

State of Montana
GIS Common Operating Picture

Recommendations for the State CIO &
Report to Montana Land Information
Advisory Council

September 2006

Introduction

By motion at their June 2006 meeting, the MLIAC asked the CIO “to assess the current state of a common operating picture for the coordination and distribution of State of Montana geographic information assets and report at MLIAC on 9/7/2006.” To accomplish this task the State CIO, Dick Clark, appointed a 4-person subcommittee and charged them with assessing the GIS common operating picture, developing a final report that summarized their findings, and making recommendations about the future direction of GIS within the State of Montana.

The subcommittee appointed by Dick Clark, is pleased to submit their recommendations to the Office of the State CIO and to report their findings to the Montana Land Information Advisory Council (MLIAC).

The subcommittee came into the process with no predetermined outcomes. The members were motivated to find forward-looking recommendations that will serve the interests of the greater Montana GIS user community, Montana taxpayers and the public at large for years to come. Although history and existing legal considerations provided context and understanding for its deliberations, the subcommittee did not constrain its thinking to existing paradigms and understandings.

The group began by gathering information from numerous sources, including the Montana State Library (MSL), Natural Resource Information System (NRIS) and the Department of Administration (DofA), Information Technology Services Division (ITSD). As further background, the committee also requested legal opinions on the statutes/rules governing the NRIS, ITSD (Montana Information Technology Act - MITA), and GIS (Montana Land Information Act – MLIA).

Other solicited and unsolicited input on various concerns and subject matter was provided by numerous individuals.

Using the existing GIS operating environment as background information, the subcommittee looked into what the State’s operating architecture should be given the national GIS environment, present and future technological advances, and how GIS will be managed, coordinated, and accessed in the future.

From there, the subcommittee began by developing a specific vision for the State of Montana GIS environment and by defining the roles and responsibilities of the various stakeholders, including the DofA/ITSD, the MSL/NRIS, the State GIS Coordinator, and State agencies and departments.

A dominate theme that pervaded this effort and has brought national recognition to their programs and to the State of Montana is the laudable work done by the MSL/NRIS and DoA/ITSD over the years. The agencies’ staffs take pride in their work, and the people of Montana have benefited greatly from their efforts. We honor them for their commitment and dedication.

In the course of deliberating the issues, the subcommittee endeavored to find the best ways to enable these people to further succeed in meeting the interests and needs of the Montana GIS user communities, public and private.

The subcommittee wishes to thank the CIO and his staff, the State Librarian and her staff, and other Federal, State, local government and private sector professionals who so generously contributed their time and effort to this endeavor.

We are pleased to submit this report to the CIO and to the MLIAC.

Robin H. Trenbeath, Chair

Lance Clampitt

Ken Wall

RJ Zimmer

Executive Summary

This report makes sixteen (16) recommendations. Primary among these is the creation of an independent Geographic Information Office housed in the Governor's Office and staffed by a Geographic Information Officer (GIO) and the current DofA, ITSD GIS Service Bureau personnel. Further, that the office oversees the development, implementation and coordination of GIS activities and technology across all State agencies. A well thought out transition plan is critical to the success of these recommendations. The subcommittee recommends that development of the detailed transition plans be directed by the GIO.

Secondarily, the report recommends that the Montana State Library, Natural Resource Information System (MSL/NRIS) is the State's GIS Data Clearinghouse, including being the providers of the State's primary (but not exclusive) GIS Data Portal, and the holder of the State's principal GIS metadata files. Further, that the MSL/NRIS not be limited to only providing these services for natural resource information but be allowed to provide these services for all of the State's GIS information content. Finally, that the MSL/NRIS discontinue the business of applications development for State agencies and stop storing GIS data content except where that content is archival data and/or the NRIS has added significant value to the content dataset.

The report also recommends that the DofA, ITSD be designated as the State's primary (but not exclusive) GIS Data Warehouse and that the GIS Service Bureau be the lead entity to work with all federal, state, local, private and tribal entities to coordinate, develop and maintain data and standards for GIS information.

