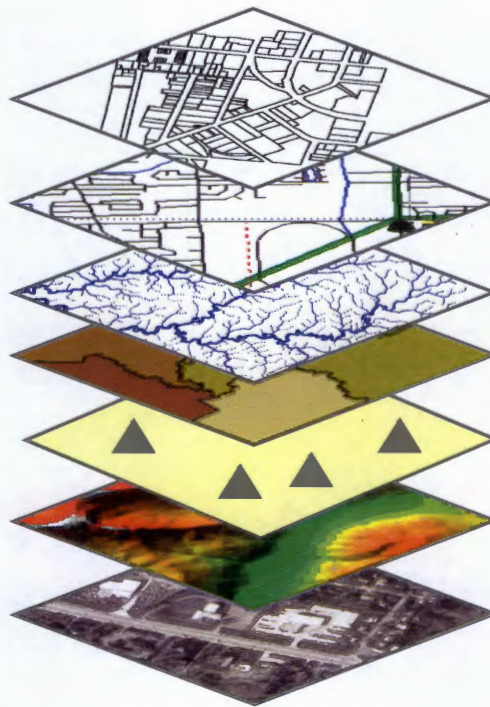


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# **STATUS OF THE MONTANA SPATIAL DATA INFRASTRUCTURE, MONTANA LAND INFORMATION ACT, AND RELATED ISSUES**



**A REPORT TO THE 60TH MONTANA LEGISLATIVE SESSION AS PROVIDED  
FOR BY 90-1-404(I), MCA AND 5-11-210, MCA**

**Compiled by the Montana Department of Administration, Information  
Technology Services Division**

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This information will be made available in alternate formats upon request by calling (406) 444-2700.

## **Executive Summary**

The use of Geographic Information Technology (GIT) is rapidly expanding throughout the state. This expansion is taking place in areas that have traditionally exploited the power of GIT but also in new areas that previously did not make extensive use of GIT. A number of relatively recent developments serve to support future progress in this important technology, including coordinated development, planning, funding, and governance.

Explosive growth in GIT and the need to integrate with a federally-mandated enterprise architecture will require the State to adopt and employ new technologies such as web services, federated approaches to the collection, maintenance and distribution of data, and service-oriented architectures. The Montana Spatial Data Infrastructure (MSDI) serves as the foundation for base geospatial data in Montana. Reliable MSDI theme stewardship and leadership, along with long-term stable funding for collection, maintenance, integration, enhancement and dissemination are needed for all MSDI themes. To assist MSDI development, use of the Montana Land Information Act (MLIA) funding is proceeding under Administrative Rule established in September 2006, and a 2007/2008 Land Information Plan, with the first round of grants to be awarded in May, 2007. MLIA funds will not meet all the funding requirements of the MSDI, and a federated enterprise GIT community must identify additional funding sources.

## **Introduction**

The use of Geographic Information Technology (GIT), whether Geographic Information Systems (GIS), Global Positioning Systems (GPS), Remote Sensing or other specialized technologies is rapidly expanding throughout the state. This expansion is seen in both traditional areas like natural resources and emergency response, and in new areas like economic development and health care. GIT, whether delivered via the Internet or more traditional map products, provides a very visual approach to supplying the geographic component that is inherent in almost every state business process or important state issue.

Within this rapidly-changing GIT environment, a number of relatively recent developments serve to support future progress in this important technology:

- Coordinated development, through the Montana Spatial Data Infrastructure (MSDI)
- Planning, as directed by the Montana Land Information Act (MLIA)
- Funding, through the MLIA
- Governance, through the Montana Land Information Advisory Council (MLIAC)

## **Changing GIS Environment:**

In contrast with its relatively obscure beginnings and limited focus, geospatial technology is now experiencing rapid changes, as are information management systems in general. These technological developments are in turn fostering significant growth in the demand for geospatial applications and their derived products by a wide variety of users. These factors present a unique set of challenges and opportunities to the technical specialists in this field and to the clients they serve.

As the technology has advanced, there has also been a shift in the way data is collected and shared. This new system can be characterized as “federated”, where a series of independent entities form a cohesive data sharing system. This federated system, however, will require a great deal of coordination, collaboration, communication, and leadership with a focus on service

Geographic Information Systems are moving from isolated islands or pockets of technologies to a more integrated approach. Formerly, individual GIS specialists were responsible for collecting data and creating and hosting various products. More recently, GIS efforts are much more collaborative and rely on the results of other projects. GIS specialists can now easily access the state’s Cadastral mapping system or the National Map, for example, via their computer. The potential exists for data to be shared among users at all levels—local, state, tribal,

and federal—in a system where everyone shares and contributes information; and their connectivity enables them to create a better source of information.

