Legislative Audit Division

Performance Audit Summary

# GIS Implementation and Development in Montana
# September 2001

## Introduction

The Legislative Audit Committee requested a performance audit of Geographic Information System (GIS) implementation and development. GIS is an information technology that allows data to be integrated based on geographic features. No single state or local entity is responsible for monitoring or managing GIS use or application within the state. The Montana Geographic Information Council (Council), created by executive order of the Governor in 1997, was established to provide policy level direction. Additionally, GIS users formed coordinating groups to facilitate development within state and local government, as well as the private sector. Four organizations have assumed primary responsibility for developing and coordinating GIS activities: 1) Montana GIS Interagency Technical Working Group (Technical Group); 2) Montana Local Government GIS Coalition (Local Coalition); 3) Montana GIS Users' Group (Users' Group); and 4) Montana Geographic Information Council (Council)

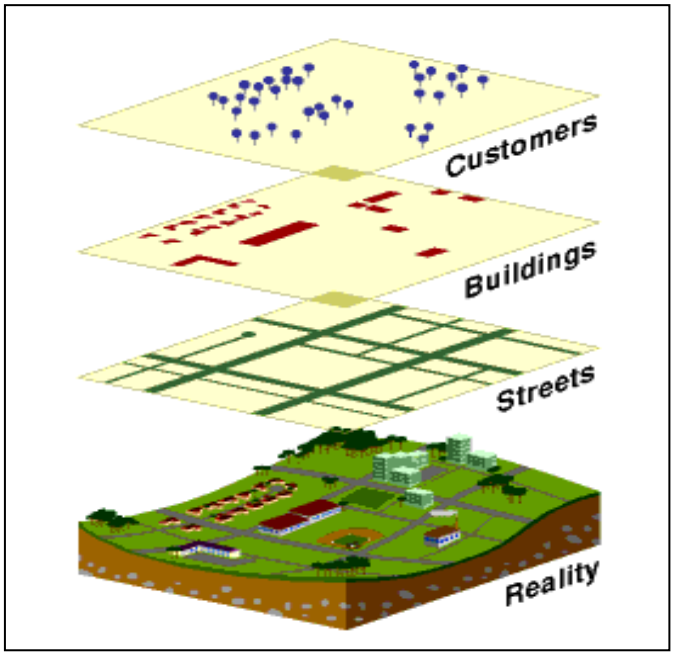
The Environmental Protection Agency (EPA) and private companies involved in Superfund site activities funded early GIS development in the state. The majority of Montana's initial GIS users were associated with natural resource organizations involved with the EPA and Superfund site activities.

## What is GIS?

A geographic information system is a computer-based tool for mapping a wide variety of information. The technology integrates database information with the visualization offered by maps. One of the goals of GIS is to eliminate redundant data collection and usage. The principle is that data should be collected once and then accessed by all who need it (efficiency). Effectiveness benefits stem from creating a capability to complete tasks that were not routinely done because of their size, cost, or complexity. With GIS, major data projects can be updated regularly and used for routine decision-making. Any data element that includes a location reference has potential for GIS application. The level of detail in geographic references can be as general as a city, county, or zip code, or as specific as land parcel or global positioning system point references.

## How Does GIS Work?

Information is stored in "layers" or "themes" – geographic location as well as attribute information. Layers can be viewed in various combinations.




## Montana GIS Clearinghouses

Clearinghouses provide access to, and information about, GIS data similar to a library providing access to other documentation. Although the general purposes of clearinghouses are similar, most focus on specific types of data or reflect regional interests. As a result, there are a number of clearinghouses in Montana. As part of their library function, clearinghouses often provide referral services and Internet links to other clearinghouses. The Montana Natural Resource Information System (NRIS) is generally considered the primary clearinghouse in the state. NRIS is part of the Montana State Library.

Another prominent clearinghouse is the Department of Commerce, Census and Economic Information Center (CEIC). The center is designated by the U.S. Census Bureau as the State Data Center and Business/Industry Data Center for Montana. The CEIC offers a variety of mapping, geographic, and GIS data resources and services.

