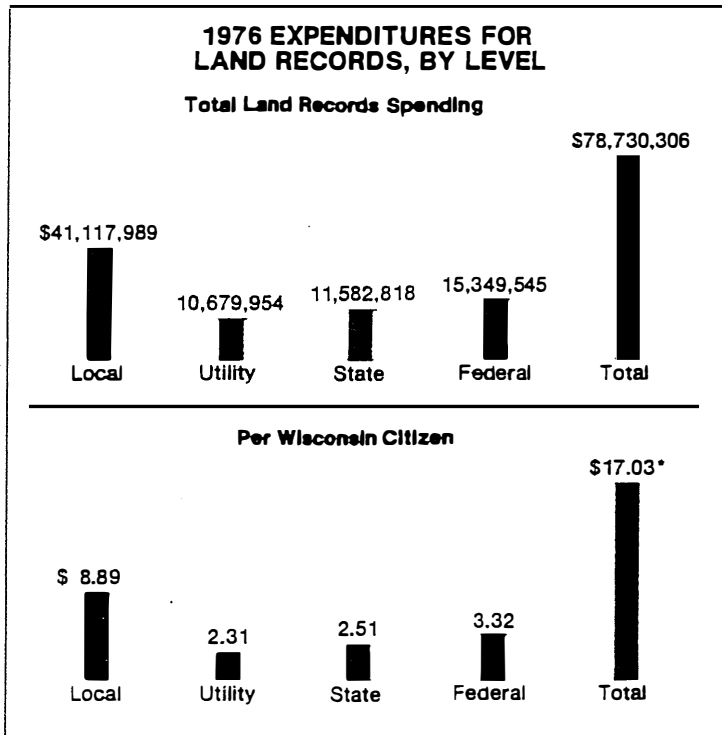
As major users and producers of land-related information those utilities contacted were well informed and concerned with governmental land records problems. (See sample letter from a Wisconsin utility firm: Appendix E) Spending estimates for calendar year 1976 were obtained from one major telephone company and from two major gas and electric utilities. Expenditure estimates were divided by total population (not customers or households) in the utility's service area.

Company	Cost per Person	Estimated 1976 Land Records Expenditures
General Telephone	\$.83	\$ 734,476
Wisconsin Public Service Corp.	1.34	939,000
Wisconsin Power & Light Co.	1.62	\$1,476,800
Total	\$2.31	

For comparison with government expenditures, the telephone utility's per capita expenditure was added to the average of the two power utilities per capita expenditures, for a single estimate of \$2.31 per resident. This calculation was used to estimate an annual expenditure for land records by all utilities in Wisconsin as \$10,679,954. (See Appendix F for details.)

Summary

Total land record expenditure estimates by all levels of government come to a one-year total of \$78,730,306 or \$17.03 per Wisconsin citizen. Gross per capita utility estimates are included in the statewide figures, as shown below.



This graph illustrates the relationship among annual expenditures by governments at several levels (and by utilities) to collect, produce, and maintain land records. As a comparison, the total of approximately \$17 per Wisconsin citizen or \$78 million, represents, for example, nearly two percent of the 1975-76 total Wisconsin state expenditures of about \$4.7 billion.

This part of the research was designed to determine the costs to the citizen of publicly held information and records about the land. The amounts cited are not trivial. The following sections probe what Wisconsin citizens are and not getting for their land record dollars.

C. Problem Identification

The preceding chapter summarizes the governmental costs for land records. Given the annual investment of \$17 per Wisconsin citizen in land records, how well does government use that money? How are the records shared or integrated among those in various levels of government, agencies of governments and within agencies?

* Figures have been rounded. In order not to mislead on the accuracy of the estimates, in general discussion the figures will be further rounded; i.e. \$17 per citizen, \$9 for local government.

1. Data Integration Efforts

a. State

Efforts have been made in Wisconsin to integrate publicly held land records, efforts that extend beyond a single agency. Some of these endeavors continue today while others are past history.

1) In 1973, the University of Wisconsin-Madison developed an inventory of all environmental research activities in the UW System.⁵² Each research project was listed on one page, with several indexes provided. The resulting volume was five inches thick. However, the inventory has not been updated.

2) In 1975, the then State Planning Section produced an inventory of available governmental maps and sources of natural resources information that were statewide in nature or covered significant portions of the state. The inventory includes aerial photography, well and soils data, wildlife and agricultural data, and geodetic and surveying information. The inventory is the single most complete index of land-related information in the state and has been updated periodically.⁵³

3) An ad hoc, interagency group of state officials met during 1975-76 under the informal leadership of the then State Planning Section. The group served as an exchange medium for information on land data collection activities and on technical concerns. The group disbanded after reaching agreement that an integrated land data system was needed.

4) The Office of State Planning and Energy administers several programs that relate to land records, such as the Coastal Management Program and the A-95 review process by which federal grants in certain program areas are examined to assure program coordination. The Office frequently convenes groups to study specific topics such as soils, aerial photography, or land use classification and has coordinated statewide studies of land use classification.⁵⁴ As indicated previously, the Office has instituted studies of proposed land information systems, one currently in the testing and evaluation stage.⁵⁵ The Office of State Planning and Energy has identified a need for statewide land records systems. However, they lack the authority and resources to set standards or force compliance.

5) Environmental impact assessment procedures are mandated for many state agencies by the Wisconsin Environmental Policy Act. This is accomplished on a project-by-project basis and information problems are faced individually by each agency. Decisions are typically made with the "best available" information. The process has revealed data shortcomings and brought attention to land information problems.

6) The Department of Natural Resources (DNR) has several land record systems and land inventories. If

these systems were compatible, they could serve as integral parts of land information systems covering publicly managed lands. The Department recently conducted a review of its data coordination and data management problems. The draft report acknowledged that without more effective management of its land- and water-related information, the Department's regulation of environmental and natural resources is severely hampered.

7) Wisconsin's State Cartographer and State Geologist (the latter heads the Geological and Natural History Survey) are users and producers of land records. Both offices attempt to coordinate land information collection and display activities among state and local agencies. However, their resources and authority to impose standards are limited.

8) The Economic Development Coordinating Committee (EDCC) in the Office of State Planning and Energy assists in the integration of long-range plans among agencies and the promotion of program efficiency. Activities include analysis of each agency's role in mining regulation and planning—an area of increasing concern due to major new discoveries of ore in northern Wisconsin. The EDCC has assumed some of the tasks of the recently abolished Natural Resources Council of State Agencies.

9) The Department of Revenue is investigating a parcel identification system and is considering setting standards for local tax mapping. This is a part of a larger analysis of automated systems for evaluating land values and computing local reimbursement factors.

b. Local

These are examples of mechanisms employed at the local level of government in Wisconsin to improve the integratability of land information.

1) The Southeastern Wisconsin Regional Planning Commission (SEWRPC), which includes Milwaukee and several nearby counties, has begun the process of digitizing and storing in the computer much of its detailed soils, land use, land cover, and other physical and environmental data. SEWRPC is able to do this because it has obtained accurate base mapping with ground control that allows it now to integrate land information and produce specialized maps efficiently.

2) Many counties have created the position of tax lister to maintain and provide property parcel maps, maintain tax records, keep abreast of changes in property and parcel boundaries, and execute other related activities. In Wisconsin, responsibility for property tax assessment is generally at the township, village, or city level, but many counties do not have common procedures and documents for land records that would help tax listers integrate land information. For example, the proprietary information contained in documents at the Register of

Deeds Office, while of great use to the tax lister and others, remains difficult to obtain and merge with other information.

3) Planning and zoning departments in several counties use and maintain a variety of land information. Frequently these departments become repositories and sources of land information for other local departments. However, the information maintained usually extends only to that needed for planning and zoning purposes.

c. Federal

There are examples of efforts by federal agencies to improve the integratability of their land information.

1) The Office of Management and Budget (OMB) produced a study in 1973 on duplication and problems in mapping, charting, and geodesy.⁵⁷ Several corrective alternatives were proposed such as a civilian version of the Defense Mapping Agency. (The DMA was created after studies showed serious duplication in defense mapping.) The study also proposed management agreements between agencies and interagency coordinative committees. Five years later, the major proposals have not yet been adopted. In a series of actions during the 1960's OMB also issued Circular A-16 that gave general guidelines for agency cooperation in land information collection and map production.⁵⁸ However, our researchers found that the A-16 directives were weak and did not significantly improve coordination of land data activities.

2) The Wisconsin Demographic Services Center, in conjunction with the U.S. Bureau of the Census, is establishing a state data center to integrate and improve access to population and socio-economic information.⁵⁹ Much of this data is geographic in nature. This example illustrates that some data managers recognize the need to integrate basic information.

3) The U.S. Department of the Interior established two organizations that seek to improve access to land records—the National Cartographic Information Centers (NCIC) and Earth Resource Observation System (EROS). NCIC indexes many products but does not distribute mapped products from agencies other than the Department of Interior. EROS indexes and distributes satellite, SkyLab and other high altitude photography, but the satellite products have proven to be of marginal use to state agencies due to their small scale. NCIC is a needed coordinator/cataloger of available federal cartographic products.

4) Other computerized indexing systems have been developed by federal agencies to keep track of land-related research. A partial list includes the U.S. Geological Survey's NAWDEX (National Water Data Exchange) and CRIB (Computerized Resources Information Bank); the U.S. Department of Agriculture's FAPRS (Federal Assistance Programs Retrieval System); the

U.S. Department of the Interior's WRA (Water Resources Abstracts); the Environmental Protection Agency's STORET and AUTOMAP and the National Technical Information Service (NTIS). Similar data access systems exist in the National Oceanic and Atmospheric Administration (NOAA), the Bureau of the Census, and the National Aeronautics and Space Administration (NASA). Several states, Texas in particular, have begun to add these files to their centralized natural resource information system.

Federal technology is being developed rapidly in land data manipulation—especially data obtained from remote sensing such as satellite data. However, the federal programs are not designed specifically to serve the states. Systems development often occurs without careful consideration of decision-making needs at the state and local levels, major users of these systems. The plethora of unrelated federal systems could be valuable to states, but states are often unprepared to define their needs and press for comprehensive data management among federal agencies.

d. Private

Several entrepreneurial efforts are related to public land information activities.

1) Title insurance companies regularly copy public records in Register of Deeds offices. The information is used for real estate transaction and insurance purposes. In Dane County, for example, some of the information held by the companies is sold to county agencies, who must find it is less expensive to buy this information than to retrieve it from the public records.⁶⁰ Citizens may well find that they can obtain public information faster and more conveniently from the private companies than from the Registers of Deeds.

2) Firms, such as Real Estate Data, Inc. of Miami, microfilm records at some Registers of Deeds offices in Wisconsin, transform the information for electronic data processing, and produce three key products which are cross-indexed and geographically based. Products include tax maps, ownership and land appraisal volumes, and aerial/topographic atlases. The three volumes cost about \$200 and are sold to realtors and developers, and in some cases to government itself.⁶¹

e. Other States and Nations

Other states and nations are making efforts to integrate their land records. Nations with large populations and small land areas (i.e. Germany, Switzerland) have built land records systems upon a base of accurate surveying and coordinate descriptions of the land itself. These systems permit the efficient use of parcel identifiers and parcel maps and permit the display of a wide variety of land data on common maps.⁶² Several developing nations have implemented sophisticated land records systems with American foreign aid funds, even though the U.S. lacks such systems.⁶³

The Maritime Provinces in Canada have completed a monumentation and coordination program and have prepared new maps based on this program. These are the first steps in a plan that includes a new land titles regime, incorporating government supported title registration, and a land data bank tied to the coordinated and mapped land.⁶⁴

Researchers at the University of Wisconsin - Madison surveyed several states to determine how they have integrated their land records.⁶⁵ The results suggest that none of the American states have approached the Maritime Provinces in the depth and breadth of approaches to the problem.⁶⁶

Some states that have worked toward integrated land-records systems are Massachusetts, Texas, Connecticut, Colorado, North Dakota, and Minnesota.⁶⁷ Much of this activity occurred during the past five years, often resulting from a natural resource or land use crisis — flooding, drought or soils/mineral loss.

2. Problems with Land Records

Considerable governmental and academic interest in improving land records has been documented. That interest continues. Why? Do common problems persist and preclude the full use of publicly held land records? The various governmental efforts to integrate land records seem a response to a continuing series of basic and related problems.

a. Basic Problems

1) *Accessibility* problems arise when a government official or a private citizen cannot obtain information for a variety of reasons. These reasons include unclear privacy or unnecessary restrictions; poor classification systems, data arrangements and files such that related records cannot be combined; lack of knowledge about what data exists, where, and in what form. Government specialists often do not know the extent of available land information; private citizens frequently are at a much greater disadvantage. Thus, in real estate transactions, public information may be available only to those who have the financial resources to ferret it out. How can public information become accessible to the public?

