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# NATURAL RESOURCE DATA NEEDS RECOMMENDATIONS

*Council of State Governments*

- The Council of State Governments
- Institute for Environmental Studies, University of Wisconsin
- American Society of Planning Officials
- Arthur D. Little, Inc.
- U.S. Geological Survey

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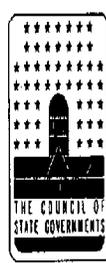
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# Foreword

State and local governments face a demand for massive amounts of data on natural resources. This demand has evolved because of federally mandated requirements, such as environmental impact statements, and an increased awareness of the need to protect the environment and our Nation's natural resources.

Many data producers, including federal agencies, structure the input to meet their specific uses. However, this same information (with modifications) could fulfill its initial objectives and, at the same time, be of more assistance to state and local governments in determining their own needs and meeting federal requirements. Recommendations in this report highlight the kinds of coordination and cooperation required of data producers to make their information useful to an expanding universe of users.

Lexington, Kentucky  
January 1976

Brevard Crihfield  
*Executive Director*  
*The Council of State Governments*

# Preface

Natural resource information needs have multiplied rapidly in recent years as new perspectives on the environment, energy, development patterns, and resource policy have emerged. New information users and programs have come into existence in response to these evolving perspectives. The new program information needs and the new users' skills and responsibilities present a challenge for the producers of natural resource information.

Often there is a mismatch between the needs of new users and the products available from producers. The mismatch exists for numerous reasons, including a lack of interagency coordination, narrow professional interpretations, an inability to forecast future needs, and a failure to provide timely production. The largest problem, however, may be a lack of simple communication among users and producers.

This report consolidates the findings of five separate studies in this area and represents a consensus among the principal investigators regarding both findings and recommendations.

Lexington, Kentucky  
January 1976

H. Milton Patton  
*Associate Director for State Services*  
*The Council of State Governments*

# Introduction

During 1975, five studies were conducted which dealt with the use of natural resource data products. This report attempts to bring together the commonalties of these studies. All five studies included interviews with users of these products; all five drew conclusions about the use of these products; and all five made recommendations regarding the improvement of products, product delivery, and additional services that should be offered by the producers of these data products. The data producers are, by and large, agencies of the federal government—agencies with greatly diverse mandates, objectives, and methods. It is to these agencies that the recommendations in this document are primarily addressed.

The five studies were conducted by the American Society of Planning Officials (ASPO); Arthur D. Little, Inc. (ADL); the Institute for Environmental Studies at the University of Wisconsin (UW); the U.S. Geological Survey (USGS); and the Council of State Governments (CSG). Each of the studies had a different focus, considered a different user group, and was conducted for a different purpose. Even so, it is difficult to read the reports of the separate studies and miss their underlying similarity.

This report is based upon the results of a meeting of the studies' principals held at the Council of State Governments in Lexington, Kentucky, in December 1975. The principals were William Toner of ASPO, William Ollinger of ADL, Jon Kusler of UW, W. J. Kockelman of USGS, and Tom Hauger of CSG. All the findings of the studies are not included here; rather, significant conclusions and recommendations that were specifically addressed in the studies or that were given a consensus at the Lexington meeting are highlighted.

Following this introduction are summary recommendations based on the reports and the Lexington meeting. Three chapters of conclusions and fuller recommendations follow that summary. The first chapter describes the new class of data users addressed by the studies and the types of data they

require. The next chapter lists the uses to which this data may be put and draws implications for the format of data presentation. The third chapter cites weaknesses in the current system of data provision and use and suggests approaches to improve this system. Finally, a chapter describing the five original studies that led to this report is provided.