The report also recommends that consumers of GIS data content have multiple paths available to retrieve the information they seek.

And finally, the reports recommends that the MLIA Council actively support efforts to secure and ensure the funding and other resources necessary to carry out these proposals.

Appendix A is a matrix of the general roles and responsibilities anticipated by these recommendations.

The subcommittee recognizes these recommendations are general in nature and will require more specific detail before implementation. We see this as a collaborative effort of the Montana GIS community under the leadership and authority of the GIO.

Finally, we are aware that it will take time to implement the proposals, but urge the CIO to move quickly towards execution of these recommendations.

Background & Issues

In reviewing the current State GIS operating environment, the subcommittee observed that a major issue is the strained relationship between the MSL, NRIS and the DofA, ITSD, GIS Services Bureau, and the impact of that tense relationship on the GIS community across Montana. It is our determination that these basic issues revolve around the roles and responsibilities claimed by each organization.

Given that perspective, the subcommittee concentrated on the following questions:

- What are the roles and responsibilities of a GIS Clearinghouse?
- What are the roles and responsibilities of a State GIS Coordinator?
- What are the roles and responsibilities of other GIS entities?
- How should GIS archival data be preserved?
- What is the accepted data access and distribution technology of today?
- Does the State need a central and unbiased position of authority regarding GIS?

Definitions

A GIS Clearinghouse is an institution that collects and distributes metadata about geographic information. A clearinghouse publishes those collections that describe geographic information and data resources within their areas of responsibility, documenting data quality, characteristics, and accessibility (metadata). A clearinghouse uses readily available web technology for the publication and discovery of geospatial resources. This document recommends a Montana GIS Clearinghouse be officially recognized. The Montana GIS Clearinghouse will provide a central location where state and local agencies can list GIS datasets and the associated metadata, and where users can browse the list, search for specific key words, find the availability of data, verify who holds the data, and determine how the data can be obtained through a GIS Data Portal. The GIS Portal acts as an information broker that facilitates GIS data access and dissemination and in some instances validation, via a gateway, regardless of the data's physical location. The Clearinghouse does not necessarily store or serve any data, yet provides an application or link to put the consumer of information and the information they seek together.

A GIS Data Warehouse is a central, physical location where GIS data is stored. This does not mean that this organization is the distributor of information or even the creator of the data; it is simply a place to park data.

Active/Operational Data –the active and operational data content collected, maintained and used by the source agency (data steward) to fulfill their mission.

Archival Data –a digital “snapshot” of source agency GIS data content that preserves a copy of the information for that particular point-in-time, data status, or database content, and is used for historical and research purposes.

Historical Data – preservation of “snapshot” data content for future generations.

Value Added Data – GIS digital content which has undergone a conversion from the data content gathered by the source agency such that it provides a necessary alternative enhancement.

Legal Analysis (Appendix B)

Each agency, their management, legal team, and employees interpret existing laws differently. A major portion of the existing conflict is due to the interpretation of these statutes. Montana’s need to manage geographic information has never been more important. Yet, growing agency operational responsibilities, new laws and implied missions have further clouded the issue.

However, it is the conclusion of the subcommittee that new laws amending current statutes are not required; any new laws would be open to the same interpretations as the existing ones. It is also a finding of the subcommittee that existing laws are general enough that most of the issues and recommendations identified within this report are well contained by the present legal construct. The only exception may be in the creation of a central GIS authority that can provide unbiased decision-making and is the final authority concerning implementation of existing laws and associated GIS roles and responsibilities.

If the Executive and Legislature do decide to enact new laws, the act should take full advantage of a GIS Operating Environment through the assignment of specific roles and responsibilities for GIS coordination, production, maintenance, archive and access. It is also understood that any new laws governing GIS may implicitly assign responsibilities to a single existing agency, multiple existing agencies, a newly formed agency or department, or any combination thereof.