2) *Availability* refers to gaps in what is known about certain aspects of the land: How are Wisconsin waters actually being used? How is the land being used? Who owns what land? Are all lands identified and assessed for taxation purposes?

The answers to these and other questions frequently are not known. The result is that public and private decisions are often made in ignorance of the facts.

3) *Duplication* problems occur when two or more governmental entities compile or maintain essentially the same land records. The obvious result is waste.

4) *Aggregation* problems exist because our current system or systems are generally not designed to serve the land information needs of private individuals and groups while continuing to meet the needs of local, state, and national government agencies. Many current land information systems are assembled at the national or state level with products provided to the smaller governmental units. However, at the county, town and municipal levels (where basic land decisions are made in North America) the prevalent reaction is that the state and federal products are too general or are inappropriate in scale and resolution.

5) There are two kinds of problems with *integrability* of land records. One is that similar or related data, such as location of wetlands and prime agricultural lands, are described in different ways: by latitude/longitude, by State Plane Coordinates, by river basin. This prevents the records from being combined even though the same piece of land is involved. Second, there is an historically-based separation of physical and proprietary land data. The current system of land ownership descriptions (metes and bounds, subdivision name, street address) is difficult to combine with physical resource information even though the same or neighboring pieces of land are involved.

6) Problems of *confidentiality* with land records now occur because agencies and levels of government sometimes have conflicting standards, or the officials are unclear on what is or is not public information. The definition of just how public is "public information" appears to be subject to interpretation. In addition, some government-held information is so inaccessible as to be nearly "confidential."

7) *Institutional* problems in government can be seen in the apparent mismatch between the typically vertical structure of existing governmental institutions and the inherently horizontal nature of the land resource. Even a cursory examination of existing departments and agencies at the local, state, and federal levels, reveals that each is organized to respond to related but distinct problems. For example, in state government, it is typical to find units organized around a particular land-related task such as property assessment, highway planning and construction, solid waste management, and septic tank regulation. Each of these units requires land information and each of them typically operates and maintains its own system essentially in isolation from the others; this encourages duplication. The separatism is not limited to government alone, however; utility companies and title insurance companies also maintain independent, uncorrelated land information systems.

Summary

A major governmental role is to protect and enhance the land upon which its citizens depend. In this role, govern-

ment is the major producer of information about the land. The land information problems identified above persist and are serious. They must be resolved if government is to manage the land resource effectively and economically and meet the increasingly complex technological and political demands upon the land.

b. Analysis of Existing Products

The following series of examples have been selected from our findings to illustrate the various and interrelated problems of government-held land information:

1) Local Tax Maps

A 1976 survey conducted by the State Cartographer (See Appendix H) identified the status of county tax maps in the state and indicated that counties and municipalities varied widely in their tax mapping efforts. With 59 counties responding, only 33 or 56% had tax maps of any type and six of these stated they were using vintage 1930 tax maps prepared by the WPA. Scales, procedures, and standards used were different from county to county.

The impact of tax mapping can be seen from the case of the city of Baraboo, (Sauk County) population 7,900. The tax mapping program discovered 60 parcels that were not being taxed (See Appendix I). Assuming an average population of three per parcel, this equates to 60 parcels missing out of an approximate total of 2,630, or 2.3 percent error.

The survey also showed that without accurate large-scale maps, local assessors and county tax listers have difficulty in keeping abreast of changes in parcel boundaries, ownership, and use. The survey responses indicated that tax listing maps are essential to fair and equitable assessing. (Some subdivisions of parcels do not show up as taxable because the information is not automatically filed with the tax lister's office.)

Tax maps allow field inspections and aerial photographs to be directly related to the property assessment process.

PROBLEMS:

Availability - Tax maps with accurate geographic bases are not available in all counties.

Aggregation - opportunities for local-regional-state aggregation of tax information are being missed.

Integrability - existing products are not compatible.

Institutional - county governments usually have not coordinated their tax mapping efforts; state government has failed to set specific and required standards for tax mapping.

2) *Privately Produced Plat Book Maps*

Private firms such as Rockford Map Company in Rockford, Illinois, supply major products—particularly the county wide plat book (ownership) maps—that are widely used by state agencies, local governments and citizens. Although the Rockford Map Company disclaims responsibility for accuracy, it is the only statewide source of parcel ownership information. Since the plat maps show parcel boundaries with the owner's name, they are used as tax maps for assessment, for planning aids, and as a base for zoning. Map symbols, scale, parcel size and accuracy of information vary widely from county to county, depending upon the producing firm, the advertising sold, the sales price and the local support.

Privately-produced plat book maps may print parcel boundary and ownership data that are grossly out of date or incorrect; nevertheless, the maps are often accepted as correct by citizens and by all levels of Wisconsin government. To government, the plat maps are a very useful record about ownership of the land, but there is no assured quality control over the information or the map. (The maps are compiled by private firms frequently in cooperation with local organizations like the 4-H Clubs which gather advertising as a fund raising effort.) Data may be only superficially collected from the Register of Deeds' office. Parcels smaller than ten acres are not shown on the maps at all but all parcel owners may be listed alphabetically, with no specific indication of the location of those lands.

PROBLEMS:

Availability - accurate, updated ownership information does not exist for all counties.

Aggregation - opportunities for local to state aggregation of information are being lost due to lack of consistent accuracy standards.

Integratability - form and contents vary from county to county, so information is not compatible.

Confidentiality - ownership information, often incorrect or many years out of date, is widely published.

Institutional - the lack of state or local action to produce useful maps has encouraged governmental reliance upon the private maps.

3) *Revenue's Land Sales Inventory*

The Wisconsin Department of Revenue obtains a report on each recorded sale of land in the state. The information is computerized and used as a basis for calculations involving local aids, equalization, and prevailing market values. The Department considers certain information in the computerized file highly confidential (i.e., names of transferees), yet much of that information is open to the

public at the county level. Recently, the Department of Revenue allowed one state agency access to the file but denied access to another state agency. Use of the file is closely monitored to protect the privacy of sellers and purchasers.

This example illustrates the importance of properly classifying and setting standards for public vs. confidential pieces of land-related data. The location and the dollar values of lands sold are important to state, local, and private appraisal groups; the names of individuals who transferred the property are not.

PROBLEMS:

Confidentiality - confidential information standards and policies for access have not been clearly established.

Accessibility - state agencies sometimes are denied information that is available at the county level.

4) *Lake Maps*

Lake maps (hydrographic with lake bottom characteristics and depth curves) are prepared by the Department of Natural Resources (DNR), Bureau of Engineering. The map "plates" are sold to private mapping firms who reproduce and sell maps to fishing and boating enthusiasts. The commercial firms, however, only reproduce maps where sales warrant, so coverage is incomplete. The DNR does not sell these maps nor the maps they prepare of lakes without public access. An assistant director of a DNR district office expressed the need for lake maps in his management of programs but was unaware of the existence or origin of lake maps except through private mapping firms.

PROBLEMS:

Accessibility - existing information has not been successfully distributed to those who need it, or its existence made known.

5) *Aerial Photography*

At least three state agencies, four federal agencies, three regional planning commissions, many counties, municipalities, and some civil towns obtained aerial photographs of Wisconsin's land in 1971-76. These photographs were taken for particular program purposes—crop stabilization, highway planning, soil conservation, forestry management, taxation. The photos were taken at different altitudes, encompassed overlapping political jurisdictions, and used different technical and accuracy standards. Much of this repeated activity could have been avoided through coordinated effort and compatible standards.

Some examples of duplication, according to records at the State Cartographer's Office, are:

Between 1971-1976, Brown County was "flown" ten times, three complete and seven partial coverages; Sheboygan County was "flown" eight times; four complete and four partial coverages. Aerial photographic contacts for total coverage were let by the county, by the regional planning commission, and by the U.S. Department of Agriculture. The entire Lake Michigan/Green Bay coastal area was flown by both the Department of Natural Resources (coastal zone management) and by the U.S. Army Corps of Engineers. The latter flew the Lake Michigan shoreline twice during this time period.

Past attempts to coordinate flights among agencies and government levels have not been successful due to a variety of technical and institutional reasons. An ad hoc group of Wisconsin state agency representatives is now coordinating one upcoming statewide photography flight to be cooperatively funded and used by a number of state and federal agencies, as well as by county governments. An analytical report for this group indicated that approximately \$123,000 was being spent annually on aerial photography in Wisconsin by state and local government (\$737,206 total for 1971 through 1976), an estimate that covers approximately 80 percent of all photography acquired by those agencies.

PROBLEMS:

Accessibility - information about existing governmental aerial photography and about plans for aerial photography is scattered throughout agencies and governments. It is difficult to know where to ask for what's available.

Availability - photographic coverage is piecemeal; adequate coverage in some locations is not available while in other locations many photographs are available.

Duplication - little institutional cooperation has existed in the past and significant duplication and overlap has resulted; lack of uniform standards has encouraged duplication in photography.

Integration - coverage is usually incompatible from place to place so that existing photos do not complement or merge with each other to produce region-wide pictures.

Institutional - local, state and federal agencies have failed to adequately coordinate their efforts.

6) Well Drilling Reports

For every well drilled in the state, a driller's well construction report (showing location, formations encountered, depth of water and bedrock) must be filed with the Natural Resource Department's Private Water Supply Section in Madison. The Section files the reports by

county and then chronologically, with a cross-reference to the driller's record card. Well location is shown on the reports by public land survey description (township and range). The well report is cross-referenced by the original house builder's name, by the property owner's name, or by the name of the agent of that owner or builder.

Copies of these reports are not sent to local or county governments or to the State Geologist. They would be useful to the State Geologist in understanding Wisconsin's geologic and groundwater conditions, both locally and statewide.

There is no map for each county or for the state showing where all the wells are, nor a compilation of well depth or bedrock information by town or county. Well location and characteristics appear to be accessible to new homeowners only if they know the driller's name, the year of construction, and/or the names of the owner/builder/agent when the well was drilled. In addition, the Private Water Supply Section Chief has been reluctant to release the information to the public, to other state offices, or to utility companies.

PROBLEM:

Accessibility - the form of filing the reports makes it difficult to retrieve or compile information.

Aggregation - opportunities for aggregation of information from the local to the state level are lost.

Integration - valuable natural resource information is not arranged by location but by less useful designations (i.e. owners).

Institutional - available information is not shared among related institutions.

7) Publicly Owned Lands

Neither the federal government nor state government—nor even county and local government generally—have centralized or complete inventories for locating all their lands. If governments were asked, "Where are all lands located that you own or manage?" or "Where are one-to-three acre government-held parcels available for building in area X?", agencies either could not answer at all or could answer only after tedious and possibly inaccurate searching of records.

For instance, when the State Bureau of Facilities Management, as staff to the State Building Commission, was asked to produce a map of possible building sites for new prisons, they were forced to purchase a complete set of Rockford Map Company county plat maps. (As noted in the example on Privately-Produced Plat Book Maps, these private plat maps are the only existing statewide source of land ownership information.) Facili-

ties Management staff then located parcels described as state-owned and generated a map on the areas of interest. At about the same time, the Office of State Planning and Energy and the Wisconsin Department of Natural Resources produced maps of publicly-owned or managed lands but these covered only large parcels, or only certain types of public lands.

Elsewhere on the state level, the Secretary of State obtains and stores some information about state-owned lands (deeds, bonds, easements, abstracts) as required by statute. However, not all agencies submit the records nor does the Secretary monitor the location and size of the parcels. The state Department of Natural Resources itself has several inventories of public lands which are basically incompatible with one another. The Wisconsin Department of Transportation has a computerized inventory of public lands found along highway corridors, but that system generally is incompatible with other agencies' land inventory systems. The University of Wisconsin System also has two distinct sets of manually sorted records of University lands, filed by campus.

The public ownership situation at the federal level is similar: the federal land inventories are fragmented, incompatible, and incomplete. Many local governments, too, are not certain of the extent and location of their lands. The public real estate that is most carefully inventoried on all governmental levels is highways, apparently since funding is calculated according to the precise number of feet and miles of roadway.

PROBLEM:

Accessibility - available information about publicly-owned lands is scattered throughout public agencies and is not arranged by location in a convenient form.

Availability - information is often incomplete and not up to date.