# Summary Recommendations

- Data Users and Data Needs
1. In urban, urbanizing, and other areas confronted with the possibility of near-term future developments, soils, geologic, and hydrologic mapping should be continued.
  2. Production of the U.S. Geological Survey, 7½-minute topographic quadrangles should continue.
  3. Aerial photography efforts such as orthophotoquads and other high-resolution photographic efforts being performed by the federal government should be continued.
  4. Federal agencies should continue their involvement in floodplain mapping.
  5. The gathering of wetland, wildlife, and vegetation data should be pursued by relevant federal agencies with emphasis on that data which is most definite as to location and should, when possible, show the relative criticality of the resources depicted.
  6. Where possible, quantitative inventories of natural resources should be compiled by federal agencies to assist States in identifying significant resources within their boundaries.
  7. The provision of derived maps or data products should become a regularized and readily accessible service to state data users upon request.
- Data Uses and Format Needs
1. Mapped data and aerial photography should be provided at large scales for most purposes.
  2. Federal data programs that stress the production of small-scale (1:100,000 and smaller) maps should be deemphasized—unless they are derived from more detailed data—in favor of larger-scale maps.
  3. Data production should continue to employ maps as the chief presentation technique.
  4. Federal mapping efforts among various agencies should be better coordinated with one another, at least to the extent that maps produced are compatible.

5. Maps depicting particular resources or hazards (e.g., minerals, wetlands, habitats) should, to the extent possible, identify the intensity or relative value of given locations of that resource or hazard.

Accessibility and  
Responsiveness in the  
Provision of Data

1. Federal expertise in the field of natural resource data should be made available in the form of technical assistance to state and local data users.

2. In order that data users within the States may be more aware of what data currently exists for their States, natural resource data directories should be prepared for each State describing the types and locations of all available data for that State.

3. A viable and permanent mechanism should be established that can serve as a communications link between federal producers and state and local users of natural resource data.

4. Within each State, the users of natural resource data should organize themselves to promote the following ends: (a) better cooperation and exchange in the sharing of commonly needed data; (b) creating a single set of data requirements that can be channeled through the State's cooperative programs; and (c) identifying a unified voice which can credibly represent the State's interests in the recommended federal-state communications mechanism.

5. The successful operation of a federal-state communications system implies that disparate federal data producers need to be better coordinated with one another.

6. The structure, organization, and operation of the recommended federal-state communications mechanism and the recommended intrastate mechanisms should be further studied.

# 1 | Data Users and Data Needs

## Background

The use of natural resource data has expanded among state and local governments due to a growing awareness of the need to protect the natural environment and the resources it offers, and to devise development patterns compatible with natural features. To be sure, much of this awareness has been encouraged through federal legislation that requires environmental impact statements, coastal zone management plans (in eligible States), or the designation of floodplains in order to qualify for the federal insurance program. Many of the causes for the increased use of this data, however, are state or locally initiated. There are, for example, state programs designed to protect wild and scenic rivers, wetlands, and unique habitat areas. There are also state programs that require environmental impact statements for state and privately sponsored projects, or that require detailed site plans and permits for facilities such as powerplants. Local governments have, of course, been traditionally responsible for the preparation of land use plans for their respective jurisdictions, and in some areas, at least, this increasingly implies the consideration of natural resource data.

## Type of Data Needed

The type of data used is highly dependent upon the scope and nature of the program under consideration. In state government, data may be used by the highway department to locate sand and gravel that will be used in construction. This same department uses data to assist in finding suitable corridors for road construction and the engineering difficulties that may be encountered. Such uses of natural resource data occurred in state government even before the adoption of more recent land management programs, but the different goals, contexts, and emphases of the newer efforts indicate the need for different types of data and wider areal coverage of that data.

Policy decisions reached in the State Legislature or in the executive branch that lead to the formation of particular environmental programs are based on knowledge derived from certain

collections of natural resource data that indicate problems of areas of relative importance in the State. Within the programs of the executive branch, plans that are drawn, such as for the management of the coastal zone, require the use of a wide range of data for a fairly large area, while EIS or powerplant siting functions suggest the need for data in a narrowly defined geographic area. Local land use planning agencies employ data that describes characteristics which may limit future development.