GIS technology has and will continue to evolve over time. GIS has been changing at a fundamental level, from a database and data sharing approach to a knowledge approach. To work collaboratively with federal, state, tribal and local entities, it will be necessary to adapt to new technologies such as web services and distributed data, and a service oriented architecture (SOA).

### **Summary:**

Explosive growth in GIT and the need to integrate with a federally-mandated enterprise architecture will require the State to adapt and employ new technologies such as web services, federated approaches to collect, maintain and distribute data, and service oriented architectures.

## **Montana Spatial Data Infrastructure**

The federal government, in cooperation with state, regional, local and private sector interests, has identified seven geospatial “framework data layers” for the nation. Framework layers follow themes identifying geographic features or characteristics, relating to national, state or regional interests and needs. Geographic features may be either natural or manmade. These layers represent the primary spatial or geographical themes and can be overlaid upon each other to provide varying levels of detail. The seven layers include:

- Cadastral (or land parcel)
- Elevation
- Geodetic Control (a set of known positions with precisely determined locations from which other locations can be referenced)
- Government Units (boundaries of entities such as cities, counties or reservations)
- Hydrography (surface water features)
- Orthoimagery (aerial photographs and/or satellite imagery)
- Transportation

In addition, the state has added six framework layers:

- Geology
- Hydrologic Units (sub-watersheds and drainages)
- Land Cover (Vegetation)
- Soils (Inventory and Classification)
- Wetlands
- Critical Infrastructure and Structures

Together, these 13 layers constitute the Montana Spatial Data Infrastructure or MSDI. Some of these layers are comprised of multiple sub-layers or themes.

For example Government Units include school districts, legislative districts and municipal boundaries while Critical Structures include police stations, schools, and dams. However, within these layers and sub-components, most of the data needed to compile the base map for almost any application is included.

These data layers are in various states of development and the initial completion, dissemination and ongoing maintenance and enhancement of the MSDI has been identified as a top priority by the entire GIS community. In April of 2006, MLIAC prepared a directive on Theme Stewardship to offer an operational structure in which MLIAC can meet the goal of consistent, accessible, complete geographic data statewide called for in MLIA (Appendix A). The Directive identifies a methodology for the acquisition, formatting, dissemination and maintenance of each of the data layers and for coordination with the National Spatial Data Infrastructure (NSDI).

### **Summary:**

Reliable theme stewardship and leadership, along with long-term stable funding for collection, maintenance, integration, enhancement and dissemination is needed for all MSDI data layers.

## **Montana Land Information Act**

The MLIA was passed by the 2005 Legislature with the stated purpose of:

*"The purpose of this part is to develop a standardized, sustainable method to collect, maintain, and disseminate information in digital formats about the natural and artificial land characteristics of Montana. Land information changes continuously and is needed by businesses, citizens, governmental entities, and others in digital formats to be most effective and productive. This part will ensure that digital land information is collected consistently, maintained accurately in accordance with standards, and made available in common ways for all potential uses and users, both private and public. This part prioritizes consistent collection, accurate maintenance, and common availability of land information to provide needed, standardized, and uniform land information in digital formats."*

The administrative rule related to MLIA was finalized in September 2006.

As per Administrative Rule, a Land Information Plan will be published by January 15, 2007. Also by January 15, 2007 grant criteria and instructions for submitting grants will have been completed, with grant applications due by February 15, 2007. Submitted applications will be prioritized by May 1, 2007, and finalized based upon available funding by May 15, 2007.

Funds collected from July 1, 2005 to June 30, 2006 from the 1 dollar fee on document recordation generated approximately 1.3 million dollars, with 25% of each dollar retained by the counties where the documents were recorded.

The efficiency and success of the MLIA, Administrative Rule, and the grant program in general, cannot be determined until the state completes the first round of grants.

**Summary:**

The implementation of MLIA is proceeding under the administrative rule established in September 2006, and a 2007/2008 Land Information Plan, with the first round of grants to be awarded in May, 2007

## **Montana Land Information Advisory Council**

The Montana Land Information Advisory Council (MLIAC) is established by the MLIA and replaces the Montana Geographic Information Council originally created under a 1997 Governor's Executive Order. The Council's stated statutory duties are:

**90-1-406. Land information advisory council -- duties -- advisory only.** (1) The council shall:

(a) advise the department with regard to issues relating to the geographic information system and land information;

(b) advise the department on the priority of land information, including data layers, to be developed;

(c) review the land information plan described in 90-1-404 and advise the department on any element of the plan;

(d) advise the department on the development and management of the granting process described in 90-1-404(1)(e);

(e) advise the department on the management of and the distribution of funds in the account;

(f) assist in identifying, evaluating, and prioritizing requests received from state agencies, local governments, and Indian tribal government entities to provide development of and maintenance of services relating to the GIS and land information;

(g) promote coordination of programs, policies, technologies, and resources to maximize opportunities, minimize duplication of effort, and facilitate the documentation, distribution, and exchange of land information; and

(h) advocate for the development of consistent policies, standards, and guidelines for land information.