## Communication and Cooperation

Cooperation and collaboration are fundamental to the development of GIS capabilities. Success relies upon the establishment of large data bases used by entities at all levels throughout the public and private sectors. Frequently, development requires the integration of multi-discipline data. As a result, a project advocacy approach has evolved in Montana.

The existing organizations and oversight processes effectively use communication and coordination to develop GIS capabilities. Montana has benefited by using the cooperative approach to focus on specific projects and encourage the use of GIS. The cooperative relationships between the Council, Technical Group, Local Coalition, and Users Group help to minimize duplication and increase cost sharing. A higher level of communication and coordination is achieved because the majority of the participants are active GIS participants. ***GIS development to date in Montana has been effective as a direct result of the participants' strong commitment to communication and coordination.***

## Planning

The Council and the Technical Group routinely receive updates on the development of framework layers. However, project status is not compared to planning projections or milestones because in most cases they have not been formally developed. Recently, the Council and the Technical Group endorsed a planning approach proposed by the Federal Geographic Data Committee to assure consistency between states.

Increasing state and local agency participation, increasing access to training, timely designation of custodians, and improving the standardization process are all activities which could be enhanced with more focus on formal planning. Council members would have a better opportunity to compare project status, already provided on a routine basis, to established project goals, priorities, and milestones. Future GIS development will continue to require significant inter-jurisdictional cooperation and agreements. The Council's role as a facilitator in this process is important. ***We recommend the Council establish a framework layer project planning review process to include review of:***

- ***Project cost, funding sources, and milestones.***
- ***Entity participation and training needs.***
- ***Data custodianship.***
- ***Standardization needs.***

## Issue Resolution

The GIS community involves all levels of government and the private sector. In this environment, where an agency must rely on outside entities, difficult decisions must be made to assure the overall effort stays on track. Sometimes these decisions will result in an outcome that may not be in the best interest of a particular agency. Yet, the decision benefits the GIS community as a whole. We believe developing recommendations, which lead to a decision, is one of the roles of the Council. Currently, there are long standing issues that are viewed as not being resolved. These issues were frequently discussed at Council or working group meetings. What was missing was the step that concluded with a Council position. The Council did not clearly communicate consensus on the issue, provide a formal resolution to the GIS community at large, or make a recommendation to the governor or legislature if warranted.

We believe the Council should assume a more pro-active role regarding resolution of issues. At one extreme, Council proposals for resolution might be no more than a policy statement reflecting consensus. At the other extreme, the Council could make a recommendation to the governor or the legislature. ***We recommend the Council develop procedures for resolving issues within the GIS Community by:***

- ***Establishing clear milestones and deadlines.***
- ***Documenting Council consensus or resolution.***
- ***Developing formal recommendations for the governor and/or legislature if necessary.***

## Council Resource Recommendation is Needed

To date the implementation of GIS across Montana has been successful because of the willingness of the active participants to dedicate time and energy to Council business. At times this has required members to place GIS activities above their primary duties and responsibilities. For the Council to implement our recommendations, it needs help to review project status and conduct thorough planning. Similarly, in order to more actively resolve issues impacting GIS development, the Council will require help to identify priorities, document progress, and formalize positions.

Identification of the needed resources to meet the requirements of the Council and statewide GIS coordinator activities is a Council responsibility. The Governor's executive order establishes the importance of coordinating efforts in order to minimize duplication and take advantage of cost sharing. While the order endorses an "aggressive policy," the level of aggressiveness is clearly left to the Council to determine. ***We recommend the Council:***

- ***Determine the amount of administrative support required to improve planning, resolve issues, and provide an overall GIS implementation status.***
- ***Evaluate alternatives for resource allocation.***
- ***Prepare a recommendation to the Governor to address resources.***

For a complete copy of the report (01P-07) or for further information contact the Legislative Audit Division at 406-444-3122; e-mail to lad@mt.gov; or check the web site at http://leg.mt.gov/audit.