**Program Needs**      The data required for use in most of these programs is not defined in the legislation creating the programs. Rather, the program staff has had to define its own data needs and gathering efforts based on the authority and objectives of the program. Frequently lacking the budget to undertake entirely fresh data gathering, the programs rely on available data that has been collected by federal agencies or sister agencies within the State. The fact that programs make optional use of available data products does not imply that these products are the most needed either in terms of the data presented or the format employed.

**Current Data Use**      The separate studies reviewed the data being used currently by various programs at the state and local level. Based on interviews with the data users, it has been possible to determine which data items used are considered important and which additional items are perceived as necessary in order to carry out program missions. Among the data items often cited as necessary are:

1. high-resolution aerial photographs;
2. 7½-minute topographic quadrangles;
3. high-resolution soil maps;
4. high-resolution geologic maps;
5. high-resolution hydrologic maps;
6. floodplain delineation;
7. wetland delineation;
8. wildlife habitat delineation;

9. vegetation maps;
10. current land use;
11. quantitative inventories; and
12. various derived products.

#### AERIAL PHOTOGRAPHY

High-resolution aerial photography is useful to state and local programs as a source from which they may glean valuable pieces of information. Existing land use and vegetation patterns, as well as changes in these features can be detected from photographs taken of the same area on a repetitive basis. This photography is now performed to some extent by the Agricultural Stabilization and Conservation Service, state highway departments and other state agencies, and by various agencies of the federal government, including USGS in its topographic mapping program. Department of Defense operations in this country sometimes result in high-resolution photographs which are not made generally available to state government agencies.

#### TOPOGRAPHIC QUADRANGLES

The 7½-minute topographic quadrangles, not yet available for the entire country, are used as base maps in many state and local programs. In addition, they are being supplemented by the provision of orthophotoquads. There are state data users who consider the orthophotoquads as good as or better than the topographic quadrangles for base maps and for delineating important natural and cultural features. The orthophotoquad program is scheduled to be completed by 1978.

#### SOIL MAPS

Soil maps are important to a number of state programs, including those designed to protect wetlands or prime agricultural lands or to control erosion and sedimentation areas. They also identify the ability of the land to support light structures and can be useful in evaluating the land's suitability for installation of septic tanks. Large-scale maps of soil data are currently available for only a very limited portion of the country.

#### GEOLOGIC MAPS

Geologic maps that indicate the locations of important minerals such as copper, coal, or other valuable items are needed to facilitate extraction and prevent unwise development in the relevant areas. The location of construction materials is similarly useful. Other useful geologic data includes the location of hazard areas that might inhibit development or areas of unique geologic interest that the State may wish to retain in a pristine condition.

#### HYDROLOGIC MAPS

Maps of hydrologic characteristics may serve to identify aquifers, aquifer recharge, and other groundwater movements. This is useful not only to locate possible sources of water supply, but also to gain an understanding of the negative effects certain man-imposed activities may have on the quantity and quality of this water.

#### FLOODPLAIN AND WETLAND MAPS

Floodplain and wetland delineations are necessary to implement specific state and local programs aimed at these areas. Considerable federal efforts have already gone into floodplain delineation, and a national wetland inventory has been proposed.

#### WILDLIFE AND VEGETATION MAPS

Wildlife delineation and vegetation mapping are useful to locate and identify rare and endangered species. In addition, knowledge of wildlife habitats can assist in making development decisions that will least interfere with native wildlife. Vegetation data can also be used to help define wetland areas or areas of prime agricultural potential.

#### EXISTING LAND USE MAPS

Existing land use data can be helpful as a base against which to compare new development that may indicate land use trends. It may also be used, particularly at the local level, to ensure that future development is compatible with existing use.

#### DERIVED DATA

Derived data products are generally maps on which several data items have been combined to reveal a situation or condition of importance. As an example, the combination of soils data, water availability, and existing use may help delineate a region of prime agricultural lands.