(2) The council functions in an advisory capacity, as defined in 2-15-102.

The Council meets quarterly on the first Thursday of the month in March, June, September and December. Since its first meeting in September 2005, the Council has concentrated on advising on MLIA Administrative Rule, and implementing the MLIA process. The Council has had an active MLIA Land Information Plan Subcommittee and will be forming a MLIA Grants Subcommittee. The Council has also participated in a strategic planning effort

through a Federal Geographic Data Committee grant administered by ITSD, and has been actively pursuing stable agency stewardship for MSDI themes.

**Summary:** The MLIAC has been established in accordance with the MLIA and is carrying out its responsibilities under the act.

## **GIT Common Operating Picture**

The staff of the Department of Administration and the Montana Land Information Council has dealt with a number of challenges in implementing the MLIA in these first few years of existence. Funding issues, roles and responsibilities, and planning issues are just a few of the issues that will need to be addressed in the coming years. In response to an MLIAC request known as the "Common Operating Picture", the State CIO commissioned a four member committee to research the present structure and to make recommendations regarding future vision, roles and responsibilities. That committee submitted the following sixteen recommendations to the CIO as well as presenting them to MLIAC and other groups:

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 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.

The entire document entitled "GIS Common Operating Picture for GIS" can be accessed at <http://itsd.mt.gov/policy/councils/mliac/mliac.asp>.

### **Summary:**

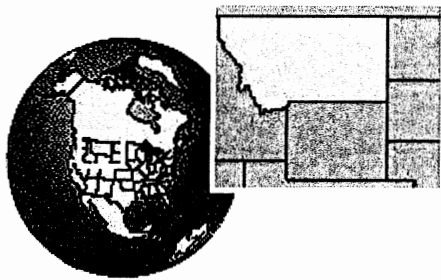
Although a great deal of progress has been made in the initial implementation of the MLIA, a great deal of work remains. Future efforts will be focused on implementing the recommendations contained in the "Common Operating Picture".

## **Appendix 1 - Draft Montana GIT Strategic Plan**

(see attached)

## **Appendix 2 - Draft 2008 Montana Land Information Plan**

(see attached)



# Montana GIS 2010

## Geospatial Strategic Plan



Montana Land Information Advisory Committee

Second Working Draft  
September, 2006

## FORWARD

The Montana Geospatial Strategic Plan creates a vision for the development, maintenance and dissemination of geographic information for the state of Montana. The Plan has been prepared in conjunction with the National States Geographic Information Council (NSGIC) Fifty States Initiative, which “outlines a fundamental change in the way all governments will work together in the future to build the National Spatial Data Infrastructure (NSDI)... The principal goals of the Initiative are to:

- Encourage implementation of statewide spatial data infrastructures through effective strategic and business planning efforts.
- Provide guidance on planning activities.
- Encourage the formation of partnerships and alliances that will improve the planning process.
- Provide a uniform national framework for strategic and business plans, so they can be compared and contrasted to reveal national trends.”<sup>1</sup>

The Montana Geospatial Strategic Plan not only facilitates Montana’s participation in the development of the NSDI, but also provides overall direction for the entire Montana geospatial community, a system of Geographic Information System (GIS) technical specialists and users in both the public and private sectors. More particularly, the Plan provides guidance for public policy decisions related to geographic information and a framework for annual State Geospatial Business Plans and the associated allocation of resources.

Part and parcel of our participation in both state and national efforts to plan for the management of geospatial data, is the development of a service oriented architecture and associated standards and protocols that will enable information to be shared across political, jurisdictional and organizational boundaries. Communication, coordination, standardization, access and education are the key components of our strategy and underscore each component of the Plan. The Plan includes goals and objectives as well as suggested implementation strategies that are intended to foster and support efforts to provide reliable, easily accessed information in more efficient ways for a variety of applications and shared uses aimed at the overall economic and community development needs of the state of Montana.

The Montana Geospatial Strategic Plan is intended to foster a “federated” model for sharing information among a variety of users, through data stewardship, education and collaboration. This approach reflects the transition from a system of isolated information nodes to a cohesive, integrated federated system, made up of a variety of entities focused on providing service to users of geographic information.