GIS Data Environment

Regarding Natural Resource information collections and dissemination, the subcommittee sees no valid distinction between Natural Resource GIS data and all GIS data. The Natural Resource Information System has an inherent and statutory duty to collect natural resource information. The Department of Administration is charged with being the lead entity to “work with all federal, state, local, private and tribal entities to develop and maintain land information”. The MLIA language of “land information” replaced the original language and intent of geographic information so that it would be understandable to the legislators and laymen alike. There is no doubt that the MLIA language means geographic or GIS information, and that the Department has the responsibility under this law to coordinate all land information including that of the natural resource flavor. The Department also has the overall responsibility to develop standardized, sustainable methods to collect, maintain, and disseminate information in digital formats about land information.

Because it needlessly limits the mission of data distribution and access, the line dividing types of GIS information such as “Natural Resource” data should be erased. The separation of responsibilities based on data type is no longer a valid or necessary distinction. The distinction should be made as to the responsibility for service (steward, coordinator or access provider) and not by type of data.

Funding

This subcommittee did not consider past or existing agency funding (or the lack of funding) to perform a mission. Our recommendations are based on which agency should have specific responsibilities related to GIS data coordination, production, maintenance, archival and the ability to make this data accessible to information consumers. As recommended in this document, each responsible agency should be fully funded to fulfill their mission.

GIS Application Services

More and more agencies are developing their own support for GIS mission critical functionality within their own organizational boundaries. In addition, the availability of private sector consulting services is also growing. Although once a valuable asset to the growth of GIS and support of the GIS consumer within the State, most of these services need no longer be provided by the NRIS and detract from the primary NRIS mission.

What the NRIS should be providing are those applications that link the consumers of GIS information with the data content they seek (via the GIS Data Portal) in the fastest and most flexible manner possible. That is, the NRIS needs to concentrate its

resources on implementing the technology and applications that deliver any and all GIS information, from whatever source, to the GIS content consumer.

State agencies will, from time to time, need some guidance and assistance on small projects that, because they lack staff expertise, time or other resources, they cannot perform on their own.

While we caution any agency to avoid being drawn into a cycle of staffing up to meet contact needs and contracting to maintain staffing, there are and will be situations when it is appropriate for one state agency to provide GIS services to another agency. The State should be able to respond to that need for small projects or when there is a compelling need.

GIS Clearinghouse Role

As we contemplated the role of the Clearinghouse and in order to free our analysis of the jargon that might box us in conceptually, we posited the analogy of GIS data as a book. This analogy helped us understand the context and nature of the issues, and to assimilate the information into a manageable form.

In this analogy a library plays a very important societal role by, at its most basic level, providing free and ready access to information that the public wants. Typically the library does not write books or publish books, or stockpiles, edits, or sells them; others successfully perform these functions. The library provides a copy of a book and, though the library may not have a copy of every book, it can help the public find and obtain copies through a network of libraries and other resources. Further, the library is rarely the only avenue for finding and using books – there are many other ways, some free and some at a cost.

All this can also be said in regard to a library of GIS data. A GIS library such as the NRIS is a known, trusted, and valuable public resource for GIS data. A GIS library such as the NRIS does not need to be the only source for finding, accessing, using, and distributing GIS data, and it does not necessarily need to store the data (GIS Data Warehouse), but they do need to provide an avenue to access the information (GIS Data Portal). Indeed, information sharing is far more effective when there is a multitude of pathways through the data forest, because the users start from different origins, have different needs and perspectives, and have a variety of destinations. Therefore, it is more efficient from the user perspective, to have more than one resource for discovering and accessing GIS data.

GIS Data Warehouse Role

The role of the GIS Data Warehouse is to provide a central location where GIS information is stored. This function is very similar to the current ITSD role as the State's Data Center for non-GIS data. That is, the mission of the ITSD is, first and foremost, an infrastructure organization that provides "utility" services to government. Because of this charge, the ITSD has developed into an organization that can effectively provide the following services:

- Operational Support
- Security
- Redundancy
- Cost efficiency
- Disaster recovery

However, although the ITSD is the primary data warehouse facility for the State, they are not the only data storage resource. Where appropriate, agencies and other entities store their data in other physical locations (e.g., agency data centers).