In protecting resource areas, state programs must frequently rank a number of similar (e.g., wetlands) areas according to their relative importance as resources and their susceptibility. This may require scientific expertise or methodologies generally unavailable in state government but more easily found in federal agencies. Quantitative comparisons of resources may also assist in a ranking procedure.

#### Recommendations

1. In urban, urbanizing, and other areas confronted with the possibility of near-term future developments, soils, geologic, and hydrologic mapping should be continued. For these areas especially, scales of 1:24,000 and larger are required to delineate specific concerns.

2. Production of U.S. Geological Survey 7½-minute topographic quadrangles should continue. Prior to any changes in scale and format that may come with metrication, the quads should be made available in the current size and at the 1:24,000 scale to ensure compatibility of map sheets throughout a State.

3. Aerial photography efforts such as orthophotoquads and other high-resolution photographic efforts being performed by the federal government should be continued. State governments should have access to and be apprised of the availability of these products. Military and other security classifications that limit the availability of high-resolution photographs should be reconsidered to provide added assistance to interested state programs.

4. The federal agencies should continue their involvement in floodplain mapping. However, improvements should be made in the techniques employed in mapping and quantifying data to ensure more accurate delineations.

5. The gathering of wetland, wildlife, and vegetation data should be pursued by relevant federal agencies with emphasis on that data which is most definite as to location and should, when possible, show the relative criticality of the resources depicted.

6. Where possible, quantitative inventories of natural resources should be compiled by federal agencies to assist States in identifying significant resources within their boundaries.

7. The provision of derived maps or data products should become a regularized and readily accessible service to state data users upon request. Methodologies that describe to data users the manner

in which they can use data should be an essential part of the technical assistance function that data producers provide. Data producers should also maintain their capacity to respond to specific requests by providing products depicting more than one data element or a higher level of analysis.



the proposed use or development with the land's capacity. The government agency may also rely on the developer to provide the detailed data required to evaluate the on-site proposal.

Programs which employ land acquisition as an implementation technique also require fairly large-scale data. Although such programs generally begin with a broad survey to select likely areas for acquisition, they then narrow down to determine which of several areas is most important. This ranking of areas may often require comparison of large-scale or site-specific data. Locally available data on land ownership and boundaries is also necessary, and natural resources data that can be ascribed within these boundaries is useful.

Natural resource data is required in efforts, at both the state and local levels, involving the review of plans for particular development activities. These reviews may stem from requirements for environmental impact statements (federal or state) or from state activity-oriented programs, such as powerplant siting or mined land reclamation. While the concept of review implies the existence of plans and/or data to be reviewed, the preparation of the environmental impact statement, for instance, may require the gathering of data related to impacts not stated in the plans. This data is usually site-specific or very large scale. Powerplant siting review and similar processes differ among the States, but they often begin with a general collection of relatively small-scale data to eliminate problem areas from consideration, and progress to larger-scale data for choosing the ultimate site.

Data for  
Education and  
Policy Development

Some natural resource data agencies within and outside state government have (or choose to use) only the authority to educate. This education may be directed at the public at large or at specific policy-making bodies within government. In either case, the aim is usually to affect the policies of the State regarding the conservation, destruction, or preservation of the natural environment. Data for such purposes, when mapped, is usually presented at small scale, and statistical compilations of data may be used to show the severity and areal distribution of the problems. The mapped and statistical results of alternative policy solutions to the problem may also be generated and are useful to the policymaker confronted with the decision. While small-scale maps may help to bring about the desired legislation or

policy regarding the natural resource in question, the implementation of the policy will likely require more detailed data that cannot be obtained from the simple enlargement of the small-scale map.