Duplication - several state agencies and federal agencies collect similar, incompatible information for specialized needs.

Aggregation - opportunities to aggregate data from the local level up to the federal level have been lost.

Integration - inventory files which could be integrated have not been; natural resource characteristics (i.e. location on the surface of the earth) have not been used as referencing indices.

Institutional - agencies on each level and between levels have not successfully cooperated in the compilation and central storage of owned-lands information and no one agency has been assigned responsibility to keep the information up to date.

8) Permit Filing Methods

State-required permits and other documents relating to buildings or parcels of land are filed in diverse ways. For instance, the Department of Natural Resources files sewer extension permits by project number; the Department of Industry, Labor and Human Relations files building permits for large construction projects by street address; the Department of Health and Social Services files septic tank permits by permit number, and the Department of Local Affairs and Development files subdivision plat information by county and by land subdivision title assigned by the developer.

A similar situation exists on the local level, where permits are often filed chronologically or by builder's name and not cross-referenced to location.

While these various permits may pertain to the same piece or area of land, they are referenced in ways that effectively prohibit analysis of the cumulative effect of permitted activities on that land, such as analysis of potential groundwater contamination. Governmental use of different spatial referencing techniques reduces the quality of land regulation, planning and management because the existing information cannot be easily integrated.

PROBLEMS:

Accessibility - access to information is restricted due to different filing methods that do not reference back to specific geographic location.

Integratability - diverse and needed information cannot be integrated without compatible referencing systems.

Institutional - public agencies' management of programs and their comprehensive planning and analyses are reduced by the lack of ability to share and compile information.

9) High-Altitude Photography

In the late 1960's, the National Aeronautics and Space Administration (NASA) produced a series of high-altitude color photography acquired with U-2 or RB-57 aircraft employing sophisticated equipment. Much of northern Wisconsin was covered. Even though the photos contained nothing of pressing military or security interest, the photographs were routinely classified and kept out of circulation until they were out of date. The labeling of these color photographs as "classified information" seemed unwarranted, too, because more detailed black and white photographs of the same region were available from other federal agencies such as the U.S. Geological Survey Topographic Division; and U.S. Department of Agriculture, Agriculture Stabilization and

Conservation Service. Nonclassified, high-altitude photography is presently available to the general public through the U.S. Geological Survey at its Earth Resources Observation System (EROS) data center in Sioux Falls, South Dakota.

PROBLEMS:

Accessibility - unnecessary classification limits public and governmental access to materials.

Confidentiality - inappropriate classification methods restrict valid intergovernmental use of public information.

Institutional - federal agencies sometimes are not responsive to user needs of state and local governments.

10) Mining Core Samples

Private mining firms send a small proportion of their core samples or sample cuttings to the State Geological and Natural History Survey for analysis. The resulting information is considered public only in summary form or after ten years. Most mining leases require that the individual landowner may not have access to the information until the lease terminates. In addition, the location of exploratory sites shown on prospecting permits (sent to the State Natural Resources Department and then to the State Geological Survey) is not open to the public under the Mining Reclamation Act.

Thus, while three state agencies have minerals information (Revenue, Natural Resources, Geological Survey) affected landowners or local governments may be unaware of the information or unable to obtain it due to statutory or institutional restrictions.

PROBLEMS:

Accessibility - available land information is not accessible to individuals and local governments affected.

Confidentiality - standards for public vs. confidential information are not thoroughly articulated and accepted on each governmental level.

11) Subdivision Plat Review

There are many state regulations that real estate developers must follow if they wish to divide land into five or more building lots. If they develop four or fewer, they are exempted from the regulations. The Department of Local Affairs and Development reviews technical and land surveying aspects of the regulations and reports that on several occasions developers have reported eight or more contiguous lots as being two or more separate groups of four, thus avoiding the regulations.

The information from submitted plats is filed in such a manner that adjacent parcels cannot be easily identified by the Department. If different developers submit their plats for neighboring lands at different times, the present plat referencing system is not capable of easily linking these two events. Thus subdividers and developers can comply with the letter of the law while circumventing its intent.

The Wisconsin statute regarding subdivision plats delegates certain review powers to several state agencies. Besides the Department of Local Affairs and Development, the Departments of Transportation, Natural Resources, and Health and Social Services also review subdivision plats and have powers of objection in their functional areas (road access, floodplain and other natural resource issues, and septic/environmental health issues).

The effectiveness of the subdivision regulation process itself is handicapped because of poor referencing systems and because at least four state agencies are involved in the review of plats with no one state entity responsible for the entire process.

PROBLEMS:

Accessibility - poorly indexed information is not geographically meaningful.

Integrability - information from the plat review process cannot be related easily to other natural resource or ownership information.

Institutional - specialized plat review by several agencies does not insure effective state review.

12) Land Survey Markers and Documents

Primary responsibility has rested with Wisconsin county, municipal, and town governments for maintenance of the Public Land Survey markers and for restoring those that have been removed, buried, or decayed. This responsibility was delegated to them by the state and to the state from the federal government.

Counties, towns and municipalities have varied over the years in the amount of attention given to the markers and in the recordation of what has happened to them. Some counties have no county surveyor, the statutory official responsible for this activity. In such cases, survey information may be filed with other county officials and the records lost over the years. Also, some records are not turned over to the county by private surveyors, who sometimes view them as private not public documents. Also, in restoring the markers, the level of surveyors' performance varies, depending on the type of survey being performed. (See Appendix J.)

The researchers found no state agency that knew—and

it's doubtful that many counties know—how many markers have been restored, to what standards markers were restored, how many markers existed originally, and how many are still in need of “remonumentation.” This delegated federal activity appears to have been poorly administered. The State Cartographer's Office is questioning counties to try to ascertain the status of markers in the State; that survey may cease, however, due to lack of funds.

More attention should be given to maintenance of federal Public Land Survey monuments and records because they are the backbone of our entire legal system for describing owned land. Restoring and locating these markers are prerequisites for accurate, detailed mapping. As governments seek more and more land-related information, such as wetlands, “prime” farmlands, and public ownership, accurate boundary descriptions of the land are required.

PROBLEMS:

Accessibility - inadequate records management contributes to misplacement or non-filing of significant information and records.

Availability - some important marker and boundary information does not exist.

Aggregation - opportunities to aggregate from county to state are missed due to lack of adequate, compatible base maps.

Integration - lack of statewide surveying and mapping standards reduces the integratability of existing information and documents.

Institutional - state government is not providing adequate leadership to county governments in this area: no state agency currently is empowered to set standards and oversee land surveying and monumentation activity.

13) Soil Maps

Remapping for the modern soils series is presently under way in Wisconsin. As shown on the September 30, 1977, U.S. Department of Agriculture's (Soil Conservation Service) report, 26 (or 35 percent) of Wisconsin counties have modern soil surveys published. An additional 17 (23 percent) are in the status “modern soil survey with field mapping completed, to be published”. (Dane County, for example, was in the latter status for approximately three years.) The report concludes that eleven counties have soil surveys being conducted (for a total of 54 “surveyed” counties) and that 18 counties have only the “old published soil survey.”

Soils mapping, from the start of the survey to the publication of the report, usually requires five to seven years.

Part of this time is spent in fieldwork by a soil scientist, working out of a local office, who compiles maps for the entire county as an index to the existing soil descriptions. When these maps have been completed they are sent to the U.S. Department of Agriculture's laboratory. It then takes from two to three years before the report is published (printed in volume for sale and distribution) even though the maps were originally available on the local level several years prior.

During those three years the data is not updated. This time lag effectively restricts use of the soils information since only the county's official file copy is available for reference during this time period. (Portions are xeroxed upon request.)

PROBLEMS:

Accessibility - existing information is not available to enough users in a suitable form during the map publishing period.

Integration - because of different mapping standards between federal agencies, integratability of two useful and common land records is restricted.

Institutional - long delays still exist despite many years of experience with the program.

14) Land Inventories

Various state and federal entities are inventorying certain aspects of the land to meet their specific program needs. Several are listed below.

The State Department of Natural Resources (DNR) is working with the U.S. Department of Agriculture's Soil Conservation Service (SCS) to do a survey of erosion potential of lands in the state. DNR is planning to develop county wide maps for this as part of Section 208 of the Clean Water Act (PL 92.500), usually referred to as nonpoint-source pollution abatement planning.

SCS has done several floodplain studies and also did a wetlands inventory of the counties in the Wisconsin River basin. Within DNR itself, the Water Resources Planning Section, the Water Quality Planning Section, the Game Management Bureau, and the Bureau of Research (among others) are engaged in aspects of wetlands inventorying. The U.S. Army Corps of Engineers has also done many wetlands studies. U.S. Fish and Wildlife is considering a wetlands mapping effort. The Wisconsin Legislature is now seriously considering a comprehensive wetlands inventory for the entire state; the last complete inventory was done in the 1930's.

Many sections within DNR's Water Quality Bureau are conducting manual and automated inventories of water quality within the state, usually by river basin. The Water Resources Division of the U.S. Geological Survey also

conducts water quality analyses and monitoring, as do the University of Wisconsin-Madison's Engineering and Agricultural Experiment Stations.

Several groups within DNR are doing stream (surface water) surveys, primarily the Fish Management Bureau and several sections within Water Quality, as well as district office staff. The state Department of Agriculture's agricultural lands preservation program, recently enacted by the Wisconsin Legislature, will also require an inventory and mapping of lands by county.

The information produced from these specialized inventories is generally not shared with other agencies, nor is the information stored in a visible place or widely distributed for possible use by others. Very little is done to see that the information collected by each agency is compatible with and complementary to other agencies' efforts. No composite base of information about Wisconsin's lands results from this plethora of governmental activity.

PROBLEMS:

Duplication - several agencies and levels of government collect similar or parallel information without adequate coordination.

Integratability - lack of a common geographic base and lack of compatible data collection standards results in unintegrated land information and records.

Institutional - levels of government and agencies on the same level have not adequately striven to merge their activities or cooperated on standards for data collection.

15) *Permits to Alter Stream Banks*

Three levels of government—and three different sets of forms—are involved in regulating requests to modify the banks of any navigable stream in the state.

- the U.S. Army Corps of Engineers, through its district offices, reviews requests for alteration and issues a permit;
- the State Department of Natural Resources, through its Floodplain and Shoreland Management Bureau and its district offices, reviews requests and issues permits for stream bank alterations;
- county or municipal offices review and issue building permits for structures that modify stream banks; and
- some towns have site permits to allow building according to certain set-back restrictions, which may involve stream banks.

Thus, proposed alterations require three levels of gov-

ernmental review and three (occasionally four) sets of forms to be filled out. This example demonstrates federal/state duplication and governmental over-regulation which is inconvenient for the citizen, costly for the taxpayer and time consuming for government.

PROBLEMS:

Duplication - several agencies perform the same function.

Integration - the cumulative effect of the various permitted activities is difficult to ascertain because of all the levels of government involved.

Institutional - no intergovernmental common permit application and review process has been established.

16) *Farmland Classifications*

Under Section 302, Title III, of the Rural Development Act of 1972, the U.S. Department of Agriculture's Soil Conservation Service (SCS) is compiling and publishing county maps of Wisconsin's "prime and unique" agricultural lands, using soil and slope characteristics as its major criteria for selection, regardless of parcel boundaries. A farmer could have several soil types so that part of his fields would be considered prime or unique while other parts would not.

Wisconsin itself is implementing a tax rebate program for farmland preservation (chapter 91 *Wisconsin Statutes*). The criteria for the "agricultural lands to be preserved" include soil types, contiguous ownership, profits gleaned from the land, Wisconsin residence, proximity to markets, urban pressures and zoning—all on a parcel-by-parcel basis. This program will involve counties and the State Department of Agriculture, Trade and Consumer Protection, the Department of Local Affairs and Development as well as the state Departments of Revenue and Justice. Counties may use SCS "prime land" maps, but so far the maps have been too general and at incompatible scales.

Thus, Wisconsin will likely have several different sets of "official" prime farmlands, each separately identified using different criteria. Legal actions and taxation appeals are possible from farmers with prime and unique lands under SCS criteria but who are refused tax breaks under the state's agricultural lands preservation program.

PROBLEMS:

Duplication - the parallel efforts with different criteria will result in two distinct information sets.

Aggregation - funds expended on different information sets could have been spent on one system aggregated from local to state to federal levels.

Integratability - the two information sets will not be compatible.

Cost-effectiveness - the federal program is not tied to specific, communicated policy issues, thus its usefulness is questionable.

Institutional - lack of federal sensitivity exists to state needs and plans.