Central Authority

A Geospatial Information Officer (GIO) as a central authority would have similar responsibilities and authority within the GIS world to those of the State CIO within the general IT environment. A neutral position of authority would provide credibility within the State and the GIS community. The GIO would be housed in a neutral agency and serve as the highest level of authority on GIS standards, processes and operations within the State of Montana. The position would provide:

1. Leadership
2. Guidance
3. Advocacy for funding
4. Develop and enforce standards
5. Set policy
6. Oversight for the coordination of GIS activities
7. Final arbitrator for all GIS roles/responsibilities

The GIO would have staff resources to include the State GIS Coordinator position and the current DOA, ITSD GIS Bureau staff. The GIO would also chair the MLIA Council.

Recommendations

The subcommittee is pleased to make the following recommendations to the CIO and the MLIA Council for their consideration. The recommendations below address the directive of this subcommittee regarding *the common operating picture for the coordination and distribution of State of Montana geographic information assets* and are not intended to wholly describe all roles and responsibilities of any State agency. It is recognized that the following recommendations will require detailed transition/implementation plans, and that these should be developed under the direction of the GIO.

1. Create a Geospatial Information Office for the State and hire a Geospatial Information Officer (GIO) who will report directly to the Governor's Office, with responsibility and oversight for managing the geospatial information efforts across all State agencies. The GIO is a new position that who acts as the final arbitrator for all decisions related to State GIS processes and operations.
2. Through a federated, enterprise approach, the GIO should strive to seamlessly merge, where applicable, geography systems and applications into the appropriate business processes of agencies in all areas of government and the private sector.
3. The GIO should ensure that, where appropriate, there are multiple pathways through the State's data forest to help public and private consumers of information find the data they seek.
4. GIO should have oversight responsibility for the stewardship of all MSDI layers.
5. Data enhancements and applications for MSDI usability and access may be done by any agency under the direction of the GIO
6. The NRIS should be the GIS Clearinghouse for the State of Montana. In this capacity the NRIS performs a GIS Data Library function by being the primary gateway (Montana GIS Data Portal) for spatial information access by state and local agencies, and the public.
7. Any public or private entity may provide GIS data through the Montana GIS Data Portal. However, the primary responsibility for providing MSDI data access through the portal is that of the Data Steward.
8. The NRIS GIS Data Portal function is not limited to GIS natural resource information, but should include all GIS data resources relevant to Montana.
9. The GIS data archival responsibility should remain with the NRIS, except where that function is performed by the data source entity. Regardless of the management responsibility and unless an exception is granted by the GIO, data content should be stored in the Data Warehouse.

10. GIS Application development services should be phased out of the NRIS.
Application services in this context means application services other than those performed to provide data access.
11. The DOA, ITSD Data Center should serve as the primary GIS Data Warehouse.
All GIS, non-source data content will be stored at the ITSD Data Warehouse.
Exceptions may be granted by the GIO.
12. The DOA, ITSD, GIS Service Bureau, including the State GIS Coordinator, should be realigned to report to the GIO.
13. The State GIS Coordinator should be the lead in working with all federal, state, local, private and tribal entities to coordinate, develop and maintain data and standards for GIS information.
14. When GIS data becomes “historical” in nature, it should be transmitted to the Historical Society for records preservation.
15. MLIA Council should work with the GIO and ITSD to develop guidelines to help agencies determine when contracting in-house is appropriate and when work should be out-sourced to the private sector.
16. The MLIA Council should actively support efforts to secure and ensure the funding and other resources necessary to carry out these recommendations.