#### Data for Planning

Some agencies use natural resource data solely to prepare plans for the use of a resource—most frequently land. While land use plans are prepared at both the state and local levels, the process of land use planning at both levels involves the formulation of policy guidelines to be followed in the decisions made regarding the development of land. In many cases planning also involves specific programs (e.g., local zoning regulations or various state critical areas programs) that are designed to incrementally achieve these stated goals. The data needs for preparing plans are thus similar to those used either in policy making or in actual program implementation in terms of the specificity required.

#### Recommendations

1. Mapped data and aerial photography should be provided at large scales for most purposes. Scales of 1:24,000 and larger are needed for the exercise of nearly every implementation tool data users may employ. For urban areas, scale requirements may often be 1:12,000 or larger. This implies the need for high resolution in these products so that sufficient detail can be obtained for the promulgation of specific plans or regulations.

2. Federal data programs that stress the production of small-scale (1:100,000 and smaller) maps should be deemphasized—unless they are derived from more detailed data—in favor of larger-scale maps. Documented use of small-scale maps generally occurs in the policy formulation stage. It also occurs in the implementation stage when larger-scale is not available. Most users agree, however, that implementation is most effective when based on larger-scale, high-resolution data.

3. Data production should continue to employ maps as the chief presentation technique. This should not, however, be to the exclusion of statistical summaries or computerized data, both of which may be used in various stages of data use.

4. Federal mapping efforts among various agencies should be better coordinated with one another, at least to the extent that maps produced are compatible. This suggests the need for common scales and

georeferencing systems so that a data user may easily compile data from several sources in making his decisions about the land or resource involved.

5. Maps depicting particular resources or hazards (e.g., minerals, wetlands, habitats) should, to the extent possible, identify the intensity or relative value of given locations of that resource or hazard. This is useful to program staff attempting to rank areas for purposes of program implementation. Some resource areas may be more conducive to development than others, and hazard areas may constrain development in varying degrees. It is important to most programs that the degree of criticality or hazard be documented.

### 3 | Accessibility and Responsiveness in the Provision of Data

**Background**      Among the state and local users of natural resource data, there are wide variations in terms of budgets, sophistication, and the geographic areas for which they are responsible. These variations cause difficulties in the provision of natural resource data that are less easily identified and overcome than are the data problems discussed in the previous chapters. However, the problems discussed in this chapter must be overcome if the full and pressing needs of the data user community are to be met.

**Personnel Capability**      The sophistication of personnel charged with handling natural resource data is a significant factor in determining the data that will be used, the manner in which it is manipulated, and the quality of the resulting policies, plans, or regulations. An inexperienced person in such a position or one who is untrained in the earth sciences may be at a loss as to what data to use, what data is available, whom to contact in the state or federal government to obtain the data, what it takes to produce that data, or what is to be done with the data he does obtain.

The questions of what data to use, how to use it, and what goes into the gathering of that data are especially critical when the data user is not trained in the earth sciences. Since many data-using programs employ persons for their ability to deal with administrative, regulatory, or policy problems, the earth science qualifications of personnel may be ignored or given low priority. At those stages in the program when data gathering and manipulation are most important, it falls to the personnel practicing in the “softer” sciences to perform the data functions as well.

**Financial Constraints**        The varying ability of data-using programs to obtain funding also accounts for differences in data use. Where funds are more plentiful, sufficient and trained staff can be employed, original data-gathering efforts can be undertaken, and an effective information system can be developed. Less well-funded programs are more likely to suffer in these areas and may be forced to establish strict priorities in data gathering to comply with budgetary limitations.

**Geographic Variables**        Other variations among data users may exist in terms of data emphasis because of the nature and conditions of the geographic areas involved. For instance, data on landslide potential is more vital in California than it is in Louisiana.

**Intrastate Coordination  
of Data**                        The concerns of what data is available and whom to contact are symptomatic of a poor system of communication among data users and data producers. Only a few States have compiled lists of what and where natural resource data is available for that State. The matter of putting data users in regular contact with one another in order to coordinate their activities has been addressed by only a few States.