17) Water Quality Records

The Bureau of Water Quality, State Department of Natural Resources, regulates nearly all aspects of water quality in Wisconsin. Several sections within the Bureau, however, have confusing, overlapping functions making it unclear (even within the agency) exactly who is responsible for what.

The most extensive overlap was found in effluent monitoring, discharge permits, groundwater studies, nonpoint source pollution, water quality monitoring and research, planning and analysis. Other DNR Bureaus also perform some of these functions, primarily Inland Lake Rehabilitation, Fish Management, and Research. The situation is such that one must almost know the individuals involved to secure information.

This overlapping of similar activities by separate organizational units further complicates the already complex field of water-related regulation. Public access to DNR's land records, and access by researchers and other government agencies, is hampered by the many individuals and organizations involved with small parts of the whole. As a result, the agency's responsiveness and accountability to the public and to the legislature suffers.

The Bureau's nine sections contribute to a computer program that is supposed to interrelate the multitudes of water data and display it in reports for management. These reports would be useful in administering of water quality programs but many managers complained about not receiving usable products back from the computer system.

PROBLEMS:

Accessibility - existing information is not readily accessible or usable due to confusing program overlaps and ineffective use of the computer.

Duplication - responsibilities are fragmented and activities are repeated among several bureaus and sections.

Integratability - information collected is not placed into a common, useful file or consistently referenced by location.

Institutional - program linkages and management re-

sponsibilities among related water quality programs are unclear.

18) Property Parcel Records

Parcel boundary descriptions are essential to the American legal system and must be easily and accurately related back to the land itself. Wisconsin law reflects the importance of such a geographically organized index of land title information. The law provides for a tract index in each county noting the volumes where mortgages, deeds, attachments, affidavits, sales, or other documents relating to land title are stored. The tract index is arranged according to the Public Land Survey System in a hierarchy descending from the section to the quarter section, sectional lot, town, city or village lot or other subdivision of land.

Parcel identification codes are used as one method for integrating certain land information. A number is assigned to each land parcel. This number is then attached to documents related to that parcel. Tax and title documents are the most frequent objects of parcel codes.

Much of the land tax and title information is maintained at the town and county level, and these governments increasingly are using parcel codes. A variety of codes are in use. At the same time, the State Department of Revenue has established a system that it seeks to implement on the local government levels. The result of the uncoordinated parcel codes is a series of different systems that makes it difficult to combine and compare land information.

In addition, parcel codes have limited applicability as the basis for integrating land information: they cannot easily incorporate the variety of physical land data such as soil or floodplain data which do not conform to political division of the land. In fact, parcel identification codes may encourage the generalization of physical data in an attempt to attach that information to the individual parcel.

Parcel codes alone are useful for only a restricted subset of land data, primarily tax and title information. However, parcel codes that are consistent or compatible among jurisdictions can be combined with a geographical coordinate system, such as the State Plane Coordinate System described in *Wisconsin Statutes* 236.18. The result would be a much more comprehensive method or index for relating physical and natural resource information with proprietary records. In the long run, however, all that is needed is a geographic coordinate structure that accurately describes parcel boundaries and how each parcel relates to the other.

PROBLEMS:

Accessibility - the public land survey division of land is difficult for a lay person to understand.

Availability - the independent description of individual parcels results in gaps that cannot be easily identified.

Aggregation - the complex legal descriptions in common use restrict the aggregation of title information.

19) Area of "Minor Civil Divisions"

Nowhere at the state level could the researchers find up-to-date (1970) information on the physical area of all minor civil divisions (villages, towns) in the state. While the U.S. Bureau of the Census has this data through the 1960 census, the 1970 census did not collect area data below incorporated places of 2,500 population. County clerks are required to keep track of all boundary changes in their counties, but area calculations are either not kept or not forwarded to the state agencies. As a result, population densities cannot be calculated at the state level for rural Wisconsin or used for accurate research.

Although several state agencies collect data on boundary changes of all political subdivisions within the state, project researchers could find no state organization that totals or maps the area differences created by annexations or other boundary changes. The state Department of Transportation is the only agency we found that updates and corrects the political boundary information. (Physical size affects how much money a community gets from the Transportation Fund for road maintenance.)

Those corrections are not in turn forwarded to the Secretary of State, who is responsible for collecting and disseminating boundary data.

PROBLEMS:

Availability - useful area and density information on minor civil divisions doesn't exist at the state level.

Institutional - a significant information gap has been generated by the number of governments and agencies responsible for only certain aspects of boundary information.

Summary

The land record products discussed in this section represent the kinds of records which are being collected and maintained by government. When compared with the basic problems illustrated in the following table, "Summary of Land Record Products and Associated Problems," it is likely that many more of government's existing land records may be affected.

The following table illustrates that some records are more problematic than others. Which of the problems are most important depends upon one's viewpoint or need for the record. The examples and the table illustrate, too, that improvements in land records and between government agencies are needed.

**TABLE Summary of Land Record
Products and Associated Problems.**

LAND RECORD PRODUCTS	PROBLEMS	Accessibility	Availability	Duplication	Aggregation	Integrability	Confidentiality	Cost-Effectiveness	Institutional	Sub Total
		1) Local Tax Maps		X		X	X			X
2) Privately Produced Plat Book Maps		X		X	X	X	X	X	6	
3) Revenue's Land Sales Inventory	X						X		2	
4) Lake Maps	X						X		2	
5) Aerial Photography	X	X	X		X		X	X	6	
6) Well Drilling Reports	X			X	X			X	4	
7) Publicly Owned Lands	X	X	X	X	X		X	X	7	
8) Permit Filing Methods	X				X			X	3	
9) High Altitude Photography	X						X	X	3	
10) Mining Core Samples	X						X		2	
11) Subdivision Plat Review	X				X			X	3	
12) Land Survey Markers and Documents	X	X		X	X		X	X	6	
13) Soil Maps	X				X			X	3	
14) Land Inventories			X		X		X	X	4	
15) Permits to Alter Stream Banks			X		X			X	3	
16) Farmland Classifications			X	X	X		X	X	5	
17) Water Quality Records	X		X		X			X	4	
18) Property Parcel Records	X	X			X				3	
19) Minor Civil Divisions Area Information		X						X	2	
Subtotal	13	7	6	6	14	4	7	15		

V. Synopsals

This report has attempted to show the major problems with land records found through this research project and the governmental expenditures associated with those land records.

The land record and land data problems were categorized as difficulties with accessibility, lack of data aggregatability, nonintegratability of information, duplication of efforts to gather and record land information; questionable cost-effectiveness of or need for some land records; confusing confidentiality requirements, and vertically organized, single-purpose land record-creating institutions. These problems are found within and among agencies on each level, and they are repeated between levels of government.

The above findings are compatible with those of the 1973 Federal Mapping Task Force, whose report described similar problems at the federal level as the Wisconsin study found at state and local levels.

A few of that 1973 Task Force's conclusions and recommendations are paraphrased below to illustrate the similarity and significance of the concerns.⁵⁸

- These dispersed federal agencies spent \$446.8 million in 1972 on basically fragmented, overlapping, and single-purpose land mapping activities;
- A central agency (Federal Survey Administration) should be created out of the domestic mapping, charting and geodetic units housed in seven different departments and eleven independent agencies;
- The new agency should have sufficient clout to reduce needless proliferation of mapping, charting and geodesic activities; and
- No all-source library, common filing, or reference system exists in the federal mapping community.

Land may be likened to the human body: a complex entity made up of a myriad of elements and substances functioning together as a little-understood whole. Land records can be compared to attempts by our doctors and by our physical, social, and nutritional scientists to describe, measure, analyze, and improve physical processes and human productivity. In both cases there are gaps in our information and limitations to our knowl-

edge of how to put together the information we do have.

With land problems, as well as human, a piecemeal, isolated set of approaches will not yield the needed understanding. Our records merely reflect what is known; it is critical that existing records be available to those who seek to understand land related "ecosystems."

The causes of governmental land record problems are many and varied. A few contributing factors surfaced during discussions among the Land Records researchers.

- Government tends to be problem-oriented; as a crisis or problem arises, money is put into "solving" that particular problem. Dollars generally are not placed in information systems that could help address future crises or pervasive problems.
- Agencies of government are organized along single-program (or problem) lines; each program manager has a certain problem-solving charge and is evaluated on how well that particular problem is "attacked."
- Government agencies, too, operate in a "vertical" structure; each unit or program relates "upward" toward its supervisory levels rather than relating "horizontally" to similar units or programs. This "vertical" structure combined with single-mission foci appear to reduce program coordination and foster interagency competition.
- On each level of government, no one agency is charged with integrating land data and records within and between governmental levels.

The recommendations in this report focus upon the lack of clear land record authority as a major cause of land record-keeping problems. Once an entity is established as having authority over land records, then someone will be responsible for addressing the more pervasive institutional, political, and financial traditions of governmental maintenance of information about the land resource.

The hope is that these recommendations will contribute to greater understanding, more efficient administration, and more effective management of the land upon which society depends for its economic and physical livelihood.

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APPENDIX A

DEFINITION OF LAND RECORDS

For purposes of this project, **land records** are those spatially-related documents that record governmental interest in the physical, legal, and environmental aspects of the land—whether in, on, above or under the surface of the earth.

The term **land records** includes governmental data required, collected and maintained for real estate and taxation, land transfer, environmental protection, and land management. Also included are some specific activities by utilities. The term “documents” refers to the form in which land-related data is most commonly used. These documents are usually of the following types: maps, plats, inventories, logs, microfilm, publications, field notes, magnetic tapes, reports and questionnaires.

Other terms which are potentially interchangeable with **land records** are **land information, land data, and geo-information**. The term **land information system** means the ability to organize and restructure land-related data. **Land records** was chosen because it best describes the results of many groups’ collection of data about the land and its resources.

We are not concerned with physical events on the land but with the knowledge of the land that results from and is necessary to conducting or recording those activities.

Criteria

1. **Geographically-based** documents as opposed to documents which are not primarily related to geographical location. A simple test: can the data be arranged on a map (even if in everyday usage it is not arranged on a map)?
2. **Natural resource** information as opposed to cultural, social, or political information. Economic information and some other types are on the borderline and require individual judgements.
3. Information **basic to governmental functions** is included, i.e. taxation, utility structures, sewerage and highway maps.

All three criteria cannot be applied at all times to each

type of document or product. For instance, pollution monitoring reports (smokestack sampling, for instance) would not be included because they are not primarily geographically based; if, however, the DNR should make a map showing distribution of pollution over a region, we would include that since it is geographically based.

Examples of Spatially-Related Land Records

We **do** want cost data on:

We **do not** want cost data on:

SURVEYS

Engineering
Property Assessment
Topographic/Geologic
Agricultural/Crop
Natural Resource/Nat. History
Soil/Mineral
Forest

Fish and Game Locational
Recreational
Attitudinal
Traffic

LOGS/PERMITS

Core Samples
Well Drillings
Sanitary Landfill permits
Utility extension permits
Floodplain building permits
Septic Tank permits

Safety & Building Inspections
Building permits
Pollution permits
Smokestack samples
Motor vehicle junkyard permits

MAPS/CHARTS

Zoning
Base Maps
Land Use
Topographic/Hydrographic
Land Cover
Historic Sites/Features
Tax
Geodetic Control
Lake and Stream
Highway
Plat (official farm & subdivision)
Soil suitability/productivity
Aeronautical charts

Population
Social Services
Administrative areas
Privately prepared plats

PLANS

Urban development plans
Solid waste plans
Sewage treatment plans
(& “208”)
Critical resource plans

Fish hatchery plans
Wildlife stocking

We do want cost data on:

We do not want cost data on:

We do want cost data on:

We do not want cost data on:

Land acquisition plans
Water resource plans
Park and open space plans
Highway—construction
& location
Airport development
Major facilities planning
Soil & Water Conservation
Air management plans

ANALYSES/REPORTS/
QUESTIONNAIRES

Environmental impact analyses/
statements

Water quality studies

Specific geographic analyses/
sampling

Air quality studies

Wetlands studies

Climatic analyses

Energy use (consumption/
efficiency) studies

Floodplain analyses

MISCELLANEOUS

Aerial photography &
interpretation

Thermal imagery

Boundary restoration

Remonumentations

Compiling of land-related data
from other sources

Clearinghouse/ coordination
efforts among land-related
programs and data

Manual and automated land-
data filing systems

Satellite imagery

Rural home numbering systems

Overlay maps

Land-related defense projects

Geographic textbooks

Surveying training materials

Administrative area maps

APPENDIX B

LOCAL LAND RECORDS EXPENDITURES, 1976

To create an estimate of the local expenditures for land records at the local level (civil towns, municipalities, counties and regional planning commissions), a sample design was developed with the assistance of the University of Wisconsin-Extension's Survey Research Laboratory.