Appendix A

**Recommended Operating Environment
Roles & Responsibilities Matrix
Sept. 2006**

Roles / Responsibilities	GIO	GIS Service Bureau	NRIS	ITSD	State Agencies	Stewards	Other (e.g., Feds, private, local gov't.)
GIS Oversight	X	*		*			
GIS Coordination	*	X					
GIS Advocate	X	*	*	*	*	*	*
Clearinghouse			X				
Portal			X				*
Data Warehouse				X	*		
Access/Distribution		*	X		*		*
Standards	X	*				*	
Policy	X	*					
Funding	X	*					
Maintenance					*	X	*
Data Creation / Production					*	X	*
Value Added		*	*	*	*	*	*
Applications Development For Access & Distribution)		*	X	*	*	*	*
Data Archive Storage				X	*		*
Data Archive Management		*	X		*	*	*

X = primary
* = secondary

Appendix B

ITSD Legal Analysis:

July 17, 2006

To: Jeff Brandt, Deputy CIO
From: Dal Smilie, Chief Legal Counsel
Re: GIS Statutory Authority

On behalf of the Montana Land Information Council you asked for a brief overview of statutory responsibilities for GIS in Montana.

The key statement of legislative intent is found in 90-1-401, MCA et seq., which is known as the “Montana Land Information Act”. The purpose of that act is to “develop a standardized, sustainable method to collect, maintain, and disseminate information in digital formats about . . . land”. See 90-1-402, MCA.

The Department of Administration is charged with being the lead entity to “work with all federal, state, local, private and tribal entities to develop and maintain land information”. See 90-1-404(1)(a), MCA. The collection and organization of land information is intended to be conducted by the use of information technology and the Department has the duty to plan, establish and coordinate those services. See 2-17-505 and 512, MCA.

The Act also creates the Montana Land Information Council as an advisory council. See 90-1-405 and 406, MCA.

The Legislature understood that when it passed the Act in 2005 that there were pre-existing groups highly interested in GIS. It was anticipated that a good deal of cooperation would be necessary. But, the Department was made the “primary point of contact” for other GIS coordinating groups. See 90-1-404(1)(h), MCA.

One very significant GIS entity is the Natural Resource Information System (NRIS) whose statutes were effective in 1983. See 90-15-101, MCA et seq. NRIS has the overall duty to collect natural resource information; no specific mention is made of GIS. See 90-15-201(4) and 301, MCA. NRIS’ duty is to collect existing data but not to also develop data, see 90-15-301(1)&(3), MCA. NRIS is charged with treating with natural resource data in a manner that is economical and that minimizes or eliminates duplication; see 90-15-201(4), MCA.

You can see that the Department is charged with primary duties concerning all (not just natural resource related) land information. It has broad duties that include creating information that has not already been collected. It is charged with creating plans and administer accounts that assist it in carrying out its responsibilities, see 9-1-404 & 410, MCA. It has the duty to report the state’s overall progress in collecting, maintaining, and standardizing and disseminating land information to both the Governor and Legislature, see 90-1-404(1)(k), MCA.

MSL Legal Analysis:

STATE OF MONTANA
DEPARTMENT OF JUSTICE
AGENCY LEGAL SERVICES BUREAU
444-2026

MEMORANDUM

TO: DARLENE STAFFELDT
Montana State Librarian
Montana State Library

FROM: JIM SCHEIER
Assistant Attorney General

RE: **GIS Responsibilities**

DATE: December 19, 2007

You have asked for my analysis of the GIS responsibilities of the Montana State Library (MSL).

More than 20 years ago the Montana Legislature enacted laws authorizing the establishment and implementation of a natural resource information system (NRIS). Mont. Code Ann. § 90-15-301 requires MSL to establish and maintain the NRIS, which is described in subsection (1) of the statute as “a comprehensive program for the acquisition, storage, and retrieval of existing data relating to natural resources in Montana.” Mont. Code Ann. § 90-15-303 requires state agencies to cooperate with MSL in the planning of the NRIS, and also requires state agencies to provide data requested by MSL for purposes of the NRIS.

You have advised me that MSL views its NRIS role as including the acquisition and distribution of natural resource data necessary for understanding, managing, and utilizing Montana’s natural resources and environment. The resulting geospatial data layers developed by MSL through the NRIS program, also commonly known as GIS data, have been utilized for a number of years by government and business entities, as well as private citizens, for various purposes including display purposes, as well as analyses relating to environmental permitting, economic development, recreation, wildfire control, drought assessment, and other purposes.