It is not unusual for data-using programs within a State to go about their data-gathering efforts separately. This may result in more than one agency paying for the collection of the same data. At the same time, another agency in the State may be pursuing its cooperative program with one or more federal agencies in order to further the state coverage of a particular data element. The outcomes of the cooperative efforts, in most cases, are not based on the consensus data needs of all the State's users, but rather on the perceptions of the particular cooperating officer or program.

**Coordination among  
Federal Programs**            There also appears to be a number of factors that inhibit the federal data producers from performing as well as they might in the provision of natural resource data. For one thing, the kinds of data user programs aimed at resource protection and conservation discussed here are generally of recent origin, with needs that could not have been anticipated by federal data producers long in advance. It may also be that these programs—their aims and concerns—are not entirely understood by the federal data

producers. Many of the programs are fairly new and vary in thrust and authority from State to State. Therefore, it is easy to comprehend the perplexity of some producers.

Technical and budgetary problems may also hamper the data producers in the delivery of the required data products. Several years may pass from the time of initial field work to the time of actual publication of a particular data product, making it difficult to give quick turn-around service to users. The introduction of new data programs and changing federal budgetary emphases may further slow production of data products required by certain classes of users.

Finally, the inefficiencies that have developed among federal data producers have impaired the provisions of more complete and useful products to data users. One of these inefficiencies is the duplication of data gathering that occurs. Several agencies, for instance, are now engaged in mapping land use data. Aside from the fact that there is little demonstrated need among data users for federally prepared land use maps, there seems to be a needlessly overlapping group of data gatherers working toward the same data base.

A further inefficiency is the lack of common or compatible formats for the presentation of data. Scales differ across a wide range among federal mapping agencies and similar classification systems are seldom used universally. Again, the land use mapping programs illustrate the point well: there is the Land Use Data Analysis Program which maps land use according to the Anderson land use code at a scale of 1:250,000; the Census Cities Project uses the same classification, but at a scale of 1:100,000; the National Inventory of Soil and Water Conservation Needs records land use in rural areas using a different classification scheme usually at a scale of 1:15,840; other agencies, such as the Department of Housing and Urban Development, employ still different classifications and different scales for mapping the same information.

#### Recommendations

1. Federal expertise in the field of natural resource data should be made available in the form of technical assistance to state and local data users. This technical assistance should be publicized so that potential users know whom to contact and what services to expect. The technical assistance should

address at least the following: (a) what data is available; (b) techniques for the users to gather data on their own; and (c) the possible uses and limitations of the data provided. Technical assistance might be structured as instructive seminars for groups of users, as an inquiry-response system, or a combination of these and other techniques.

2. In order that data users within the States may be more aware of what data currently exists for their States, natural resource directories should be prepared for each State describing the types and locations of all available data for that State. The U.S. Army Corps of Engineers has already compiled a number of atlases that have been considered useful by the States which have received them. Expansion of this program to all 50 States could expedite the completion of this necessarily early step in the data-gathering process, while at the same time providing a valuable base of information to all levels of government.

3. A viable and permanent mechanism should be established that can serve as a communications link between federal producers and state and local users of natural resource data. This mechanism would help producers identify the general needs of the user community as well as the specific needs of certain programs or areas of the country. Through the mechanism the users can gain a better understanding of the federal producers' capabilities and limitations, have an input to future data-gathering efforts, and achieve better access to the technical expertise of the producer community.

4. Within each State, the users of natural resource data should organize themselves to promote the following ends: (a) better cooperation and exchange in the sharing of commonly needed data; (b) creating a single set of data requirements that can be channeled through the State's cooperative programs; and (c) identifying a unified voice which can credibly represent the State's interests in the recommended federal-state communications mechanism.