Civil towns were used as the basic sampling unit. Civil towns are the local government in unincorporated areas and are not necessarily coterminous with Public Land Survey townships. Each sample unit included the chosen civil town, any municipality within or abutting the town, and the county and regional planning agency in whose jurisdiction that town is situated.

Estimates of record expenditures for fiscal 1976 were used for the civil towns and municipalities. Land records costs for county and regional planning commission were prorated by population to represent the selected civil town's proportion of county and regional land record expenditures.

The state was divided into eight strata of equal population and again into eight strata of equal geographic area. Two independent selections of eight civil towns were taken. These civil towns represented 1.2% of the state's civil towns. A description of each sample and estimates of land record expenditures follow. Because of their unique status, both the City of Milwaukee and Menominee Indian Reservation were excluded from this sample. Milwaukee's land record expenditures were calculated separately and are detailed in Appendix G.

A weighting procedure was used to create a statewide estimate from the sample unit expenditures. Weights based upon the probability of each sampling element being selected were determined from the original sample procedure.

As an example, stratum P4 represents approximately one-eighth of the state's population (minus Milwaukee and Menominee). Within this stratum were 140 civil towns. Random selection of one of these assigned the

Town of Auburn as a sample civil town. Since the probability of selecting any one town was 1 in 140, this 140 number was used as the weighting factor for the sample element. That is, the total expenditure for land records by the Town of Auburn was multiplied by 140 to estimate the total expenditures of all civil towns within that strata.

The Village of Campbellsport was included because of its common border with the selected civil town. But since the Village abutted two civil towns in the stratum the probability of its selection was 2 in 140. Therefore 70 was used as the weighting factor. Total land records expenditure by Campbellsport multiplied by 70 yields an estimate of the total expenditures on land records by all the municipalities in that stratum.

Expenditure estimates for counties and regional planning commissions were handled with one additional step. Total land record expenditure by county or RPC was prorated by population to the civil town or municipality and the weights of these sampling elements used to estimate the strata total. In this example the land record expenditure of Fond du Lac County was prorated by population to the Village of Campbellsport. This dollar figure was multiplied by the weighting factor for the village to derive an estimate of county expenditures on land records for all the municipalities in the stratum.

This procedure was followed for each stratum in the two sample selections with the total of the eight strata in each sample estimating the total land record expenditures by local government and regional planning agencies within the state. The mean of the two sample totals was used as the final statewide estimate of local government expenditure on land records for 1976.

To validate the sampling procedures used, populations of civil towns plus abutting or contained municipalities were projected to statewide population, using the same weighting factors developed for the study. This population estimate for the state differed from actual population by 9.58 percent. The UW-Extension's Survey Re-

search Laboratory further determined that the sampling methodology could be employed to yield an approximate 90 percent confidence interval for statewide local government expenditure on land records for 1976. (Specifically this was \$39,758,930 plus or minus \$19,000,000.)

The following pages show 1) the dollar calculations, 2) the location of the sample towns, and then 3) briefly describe the characteristics of each sample unit and the detailed land record expenditures per stratum. Space does not allow mention of the many local officials who contributed greatly to each estimate; for their considerable time and assistance the project staff is extremely grateful.

1) Dollar Calculations

Local Expenditures per Stratum

Area Sample	Projected Statewide Expenditures per stratum	Population Sample	Projected Statewide Expenditures per stratum
A1	\$64,960,777	P1	\$2,715,966
A2	858,816	P2	1,712,729
A3	575,845	P3	314,076
A4	528,120	P4	1,127,700
A5	135,464	P5	602,862
A6	522,708	P6	1,315,692
A7	1,817,235	P7	1,033,288
A8	756,462	P8	540,120
	<u>\$70,155,427</u>		<u>\$9,362,433</u>

The average of the two above estimates is \$39,758.930 for the 3,966,006 state residents included in the sample. This yields a per capita expenditure of \$10.02 for 1976 land records by local governments within the sample area.

For the remainder of the state's population (primarily Milwaukee residents) the following calculations were used to derive a single local government expenditure for Wisconsin residents.

	Population	Per Capita	Land Record Expenditures
Sampled Area	3,966,006	\$10.02	\$39,758,930
City of Milwaukee (see Appendix G)	654,548	2.08	1,359,059
Menominee	2,803	—*	—*
TOTAL	<u>4,623,357</u>		<u>\$41,117,989</u>

(*No costs gathered.)

The total land record expenditure by local governments, then, was \$41,117,989 which, when divided by the entire state's population of 4,623,357, yielded \$8.89 per capita. This figure then was used as the composite local government expenditure per resident on land records.

The composite figure is admittedly low; it does not include the portions of expenditures by Milwaukee County and Southeastern Wisconsin Regional Planning Com-

mission for land records related to the City of Milwaukee. The Milwaukee expenditures were gathered in a manner different from the rest of the state's figures, so the \$2.08 figure is probably low from that standpoint too.

2) Location of Sample Towns--See map on following page.

3) Sample Unit Details

This section briefly describes the sample units and details their estimated 1976 expenditures on land records.

Area

A1

Fitchburg borders on Madison, the capitol of Wisconsin, and has had a great deal of subdivision activity in recent years. Madison was included as part of this sample. Its population density and volume of land records has led to the development of a computerized land information system. "Shared Data" contains three separate data bases and is the result of cooperation between thirteen city departments. This system was in its last year of development in 1976, with a total expenditure of \$239,220.

Both town and city are located in Dane County, the second most populated county in Wisconsin.

	Population	Total Expenditures for Land Records
Town: Fitchburg	10,053	\$31,882
City: Madison	172,063	\$1,681,056
County: Dane	312,472	\$840,850
RPC: Dane County	312,472	\$42,000

A2

The Town of Moscow and Villages of Hollandale and Blanchardville are located in the southeast corner of Iowa County, 20 miles west of Madison.

Town: Moscow	541	\$829
Village: Hollandale	272	\$640
Village: Blanchardville	748	\$1,265
County: Iowa	19,550	\$59,115
RPC: Southwest	134,426	\$10,000

A3

Liberty is an agricultural town lying between the Embarrass and Wolf Rivers in western Outagamie County. Outagamie extends from the urban centers of the Fox Valley to the rural farmland of east central Wisconsin.

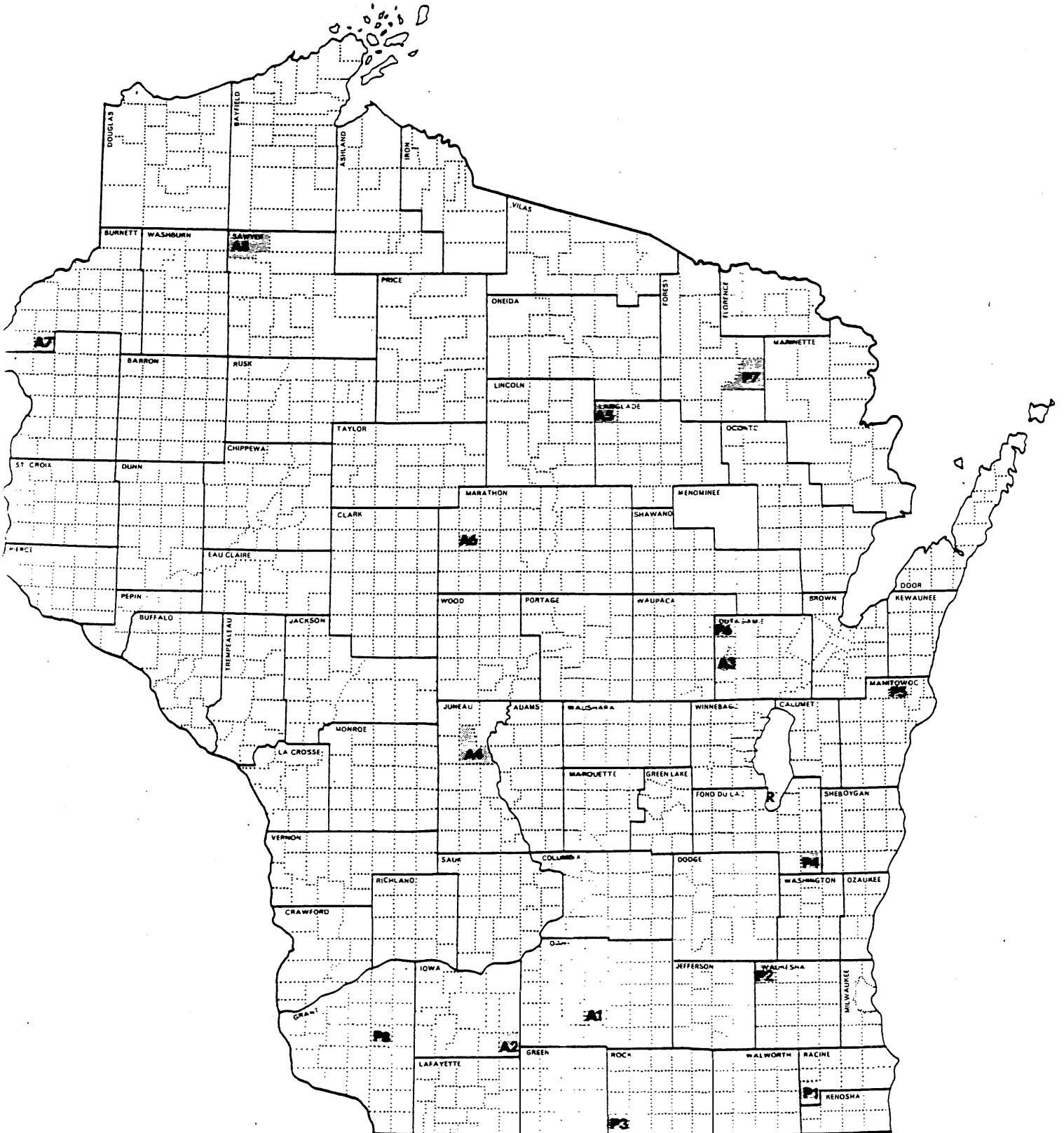
Town: Liberty	558	\$1,390
County: Outagamie	127,190	\$312,277
RPC: East Central	499,233	\$39,926

A4

The Village and town of Necedah are on the west shore of Castle Rock and Pentenwell Flowage on the Wisconsin

WISCONSIN LAND RECORDS PROJECT

MAP OF SAMPLE TOWNS



GEOG. DEPT.-U.W.

sin River. Most of the town is included in the Necedah Wildlife Refuge of the U.S. Fish and Wildlife Service.

Town:	Necedah	981	\$3,260
Village:	Necedah	754	\$1,319
County:	Juneau	18,746	\$73,347
RPC:	North Central	342,870	\$19,615

A5

Most of the Town of Parrish is now in a county forest. It had the smallest population of any of our samples, 76. Langlade County is divided between the agricultural regions to the south and the timber areas along the state's northern border.

The Parrish segment of the county Ice Age Trail has recently been incorporated into the national trail system by the Bureau of Outdoor Recreation.

Town:	Parrish	76	\$875
County:	Langlade	19,552	\$69,239
RPC:	North Central	342,870	\$19,615

A6

Frankfort is an agricultural community about thirty miles west of Wausau. Marathon is the largest county in Wisconsin and is located in the North Central portion of the state.

Town:	Frankfort	787	\$2,154
County:	Marathon	105,637	\$248,723
RPC:	North Central	342,870	\$19,615

A7

Trade Lake provides a mixture of farm homesteads and lakeside residential development. Burnett County has established a Public Land Survey remonumentation program as proposed by the 1970 state law. This program's 1976 expenditures were \$44,892 and is scheduled to be completed by 1990.

Town:	Trade Lake	692	\$2,620
County:	Burnett	10,973	\$109,784
RPC:	Northwest	162,692	\$17,100

A8

The woodlands surrounding Lake Nelson have attracted many permanent and seasonal residents to the Town of Lemroot. Since the inclusion of the Namekagon River into the National Wild Scenic Rivers System, federal agencies have purchased river frontage in Sawyer County and Lemroot. Sawyer County is about to complete a ten year project of 1" = 400' tax mapping.