In 2005 the Montana Legislature passed Senate Bill 98 (SB 98), which has been codified at Mont. Code Ann. §§ 90-1-401 through 413. The stated intent of SB 98, known as the Montana Land Information Act, was to develop a standardized and sustainable method to collect, maintain, and disseminate information in digital format regarding natural and

artificial land characteristics of Montana. Mont. Code Ann. § 90-1-402. SB 98 established a Montana land information account in the state special revenue fund to be used for the purposes of SB 98. Mont. Code Ann. §§ 90-1-409 through 411. SB 98 designates the Department of Administration (DOA) as the administrator of the account, and also assigns other duties to DOA with respect to the collection, maintenance, standardization, and dissemination of land information. Mont. Code Ann. § 90-1-404.

From a review of SB 98 it is not clear whether or to what extent the provisions of that bill were intended by the Legislature to impact the provisions of Mont. Code Ann. §§ 90-15-101 through 305, which authorize establishment of the NRIS system and implementation of that system by MSL. There is no language in SB 98 expressing an intent to repeal or diminish the effect of the statutes authorizing the NRIS system, and those statutes are still in effect. Moreover, repeals by implication are not favored. State v. Moore, 174 Mont. 292, 298-99, 570 P.2d 580, 584 (1977).

A later, general statute will not affect the operation of an earlier, specific statute unless there is a clearly manifested intent to repeal the earlier act, or irreconcilable differences in the two acts. Trustees of Carbon County School Dist. v. Spivey, 247 Mont. 33, 36, 805 P.2d 61, 63 (1991). As discussed above, on the face of SB 98 there is no clearly manifested intent to repeal or affect the NRIS statutes.

This conclusion is also supported by the legislative history of SB 98. As noted, it is not entirely clear whether the provisions of SB 98 were intended to diminish the role of MSL with respect to its responsibilities regarding the acquisition and distribution of natural resource data. If intent cannot be determined from the language of a statute, legislative history may be examined. Thomas Bros. v. Cargill, Inc., 276 Mont. 105, 110, 915 P.2d 226, 229 (1996), *quoting* Gulbrandson v. Carey, 272 Mont. 494, 500, 901 P.2d 573, 577 (1995). During the hearing on SB 98 before the Senate Committee on Natural Resources, Sen. Ken Toole asked Jeff Brandt, who was at that time the acting Chief Information Officer with DOA, whether MSL's role with respect to its responsibilities regarding NRIS would change if SB 98 were enacted. In response, Mr. Brandt indicated that the intent of the bill was not to change MSL's role with respect to the NRIS, but rather to improve coordination between state agencies regarding creating and maintaining land data.

This is consistent with the existing memorandum of understanding (MOU) between MSL and DOA's Information Technology Services Division (ITSD), which has been in effect since 2003. The MOU reflects the goal of a cooperative and coordinated approach

between the two agencies for developing, maintaining, and delivering geospatial data essential to the GIS enterprise. The purpose of the MOU is to clarify the respective roles of ITSD and MSL within the framework of the Montana GIS enterprise. Pursuant to the MOU, ITSD has agreed that it will not conduct any activities that conflict with MSL's recognized role as described in the MOU. The MOU acknowledges that MSL's role relating to GIS and geospatial information is to collect or locate existing geospatial information, catalogue that information, and disseminate or provide access to the information in an effective and efficient manner. Page 5 of the MOU lists numerous tasks that are the responsibility of MSL, including serving as the recognized single portal, within Montana state government, for access to all of Montana's existing and future geospatial data.

Thus, while it is apparent that SB 98 was intended to clarify issues relating to the creation and routine maintenance of Montana geospatial data and information, it is just as apparent that SB 98 was not intended to diminish MSL's existing role in fulfilling its statutory duties with respect to the acquisition and distribution of natural resource data under NRIS.

I hope this information is helpful. Let me know if you have additional questions or need additional information regarding this issue.

jms/