5. The successful operation of a federal-state communications system implies that disparate federal data producers need to be better coordinated with one another. As already mentioned, the use of common scales and mapping formats constitutes one area of expected benefits from this coordination. Another benefit is that more programs, such as the one conducted in the San Francisco Bay Region by

HUD and USGS, can be carried out, allowing a combination of skills to improve data products and product delivery. The ability to coordinate the federal response to user needs and user requests should be a primary aim of the proposed federal agency coordination.

6. The structure, organization, and operation of the recommended federal-state communications mechanism and the recommended intrastate mechanisms should be further studied. A reorganization of the federal data establishment has been suggested by a task force commissioned by the Office of Management and Budget.<sup>1</sup> The report of this task force provides positive guidance toward the establishment of a more coordinated federal civilian mapping contingent.

1. Federal Mapping Task Force, *Report of the Federal Mapping Task Force on Mapping, Charting, Geodesy and Surveying* (Washington, D.C.: U.S. Government Printing Office), 1973.

## 4 | The Original Studies

### American Society of Planning Officials

The American Society of Planning Officials was contracted by the Argonne National Laboratory, as part of a U.S. Department of Interior project, initially to analyze state laws and determine the natural resource data requirements included or implied by these laws. It soon became clear to ASPO personnel that more information about data requirements could be obtained from programs implementing the statutes than from simply reading the statutes.

Four specific areas of state programs were chosen for the investigation. These are wetlands, wild and scenic rivers, critical areas, and coastal zone management programs. In all, 30 programs were reviewed. The study consisted of compiling and comparing the laws that established the programs; analyzing documents produced by the programs, including guidelines, program evaluations, applications for federal funding, designation studies, management plans, and permit applications; and interviewing the managers of state programs, in person and over the telephone, to learn the types of data being used and the additional data the program managers felt was needed.

The report prepared as a result of this study was intended to be a technical appendix in support of a guidebook for state administrators of natural resource management programs. A chapter is devoted to each of the four types of programs studied. In each chapter, the various stages of program implementation are described, and data gathering, use, and needs are illuminated. Extensive matrices are employed to facilitate comparison among the different States in terms of their program characteristics and data use. In addition, general and specific conclusions are stated regarding data use and data needs.

University of  
Wisconsin

Under a grant from the National Science Foundation, the Institute for Environmental Studies at the University of Wisconsin developed a study design to determine the data needs and data-gathering approaches of state critical environmental area programs. Among the programs included were those addressing the management of floodplains, wetlands, coastal areas, shorelands, erosion areas, prime agricultural lands, scenic areas, and areas of special recreational or scientific interest.

The study consisted of a literature search, a review of completed and on-going critical areas studies, approximately 80 interviews of state critical areas program personnel, and two national workshops. The workshop participants were state program personnel and representatives of federal data-producing agencies. In addition to the formal papers presented at these workshops, informal discussions among data users and between data users and data producers provided for a free flow of information.

The summary report of the study describes the data requirements of each phase of operation of critical areas programs and, in particular, the data needs not currently being met. Data-gathering techniques and the roles of federal, state, and local governments in data gathering are also a major part of the report. A number of research topics not yet well explored pertaining to the provision of natural resources data and critical areas programs are identified, and substantial recommendations are made for all of the subjects covered in the report.

Arthur D. Little, Inc.

The consulting firm of Arthur D. Little, Inc. (ADL) was contracted by the U.S. Department of Housing and Urban Development to evaluate a joint project of HUD, USGS, and the Association of Bay Area Governments (ABAG) being carried out in the San Francisco Bay area. That project is known as the San Francisco Bay Region Environment and Resources Planning Study (SFBRP), and its goal was to combine the expertise of the two federal agencies and apply it to problems of urban planning and development. The project produced a wide range of natural resource data products defined as basic data, technical reports, and interpretive reports meant to be of use to the local and regional agencies engaged in land use planning and other aspects of urban development.