Town:	Lemroot	747	\$1,890
County:	Sawyer	11,150	\$92,041
RPC:	Northwest	162,692	\$17,100

P1

Burlington is located near the west border of Racine County, about 20 miles from the Lake Michigan shore. Racine County borders Milwaukee County to the north, and only 40 miles to the south is Chicago. In a program

financed by the county and supported by the Southeast Regional Planning Commission, the entire Public Land System in Racine has been remonumented. This was carried out in a ten-year comprehensive program including survey remonumentation and topographic base maps with two-foot contour intervals. Our sample year contained an expenditure of \$185,804 in this \$1,005,526 program.

Town:	Burlington	5,164	\$12,933
City:	Burlington	8,785	\$48,575
County:	Racine	179,334	\$387,647
RPC:	Southeast	1,726,912	\$247,300

P2

Waukesha County is located just west of Milwaukee County. Over 200 subdivisions were registered in the county last year. The City of Oconomowoc and the Village of Lac La Belle are located along Lake Oconomowoc in the northwest corner of the county.

Town:	Oconomowoc	6,074	\$17,955
Village:	Lac LaBelle	198	\$521
City:	Oconomowoc	10,633	\$68,762
County:	Waukesha	269,927	\$464,760
RPC:	Southeast	1,726,912	\$247,300

P3

Rock County straddles the Rock River on Wisconsin's border with Illinois. The town of Avon is an agricultural area at the southwest corner of the county, along the Sugar River.

Town:	Avon	602	\$2,040
County:	Rock	137,203	\$364,432
RPC:	Rock Valley Council of Government	337,381	\$46,000

P4

Fond du Lac County is at the southern tip of Lake Winnebago in east Central Wisconsin. The Town of Auburn contains a large portion of Kettle Moraine State Forest. Both Auburn and the Village of Campbellsport are located at the headwaters of the Milwaukee River.

Town:	Auburn	1,450	\$2,263
Village:	Campbellsport	1,896	\$3,965
County:	Fond du Lac	88,125	\$133,032
RPC:	East Central	499,233	\$39,926

P5

Gibson is located only six miles from Lake Michigan, in the dairy farming areas of northern Manitowoc County. Its location also places it halfway between the urban centers of Manitowoc and Green Bay.

Town:	Gipson	1,511	\$4,027
County:	Manitowoc	83,467	\$199,541
RPC:	Bay Lakes	465,603	\$28,000

P6

The Town of Deer Creek and the Village of Bear Creek are at the northwest corner of Outagamie County. They

are very similar to the Town of Liberty, sample A3, which lies just to the South.

Town:	Deer Creek	806	\$1,486
Village:	Bear Creek	516	\$960
County:	Outagamie	127,190	\$312,277
RPC:	East Central	499,233	\$39,926

P7

Forest County is on the northeast border of Wisconsin. The Town of Blackwell contains a Youth Job Corps Center on the site of a previous Civilian Conservation Corps Center. All but 23 percent of the town is owned by the U.S. Forest Service as part of the Nicolet National Forest.

Town:	Blackwell	361	\$590
County:	Forest	8,357	\$42,296
RPC:	North Central	342,870	\$19,615

P8

Liberty is in an agricultural area near the center of Grant County, which is bordered on the north by the Wisconsin River and on the west by the Mississippi. Grant County forms the southwest corner of Wisconsin.

Town:	Liberty	586	\$1,107
County:	Grant	50,896	\$67,692
RPC:	Southwest	134,426	\$10,000

As noted earlier, for the sample areas, local land record expenditures came to \$10.02 per person. When Milwaukee costs were calculated into the total, the per Wisconsin citizen cost for land records came to approximately \$8.89 for 1976.

APPENDIX C

STATE LAND RECORDS EXPENDITURES FISCAL YEAR 1975-76

Codes Used: gpr = state general purpose revenue funds; pro = state program revenue funds; seg = segregated state funds; fed = federal funds; eis = environmental impact statement.

ADMINISTRATION

Energy Office - regional monitoring of degree days	\$1,578 fed
Facilities Management - search for coal storage site. DOT bldg. site, aerial photos of state facilities, EIS.	\$18,750 gpr
Planning - coastal zone aerial photos, land inventories. critical resource inventory program. inventory of Wisconsin land resources data. landRap maps, A-95 projects related to land records, coordination of ad hoc groups.	\$105,961 fed,gpr

AGRICULTURE

Environmental Impact Statements, crop production statistics, area frame sampling.	\$311,550 fed, gpr
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BOUNDARY AREA COMMISSION

Coordination with Minnesota on uses and publicity of St. Croix scenic riverway. Land records proportion.	\$6,750 gpr
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BUSINESS DEVELOPMENT

Environmental impact statements.	\$120 gpr
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EDUCATIONAL COMMUNICATIONS BOARD

Environmental impact statements.	\$100 gpr
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HEALTH & SOCIAL SERVICES

Plat review function, septic tank & percolation tests, EIS.	\$117,359 gpr
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HISTORICAL SOCIETY

EIS, archives (historical land records, original government land survey) , private plat map collection, historical site analysis, historic site preservation analysis and records, site index.	\$26,757 fed, gpr
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INDUSTRY, LABOR & HUMAN RELATIONS

Building code enforcement, proportion of \$325,000 involving maps of sites, Job Service site surveys and soil tests.	\$2,586 pro, gpr
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LOCAL AFFAIRS & DEVELOPMENT

Plat review, boundary review. cartography (since discontinued) , planning aids, 701 planning program, EIS.	\$1,156,611 fed, gpr, pro
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MILITARY AFFAIRS

Land documents processed on properties, EIS.	\$5,305 gpr
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DEPARTMENT OF NATURAL RESOURCES

Division of Resource Management

Bureau of Forestry Management - forest lands management system and plans, forest tax law and woodland tax law maps and data. 5 CETA employees used on above projects.	\$170,450 seg, fed
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Bureau of Parks and Recreation - land surveys, ownership mapping, topo mapping, aerial photos, overlay maps, fire mapping, forestry data collection.	\$164,870 all
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Bureau of Wildlife Management - mapping activities, surveys relating species to geographical area, master planning for districts. engineering mapping (estimated proportions) .	\$425,000 seg
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Bureau of Fish Management - Lake mapping investigations, master planning, county water inventory, trout stream inventory.	\$196,748 seg	Division of Trust Lands and Investment - recordkeeping activities.	\$36,000 gpr
Bureau of Research - miscellaneous studies on water and stream characteristics, land-related studies for EIS, permits or baseline setting.	\$277,078 all	DEPARTMENT OF NATURAL RESOURCES TOTAL	\$4,389,461 all
Bureau of Engineering - real estate mapping, fire control mapping, plot plans, perc tests, aerial photography, thermal scanning, equipment and technical support.	\$195,600 seg	PUBLIC SERVICE COMMISSION	
Bureau of Real Estate - Office of Lands, acquisition and appraisal staff, appraisal review, computerized records system, deed registration, site surveys, outside fee appraisals, aerial photos, perc test, record storage, title insurance, training of appraisers, negotiation of purchases.	\$710,700 seg	Map collection, utilities EIS process, site map prep.	\$97,470 pro
Division of Environmental Standards		REVENUE	
Bureau of Air and Solid Waste Management - plan review, data collection, field research, reports and recordkeeping	\$233,744 all	Appraisal supervision, aerial photos, land classification, revaluation review, county remapping reimbursement, FSAS (Field Survey Analysis System) , Automated Taxation System, parcel I.D.	\$535,733 gpr
Air pollution activities - 86 monitoring stations generating computerized emission inventory.	\$471,542 all	SECRETARY OF STATE	
Bureau of Water Quality - base mapping, studies, permits, well reports, surveillance documents, basin survey reports, lake classification.	\$357,200 all	Annexation certificates, boundary changes, deeds to state-owned land, land transfer to feds, easements, railroad mortgages to land.	\$7,850 gpr
Office of Inland Lake Renewal - feasibility studies, groundwater studies, nutrient sediment loading.	\$374,280 all	TRANSPORTATION - all funding 60/40 fed/state unless otherwise noted.	
WINSEP (Wisconsin Information System for Environmental Protection) georeferenceable portion of information system indicators.	\$6,000 fed	Division of Business Management - plat maps, perc tests, site surveying and mapping, aerial photo enlargements, obtaining base maps, update state map data, print state maps. update and print county base maps, detour maps, gas tax maps.	\$155,156 seg
Division of Services , Bureau of Data Systems - info. systems	\$177,580 gpr	Division of Planning - alignment file HINDI system, interchange photos, local road inventory, highway study maps and graphics, rail study maps and graphics, airport study maps and graphics, misc. maps and graphics, urban transit maps, traffic forecasts base mapping.	\$103,490 seg
Secretary's Office - title opinions, property descriptions, grants and aids (env. impact assessment, local acquisition program, LAWCON and ORAP) ; EIS process for all DNR; several computerized systems for water resources.	\$368,886 all	Division of Highways - Districts (using #1 as sample (#1=10.5% of statewide expenditures) : estimate statewide remonumentation (\$80,000/annum) , microfilm of maps, right-of-way plats research, real estate document search, permits, drawing right-of-way plats, drafting highway corridor project plans, preliminary and ground surveys, soil and water locations. mapping of aggregate pits, road inventory, HINDI update, computerized cross-sections for roadgrading.	\$2,423,650 seg
Division of Enforcement - water regulation and zoning, drill hole abandonment reports, aerial photos, dam records, floodplain/shoreland management, delineation studies, computer modeling.	\$180,520 fed	Bureau of Real Estate - appraisal review, land regulation analysis, contract costs for surveying, title searches, aerial photo enlargements, graphics, perc tests.	\$342,851 seg
Field Districts - environmental protection land records, forestry management.	\$43,263 seg, fed		

Engineering Services Section - DOT's contribution to USGS topo mapping, electronic digitizer purchase, aerial photography (plane, labor, production of photo plans and photomosaics) . Photogrammetry, photo lab (microfilm, copies, enlargements) .	\$615,000 seg,pro	Cartography Laboratory - maps produced for government agencies.	\$26,000
Bridge Section - updating HINDI bridge file w/locational points.	\$2,000 seg		
Facilities Development - microfilm of original land survey, "log mile" photography system (for visual record of signing, side road access, landscaping, etc.) , micro-filming of highway plans, plat review function (shared with DLAD, H & SS, DNR) , utility parcel acquisition activities, EIS, noise contour maps.	\$391,700 seg		
Division of Aeronautics - airport site surveys, recording deeds fees, update federal air map, aerial photography, property and airport layout maps.	\$185,300 seg		
DEPARTMENT OF TRANSPORTATION TOTAL	\$4,219,147		
VOCATIONAL. TECHNICAL, ADULT EDUCATION - EIS, site documents.	\$3,275 gpr		
UNIVERSITY OF WISCONSIN SYSTEM			
Included are services to state and federal agencies as follows:			
Geological and Natural History Survey - UW-Extension, mineral, geological and water studies.	\$427,000		
State Cartographer - coordination of documents, production of cartographic indexes for state and local levels.	\$42,455		
Central Administration - campus deeds and site records. two manual files.	\$81,000		
		UNIVERSITY TOTAL	\$576,455
		Not included are educational and research activities within academic departments. Specialized programs are described below, but no precise proportion of expenditures attributed to land records could be obtained.	
		Agricultural Experiment Station - over \$100,000 per year in land-related studies.	
		County Extension Agents - total expenditures over \$9 million per year.	
		Soil and Water Conservation Board - \$313,588 for reimbursement program which includes mapping for erosion control.	
		Institute for Environmental Studies - initiated research totals over \$680,000 in general program. The EMDAG group (Environmental Monitoring and Data Acquisition Group) sponsored research totalling approximately \$1,900,000.	
		The Center for Geographic Analysis (\$800,000) , Marine Studies (\$360,000) , and the Quantitative Eco System Modeling Group (\$377,500) also sponsored research with land records components.	
		Sea Grant - the federally funded Sea Grant program funds such projects as aquaculture (perch farming) and Great Lakes studies, totalling over \$260,000.	
		Engineering Experiment Station - land research totalling over \$500,000 per year.	
		Water Resources Center - land research studies totalling over \$132,000 per year.	
		TOTAL FOR ALL STATE AGENCIES PLUS UNIVERSITY OF WISCONSIN -	\$11,582.818
		Divided by 1976 Wisconsin population of 4,623.357 = \$2.51 per person	

APPENDIX D

FEDERAL LAND RECORDS EXPENDITURES FISCAL YEAR 1975-76

Major federal agencies producing land records are described below in two sections:

- 1) a brief summary of their activities, drawn from budget and program documents, with comments on apparent duplication and overlapping, and
- 2) information actually received from the agency in answer to the question, "what did you spend on land records in Wisconsin in FY 1975-76?" The third section describes the calculations used to arrive at a per citizen cost for land records at the federal level.

1) *Budgetary Information*

DEFENSE - MILITARY

Defense Mapping Agency

1. Spent \$189 million in FY 1975-76 (87¢/capita nationwide) DMA was created to consolidate military mapping activities.
2. These dollars are not included in our cost projection.

Army Corps of Engineers

1. 1976 expenditures totalled \$2.2 billion (\$10/capita nationwide). Land records activities include navigation surveys, flood control, beach erosion studies and permits, Great Lakes water level documentation, comprehensive basin studies, "co-ordination with other agencies" (\$1,985,000), stream gaging, fish and wildlife studies (one of many agencies involved in this area), floodplain management activities (overlapping with HUD), hydrologic studies, scientific and technical information centers (\$95,000), coastal data collection (\$20,000), ERTS satellite applications, water planning, and study of waste waters. In addition, they acquire land for river channel improvements, survey and chart northern lakes and connecting waters, require permits for structures affecting water navigation, and design and build recreational facilities on lake and river sites.

2. The Corps responded "that it would take six months and cost \$140,000 to provide the information you request." They did not mention their publication *Water Resources Development in Wisconsin, 1975*, 98 pages, which describes their construction and research activities in Wisconsin. Although we did not add any Corps costs to our total, one detailed estimate came to 29¢ per Wisconsin resident for Corps land records.

Air Force and Navy

1. Both the Air Force and Navy have research and development sections. In addition, the Air Force is involved in weather forecasting. The Office of Naval Research definitely produces land records, but little information about either entity is available.

2. Both the Air Force and Navy were contacted concerning activities in Wisconsin. They reported \$5100 expenditures to maintain a few small sites in Wisconsin, and referred us to the Army Corps and the General Services Administration.

DEPARTMENT OF THE INTERIOR

United States Geological Survey

1. The Topographic Division produces maps and charts, geodetic data, and cartographic information. It provides user services through NCIC (National Cartographic Information Centers) and indexes aerial photography through the Aerial Photography Summary Records System (APSRs). The Geological Division researches and distributes information on geological formations, energy sources and land disturbances such as volcanos and erosion. The Water-Resources Division coordinates federal water data acquisition activities, indexes such information through NAWDEX (National Water Data Exchange), and conducts their own research in water-related areas. The Conservation-Division classifies and handles permits for development of federal lands. The Land Information and Analysis Office coordinates development of land records for use by planners and govern-

ment decision makers. Other programs are CRIB (Computerized Resources Information Bank), EROS (Earth Resources Observation System - LandSat and Skylab space photography), and PDS (Petroleum Data System). The Office of Water Research and Technology operates WRSIC (Water Resources Scientific Information Center).

2. From the USGS annual report, Wisconsin's share of direct and reimbursable spending for FY 1975-76 was \$1,864,000, approximately 42¢ per Wisconsin resident.

Bureau of Land Management

1. BLM is the primary federal lands manager. Their largest expenditure item is "renewable resource development"-range management, soil and water conservation, wildlife habitat protection, fire protection, etc. BLM spent \$12,334,000 in FY 1975-76 on resource inventories, data analysis, land use plans, and data management, as well as \$14,662,000 on cadastral surveys to reestablish lost boundary corners.

2. BLM reported cadastral surveys, island inventories, wild and scenic rivers studies, and Bureau planning system expenditures of \$129,625 in Wisconsin in FY 1975-76 (approximately 3¢/person).

National Park Service

1. NPS manages the National Parks system. Expenditures included \$27,293,000 for preservation of historical/archeological sites.

2. NPS reported archeological surveys, land acquisition maps, a development plan for the new Apostle Island National Seashore in Wisconsin, and a water resources study, totalling \$99,000 for FY 1975-76.

Bureau of Reclamation

1. The Bureau of Reclamation operates only in 17 Western states and Hawaii. Its activities overlap with HUD and the Army Corps in flood control; the Federal Power Administration in hydroelectric power development; USGS in water resource studies; the Energy Administration in geothermal studies; Fish and Wildlife in fish and wildlife studies, and the Bureau of Outdoor Recreation in recreation programs.

2. Not contacted since they do not operate in Wisconsin.

Bureau of Outdoor Recreation

1. The Bureau of Outdoor Recreation (now Heritage and Recreation Service) plans and coordinates recreation projects on federal lands. They spent approximately \$4

million on planning, research, and technical assistance, and an additional \$1,445,000 on "co-ordination of diverse federal outdoor recreation programs." They also manage the Land and Water Conservation Fund, in which \$300 million is taken from offshore oil leasing, motorboat fuel taxes and surplus property sales and given in part (\$116 million) to the Park Service, Forest Service, etc. to acquire land. BOR takes \$6.5 million for "administrative review of state plans." LAWCON funds will be increased to \$600 million in 1978.

2. BOR reported \$29,900 spent on river recreation surveys in Wisconsin in FY 1975-76.

Fish and Wildlife Service

1. Fish and Wildlife spends \$55.5 million on their system of wildlife refuges, \$21.9 million on habitat research and surveys, and \$26 million on fish hatcheries. They supported 120 pesticide monitoring stations, 175 research work units on contaminant effects, assisted 34 coastal zone studies, and processed 2,200 environmental impact statements and 65,500 permit applications in FY 1975-76.

2. They reported \$1,200 spending in Wisconsin to map and index federally acquired lands.

DEPARTMENT OF AGRICULTURE

Agricultural Stabilization and Conservation Service

1. ASCS handles the farm price support system, and markets commodities thus obtained. The Water Bank Program aims to preserve wetlands, protect wildlife habitats and improve water quality (conducted with Interior). To support these and other activities, ASCS collects information about individual farms, crop production, soil types, wetlands characteristics, and conservation methods.

2. ASCS reported Wisconsin expenditures of \$147,960 for aerial photos, crop acreage reports, farm record cards, producer cards and address records.

Soil Conservation Service

1. SCS is developing a national land inventory and monitoring program to aid land use planners. Their soil surveys and soils mapping covered 44 million acres in 1976. Approximately \$15 million was spent on river basin surveys and plans that were coordinated with the Corps of Engineers and other entities—including \$1.7 million for "interagency coordination and program formulation." SCS is also involved in flood hazard analysis, overlapping with HUD, Interior and the Corps. Another \$130 million goes to watershed and flood prevention ac-

tivities. Fish and Wildlife and recreation programs are developed as part of resource conservation activities.

2. SCS reported \$969,150 spent in Wisconsin in FY 1975-76 on soils mapping. Costs were not available for other reported activities such as "land inventories, land studies, environmental impact statements, flood hazard studies, flood insurance studies, and wetlands inventories."

Agricultural Research Service

1. ARS centers upon crop and animal studies, but \$33 million was spent in FY 1975-76 on soil, water and air-related research, including the application of remote sensing technology (satellite and aerial photography data).

2. No response.

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

1. NOAA spent over \$26 million in FY 1975-76 on mapping, charting and surveying; \$190 million on environmental satellite services, specialized environmental services, and environmental data and information services; \$20 million for the Sea Grant program; and \$12 million for the Coastal Zone Management program. They support ENDEX (Environmental Data Index) and OASIS (Oceanic and Atmospheric Scientific Information System), and produce aerial photography.

2. NOAA reported Wisconsin spending of \$104,850 on geodetic surveys, hydrologic and topographic surveys, vertical control network activities, and the aeronautic map series. (The Department of Commerce has responsibility for the national geodetic control network used to establish highly accurate surveying reference points—an activity parallel to the Geological Survey's programs.)

Bureau of the Census

1. While the Census is primarily socio-economic, one of the most complete and comprehensive map series is developed to support census activities. These maps are quite detailed and they are used by many governmental groups for a variety of purposes.

2. The Bureau of the Census reported Wisconsin spending of \$61,000 for updating annexation boundaries, the geographic base file, census of agriculture, census of governments, pollution abatement financial census, and the oil and gas extraction census.

DEPARTMENT OF TRANSPORTATION

1. The Coast Guard (under Transportation administration) conducts environmental research on the Great Lakes and coastal areas, especially for oil spills. The Federal Highway Administration and the Federal Aviation Administration support state and local highway and airport construction, which includes land records, surveying, aerial photography, photogrammetry, etc. Transportation studies, environmental impact assessment, and planning activities also involve land records. However, the land records component of Transportation's activities is difficult to assess.

2. No response.

HOUSING AND URBAN DEVELOPMENT

1. HUD's major land records commitment is in the floodplain mapping and permitting area, although other activities such as urban development plans and research into housing "closing costs" involve land records. HUD is planning pilot projects in model land records systems, but this did not occur in our sample year 1975-76.

2. HUD reported spending on floodplain mapping of \$750,000 in Wisconsin, through the state's Department of Natural Resources.

ENERGY

1. The federal government is creating a new unified energy agency, from such as the Atomic Energy Commission, Energy Research and Development Administration, parts of Environmental Protection Agency, Interior, Federal Power Administration, Housing and Urban Development. Like Transportation, the land records component of Energy's activities is a small portion of overall spending, and assessing this component is difficult. Most of their information gathering is not tied to geographical location.

2. The Federal Power Administration reported site survey work on a Wisconsin power plant project, but could not assess cost. ERDA built a "radiation forest" in Wisconsin to measure the impact of a radioactive source on a forest, but the land records component could not be assessed.

ENVIRONMENTAL PROTECTION AGENCY

1. EPA supports AUTOMAP (digitized stream segments) and STORET (computerized water quality data), as well as numerous pollution dispersion studies, monitoring of environmental characteristics, issuing of permits, enforcement, and hardware development for monitoring and abatement. Most of their activities are

performed by contractors and universities, although they do have their own laboratories.

2. EPA referred us to the state's Department of Natural Resources. Since EPA spending in the state was noted under state spending, no further costs were added.

GENERAL SERVICES ADMINISTRATION

1. GSA has land management duties parallel to Interior's Bureau of Land Management, although GSA's emphasis is upon buildings and facilities. Nevertheless, GSA is planning a computerized land use information system and hopes to make it compatible with Interior's proposed system. At present, GSA has a modest computerized inventory of leases, building sites, and purchase prices.

2. Costs for one year to maintain the Wisconsin portion of the inventory in 1975-76 was estimated by GSA to be \$3,000.

OTHER

The National Aeronautics and Space Administration placed the LandSat and SkyLab satellites in orbit. The resultant remote sensing and photography are used for a variety of research and land planning activities, but cost calculations are understandably difficult. The Library of Congress, the National Archives, the National Science Foundation, and the Smithsonian Institution are funding projects with some land records components, but we excluded most pure research. Spending for map distribution and filing by the Library of Congress and the National Archives was not major.

2) EXPENDITURE INFORMATION SUPPLIED BY THE FEDERAL AGENCIES TO THE LAND RECORD PROJECT

FY 1975-76 Estimated Land Records Expenditures

Agriculture

ASCS - aerial photos, crop acreage reports, farm record cards, producer cards, address records. \$147,960

SCS - soils mapping (\$969,150). Costs not available for: land inventories, land studies, environmental impact statements, flood hazard studies, flood insurance studies, wetlands inventory. 969,150

Commerce

NOAA - geodetic surveys, hydrologic and topographic surveys, vertical control network, aeronautic map series. 104,850

Bureau of Census - annexation boundaries, geographic base file, census of agriculture, census of governments, pollution abatement program, oil and gas extraction. 61,000

Defense

Air Force - misc. site documents 5,000

Navy - misc. records for sites. 100

General Services Administration - computerized land inventory 3,000

Housing and Urban Development

Floodplain mapping program through Wisconsin DNR. 750,000

Interior

Bureau of Land Management - cadastral surveys, island inventories, wild & scenic rivers studies, bureau planning system, National Park Service - archeological survey at Apostle Islands, land acquisition maps, development plan for Apostle, St. Croix water resources study. 288,225

Geological Survey

Topographic surveys, charting, geodesy, geologic and water investigations, remote sensing, EROS, water resources information, NCIC, etc. 1,864,000

\$4,193,285

divided by Wisconsin population 4,623,357 = 91¢ per citizen

3) Calculations

Federal agency expenditures usually were not organized by categories such as land records, or by state. High and low estimates were derived by project researchers by supplementing data supplied under this project with data from two related federal studies.