Some objectives of ADL evaluation of SFBRs were: (1) to provide a perspective on the accomplishments, problems, and uses of the program; (2) to improve SFBRs products; (3) to maximize transfer and use of products throughout the country; and (4) to assess the value of SFBRs objectives and results to HUD. To achieve these, ADL conducted 131 interviews of HUD, USGS, and ABAG personnel and users and non-users of SFBRs products selected randomly from a USGS mailing list. Several case studies were prepared of users and non-users, and a general analysis of the program was undertaken.

The final report of this evaluation submitted to HUD contains descriptions of the interview results and case studies. It also lists the accomplishments of the SFBRs project, the uses of specific products, the impact of the project on the governments and agencies involved, the application of SFBRs products to legislatively created programs, and problems associated with data products, their use, and the SFBRs program as a whole. Recommendations are made in the report addressing the problems associated with the data products, the management of the SFBRs program, and the transfer of the approach to other regions.

U.S. Geological Survey      The U.S. Geological Survey in cooperation with HUD, also conducted the first phase of an evaluation of the SFBRs program. Compared to the ADL study, USGS developed a more narrow focus. Specifically, the evaluation's objectives were: (1) to determine and document the use of SFBRs products by local planning agencies in their land use planning and plan implementation; (2) to evaluate the effectiveness of such uses and to analyze non-use, misuse, or ineffective use; and (3) to suggest ways to achieve greater or more effective use of natural resource data.

The chief method employed in the study was the interviewing of public officials in the 91 cities in the San Francisco Bay Region. The interviews were conducted with over 120 members of the planning staffs in those cities. The thrust of the interviews was to discover the applications of available SFBRs products to specific activities of the planning agencies. Additional questions were asked of the interviewees

regarding additional data needs, technical problems with SFBRs products, preferred scale and other suggested improvements for the products, and the types of assistance received from USGS personnel.

The report of the study describes in detail the processes and methods used and the results of the interviews. Analysis is also provided regarding the products being used, the sophistication of the data users, and the applications of the data. The report makes suggestions for future programs developed similar to SFBRs. The suggestions cover such areas as technical assistance, map scale, the need for interpretive data, the need for data producers to anticipate user needs by monitoring the course of appropriate legislation, and the more efficient distribution of products.

#### The Council of State Governments

The Council of State Governments' study was funded by a grant from the Resource and Land Information Program of USGS. The project was entitled a "product evaluation," and its main purpose was to elicit comments from state data users on the usability of certain data products considered new or innovative by their preparers.

The products' usability was evaluated by interviewing several data users in each of seven States and by a collective process, which involved a review of the products by data users from an additional four States. The data users included personnel from state land use planning offices, coastal zone management programs, and critical areas programs. In addition to obtaining comments on the specific products—how they might be used and how they could be improved—questions were asked to determine the types and sources of data currently in use, as well as data needs not being met. In the course of the evaluation interviews, matters relating to data format, the possibility of technical assistance, and other issues were discussed.

The report of the project describes the reactions of the data users to 27 of the products evaluated. It also discusses data most commonly in use and needed, and makes recommendations regarding the preparation and provision of future data services.

# Appendix

## Policy Position Adopted at the Winter Meeting of the National Governors' Conference, February 24, 1976

### Committee on Natural Resources and Environmental Management Conversion to the Metric System in Topographic Mapping

The Topographic Division of the U.S. Geological Survey is considering a plan to convert the standard 7.5 minute quadrangle map series to the metric system. A number of States are at present only partially topographically mapped at the standard 7.5 minute quadrangle scale of 1:24,000. A change to the metric system in topographic mapping before completion of mapping at the scale of 1:24,000 will result in many adjoining maps with different scales.

A change at this time will be inconvenient to the map user and place upon the user the burden of converting the maps to compatible scales. Such conversion will result in a tremendous cost in wasted time and effort. It is considered of paramount importance that the map user be facilitated if the mapping program is to have real value.

Therefore, it is the recommendation of the National Governors' Conference that mapping programs in the various States be completed at a single scale, and further, that mapping be completed at the earliest possible time.

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