In 1973 a report was issued by the Office of Management and Budget (OMB) on the cost and duplication of mapping, charting, geodesy and surveying among federal agencies.* (Wisconsin officials believe, however, that the OMB study covered only 80% of all land records spending for 1972.) OMB's figures on total expenditures for this category of activity within the United States, projected forward to 1976 based upon a 7% inflation rate, brought the annual federal expenditure for 1976 to \$439,411,000, or \$2.00 per person based upon a national population of approximately 220 million.

The second indicator of federal land record expendi-

tures was the U.S. Special Budget Analyses* prepared by the Office of Management and Budget. Section Q describes expenditures for three categories of federal environmental programs: pollution control and abatement; understanding, describing, and predicting the environment; and environmental protection and enhancement activities. The following figures represent actual and direct outlays by agencies for 1976 but exclude aids to localities, manpower development, environmental impacts on man and several other non-land records expenditures. These figures are limited by their exclusion of some land record activities such as soil surveys, agricultural stabilization programs, and highway construction surveys. Of the \$4,074,500,000 spent in 1976 on those three categories of federal environmental programs, at least 25% or \$1,018,600,000 was conservatively estimated by the Project Advisory Committee to

have been spent on land records, or \$4.63 per U.S. citizen.

Third, direct federal responses to the Land Records Project yielded a total of \$4,193,285 or 91¢ per Wisconsin citizen. This figure, however, is incomplete and unreliable: it does not include expenditures by several major land data collecting agencies.

For purposes of comparison with state and local costs, the Project Advisory Committee used an average of the \$2.00 and \$4.63 figures, or \$3.32 per Wisconsin citizen. This procedure fills the gaps in the expenditure information provided by agencies while allowing an approximate relationship to be shown between spending at the various levels of government.

*See bibliography.

APPENDIX E

COMMENTS ON LAND RECORDS

Excerpt from letter of August 19, 1977, to the Land Records Project manager from F. J. Kripps, Executive Vice-President, Northern States Power Company:

"Generally we believe that a large portion of cost data related to land matters in our records is combined with other costs and cannot be identified with reasonable accuracy. Therefore, an overall accurate view of cost of land related matters for our company is not possible to obtain.

However, we commend your efforts toward promoting efficiency and cost savings in land records and land related data of agencies and levels of government. The following suggestions are offered for your study and consideration:

1. Prepare an index of data available from all State Agencies.
2. Prepare a list of standard mapping symbols to be used by all State Agencies. This should also be consistent with the symbols used by Federal Government Agencies such as the USGS.
3. Establish one source for all these documents to eliminate travel to various locations to obtain information.

4. Establish standard map scales to be used by all State Agencies.

5. Establish standard data format which is acceptable to all State Agencies.

6. Establish a review committee of representatives of various agencies to meet regularly to review projects of various agencies to reduce duplication.

7. Induce state agencies (such as the Public Service Commission) to use *directly*, already available published resource maps in the original published form and scale, rather than requiring this data to be re-published at a different scale, using different legends and published in a different form, but still showing exactly the same data. This is repetition and duplication of the worst kind."

Excerpt from letter of September 6, 1977, to the Land Records Project manager from W. O. Neddersen, P.E., Wisconsin Public Service Corporation:

"We wish to commend your department for undertaking this task. We have felt for a long time that there is much duplication of record keeping, which results in increased costs to our customers. Anything that can be done to minimize this activity will be appreciated."

APPENDIX F

SEVERAL UTILITIES' LAND RECORDS EXPENDITURES, 1976

GENERAL TELEPHONE CO.

Locational field notes, government permits (navigable waterways, DNR and NFS forestry permits), outside plant location maps, long range land use planning, home address assignment, recording easements, surveying of Indian lands, cable location activities.
Population in service area - 883,450, or 83¢ per capita

\$734,476

WISCONSIN PUBLIC SERVICE CORPORATION (electric & gas)

Air and water quality studies, environmental monitoring, maps, records, permits, aerial photography and interpretation, surveying.
Population in service areas is 709,000, or \$1.34 per capita

\$939,000

WISCONSIN POWER & LIGHT COMPANY (electric & gas)

Power plant siting, environmental studies, air & water quality studies, engineering

studies, aerial photography, mapping surveys, locational recordkeeping activities.

Population in service areas is 905,000, or \$1.62 per capita

\$1,476,800

All three utilities are large, covering approximately 20% of the state's population and up to 40% of the state's area.

Population figures refer to all citizens in the service area regardless of age - not customers or households. For comparison purposes, we calculated the utility land records commitment by adding the telephone per capita total (83¢) to the average of both energy utilities' per capita totals (\$1.34 and \$1.62 averages to \$1.48, $\$1.48 + 83¢ = \2.31).

For Wisconsin's 1976 population of 4,623,357 at \$2.31 per capita, \$10.679,954 was calculated to have been spent by utility companies on land records.

APPENDIX G

CITY OF MILWAUKEE LAND RECORDS EXPENDITURES, 1976

Department of City Development - processing zoning changes and amendments, updating and preparing base maps, processing subdivision plats and certified survey maps, graphics charges for preparation of maps, urban development plans, grant-assisted comprehensive planning program, development of planning information system for computerized property data and inventory of public services and facilities. \$655,288

Department of Public Works - engineer's field note file for street and alley surveys, surveyor's plat plan and certified survey file, original ordinances file, road life study, floodplain building permits review, sewer maps and charts, kardex file of street and paving information, benchmark file, 1/4 section corner file, street length file. \$400,563

Milwaukee Water Works - urban development plans, distribution system maps and records, utility extension permits, plat book maintenance, and distribution of plat books. \$254,283

Playground Division - operation records, environmental reviews, as-built surveys. \$4,225

Building Inspection - storage and maintenance of maps and records. \$12,000

City Forester - drafting of landscape plans. \$700

City Tax Commissioner - property records and plat drafting. \$32,000

\$1,359,059

divided by city population as on Jan. 1976, 654,548 = \$2.08/capita*

The City of Milwaukee's Chief Engineer was responsible for coordinating the response of the various city departments to the Land Records Project. His cooperation and that of department officials is greatly appreciated.

* See Appendix B for inclusion of Milwaukee figures into the statewide totals for local government.

APPENDIX H

SUMMARY OF TAX MAPPING SURVEY

State Cartographer's Office August 16, 1976

Summary of Survey of County Tax Lister (Real Property Offices) to determine status of large-scale tax mapping in the state.

Initial inquiry was a short one-page questionnaire. Mailed on May 17, 1976 to all 72 county offices. Initial response was 36 (50%).

Follow-up letter of July 16 resulted in a total response of 59 or an 82% return rate.

Summary of Tax Mapping Inquiry

	Total	%
I. Tax maps available		
a. 59 responding counties	33	56%
b. all counties (72)		46%
II. Aerial photography available		
a. 59 responding counties	21	36%
b. all counties (72)		29%
III. Tax maps from partial or complete section corner remonumentation		
a. 59 responding counties	14	24%
b. all counties (72)		20%

It is a fact from this survey that 26 county offices responded with a definite statement "no tax maps available". Of the 33 counties responding with tax maps available, the following unique information is available:

a. 14 of the 21 counties having aerial photography acquired the photography from Agricultural Stabilization and Conservation Service, U.S.D.A. Since this federal organization has not flown photography 1975 or 1976, updated coverage is not available for these counties.

b. Of the 33 counties responding to tax maps available, 6 stated they were using, in part, WPA maps, vintage 1930s'.

c. Of the 33 counties responding, a total of 5 stated they employed commercial aerial mapping companies to prepare tax maps.

d. Finally, the scale of mapping varied widely.

<i>scale</i>	<i>number</i>
1" = 50'	1
1" = 100'	12
1" = 200'	15
1" = 400'	21
other*	13
* (1"=150', 300', 440', 500', and 660')	

Letters are available from county offices describing the variety of ways tax maps are prepared.

Kiedrowski Engineering, Inc.

PHONE 715-421-0444

IF NO ANSWER CALL
715-325-5119

Office: 80th Street Street South (Kellner) Hwy. U -W
Mailing Address: Route 5, Evergreen Avenue, Box 363
Wisconsin Rapids, WI 54494

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Anthony Kiedrowski
P.E., R.L.S., Pres.

Dale C. Hagen
R.L.S., Sec.-Treas.

APPENDIX I

Stevens Point Office
715-344-7070

Adams-Friendship Office
608-339-3454

May 5, 1975

Planning and Zoning Committee
Adams County, Wisconsin

Gentlemen:

At the April meeting of the Adams County Planning and Zoning Committee the subject of tax listing maps was brought up. A motion was made to have the County Surveyor and the Zoning Administrator gather some preliminary information.

A questionnaire was sent to the tax listing departments in all the counties except Milwaukee. Fifty-one counties responded. Approximately 100 sample maps were returned. A copy of the survey questionnaire is attached.

From the data collected, there are at least 33 counties that have tax listing maps. Most of the counties have had their maps for more than 20 years, drawn in most cases as a WPA project. Four counties with more recent maps have had them drawn by their County Surveyor's office.

In every case except Buffalo County, those tax listers without maps wish they had them. Several counties are in the process of redrawing and updating the old WPA maps. Of those tax listers that have maps, all said it would be nearly impossible to work without them.

Most maps are drawn to a scale of 1"=400', with the congested areas to a scale of 1"=100'. Most maps are drawn in ink on mylar. The amount of information shown on the maps varies. Some show no dimensions or acreage. Others are dimensioned in great detail and acreage is shown.

In the "remarks" of the survey, many tax listers pointed out the large amount of use these maps get from assessors, planning and zoning department, surveyors, attorneys, abstractors, realtors, appraisers, and other interested parties.



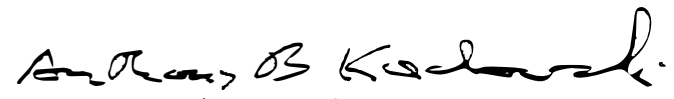
Planning and Zoning Committee
Adams County, Wisconsin
May 5, 1975
Page 2

Very little data in the way of cost is available. Sauk County is in the process of redrawing their maps at a cost of \$100,000.00. \$35,000.00 of this is coming from federal revenue sharing. Adams County will need about 800 to 1,000 maps. There are approximately 31,000 parcels in the county. Approximately 1,800 deeds were recorded in 1974, of which an unknown number were new splits.

Although the initial investment in the maps may seem high, they will provide a considerable saving in time to all who use them. If the maps are drawn, it can be expected that land will be added to the tax roll that is not presently being taxed. In the City of Baraboo, tax mapping discovered 60 parcels that were not being taxed. In a township in Sauk County six forties and one eighty were put on the tax roll for the first time. In some cases more than one party was paying taxes on the same property.

Particularly because of the many parcels of land being split and resplit in Adams County, tax listing maps are a necessity in order to provide fair and equitable assessing. For that reason and because of the many other uses for such maps, it is recommended that Adams County pursue a program to acquire tax listing maps.

Respectfully submitted:


Anthony B. Kiedrowski

ABK/kjr

William Ryman

SOURCES OF INFORMATION:

1. 51 returns of tax listing map survey, April 1975
2. Interview with David L. Pryse, Supervisor of Assessment Review, Department of Revenue, Madison
3. Interview with Thomas Krauskopf, State Planning Department, Madison
4. Interview with Art Ziegler, State Cartographer
5. Interview with Mel Elbers, Sauk County Tax Listing Supervisor
6. Interview with Edna Lippart, Tax Lister for Jefferson County, past-President of Tax Listers Association
7. Telephone interview with Jean Schultz, Tax Lister for Columbia County, present President of Tax Listers Association
8. Interview with Adams County Register of Deeds and Tax Listing Department

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R.L.S., Sec.-Treas.

APPENDIX J

Stevens Point Office
715-344-7070

Adams-Friendship Office
608-339-3454

December 5, 1977

Mr. Art Ziegler
State Cartographer
144 Science Hall
University of Wisconsin
Madison WI 53706

Dear Mr. Ziegler:

Enclosed, as requested in your letter of November 29, 1977, is a map of Portage County indicating the status of monumentation.

I assume that you have sent similar letters to all the other counties in the state. I would like to point out that there is a possibility that the information you will receive in some instances will be misleading. For instance, a certain county that I am familiar with has a great number of corner tie sheets on file, however, the corners are not properly monumented and more importantly, are not verified. That is, the basis for their location is more nearly akin to imagination than to facts. There is, at this time, no way of getting an accurate evaluation of the status of section corners in all the counties. However, I am sure you will be able to get enough information (or lack of it) to clearly indicate the sad state of affairs.

Sincerely,



Anthony B. Kiedrowski

ABK/kjr
Enclosure