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<sup>1</sup> NSGIC, February 28<sup>th</sup>, 2005

## **ACKNOWLEDGEMENTS**

The Montana Land Information Advisory Council (Members)

Stewart Kirkpatrick, Chief, GIS Services Bureau, Montana Department of Administration

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## INTRODUCTION

This Geospatial Strategic Plan has been prepared for the Montana Land Information Advisory Council (MLIAC) on behalf of the entire GIS community in Montana. MLIAC was created in July 1<sup>st</sup>, 2005, in accordance with the Montana Land Information Act (the Act) and replaced the Montana Geographic Information Council, created by executive order of the Governor in 1997 to provide policy level direction and promote efficient and effective uses of resources. The Act, in its statement of purpose, identifies the need "to develop a standardized, sustainable method to collect, maintain, and disseminate information in digital formats about the natural and artificial land characteristics of Montana. Land information changes continuously and is needed by businesses, citizens, government entities, and others...and [must be] made available in common ways for all potential uses and users, both private and public". The Act defines the Geographic Information System (GIS) as "an organized collection of computer hardware, software, land information, and other resources, including personnel, that is designed to... efficiently collect, maintain, and disseminate all forms of geographically referenced information."<sup>2</sup> The entire Act is included as **Appendix A** to this Strategic Plan.

Montana has continually been at the forefront of GIS development and is recognized nationally for its long standing efforts to employ GIS technology for use in a wide variety of applications. Successful collaborative efforts to effectively disseminate this technology are evident throughout the history of GIS in the state. Beginning at least five years prior to the introduction of GIS specific technology, there were a number of significant efforts to coordinate data management and sharing among government agencies, universities, and private sector groups at local, state, tribal and federal levels as noted in the following time line:

- 1982 – The Montana Governor's Council on Management, recognizing the growing amounts of natural resource data and the growing need for quick access to this data, called for greater coordination and information sharing among natural resource agencies.
- 1983 – The Montana Legislature created the Natural Resource Information System (NRIS) and the Natural Heritage Program: "...to be a comprehensive program for the acquisition, storage, and retrieval of existing data relating to the natural resources of Montana."
- 1985 – The Montana Interagency Information Processing Coordinating Group comprised of the Montana Department of Natural Resources and Conservation, the University System, U.S. Forest Service, the Federal Soil Conservation Service (now the Natural Resources Conservation Service), the Federal Bureau of Land Management and others was created.
- 1987 – Funding for the development of GIS capabilities at the State level was provided under the Federal Comprehensive Environmental Response, Compensation and Liability Act or CERCLA, commonly known as the Superfund Law in connection with remedial investigation activities in Butte and Anaconda, Montana, resulting in establishment of the GIS program at the Montana State Library – Natural Resource Information Program.

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<sup>2</sup> Senate Bill No. 98, 2005 Montana Legislature, <http://data.opi.state.mt.us/bills/2005/billhtml/SB0098.htm>

- 1988 -1990 –The Interagency Technical Working Group or ITWG was formed and charged with identifying critical statewide themes and mechanisms for their development; essentially establishing the framework for the current Montana Spatial Data Infrastructure (MSDI).
- 1988-1992 – The Montana GIS Users Group (MTGIS), a professional organization representing diverse GIS Users at the local, state, federal and tribal levels, was created, holding its first statewide conference in 1988. MTGIS was formally established in 1990 as a consortium of federal, state, local, tribal, university, and private organizations and individuals engaged in the use of and education about GIS technology. The Group's purpose was to provide a forum for exchanging information and ideas on GIS technology. The Users' Group was organized as a non-profit organization to serve the GIS community at large in Montana. The charter for the Montana GIS Users' Group was adopted in 1990 at the Montana GIS Users' Conference in Missoula. The organization operated for 14 years, co-sponsoring conferences with Idaho's GIS community, published a newsletter and provided support for various educational and community projects.
- 1995 – The Montana Local Government GIS Coalition (MLGGC) was initiated by local government GIS practitioners to facilitate and advance the implementation and development of GIS technology in city and county government through communication and data sharing.
- 1996 – The Montana Department of Administration (DOA) established the GIS Section within the Policy and Planning Bureau of the Information Technology Services Division (ITSD). When the DOA was reorganized in 2002, the GIS Section became a bureau under the Operations area of the ITSD Division.
- 1997 – The Montana Geographic Information Council (MGIC) was created by an executive order signed by Governor Racicot.
- 2003 – The Montana Legislature passed the Montana Information Technology Act placing the responsibility for information technology management and coordination including GIS in the Information Technology Services Division of the Montana Department of Administration.
- 2004 – The ITWG, the MLGGC and MTGIS joined forces to create the Montana Association of Geographic Information Professionals (MAGIP), a non-profit, volunteer professional association of diverse GIS users from federal, tribal and state agencies, local government, private industry, K-12 schools, and universities.<sup>3</sup>
- 2005 – The Montana Land Information Act was signed into law by Governor Schweitzer, creating the Montana Land Information Advisory Council (MLIAC). The Act is designed to provide a stable funding source to contribute toward the completion of the MSDI themes and provide financial resources to collaborative GIS projects.
- 2005-2006 – MLIAC initiated the preparation of a Geospatial Strategic Plan for the State of Montana

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<sup>3</sup> Mike Sweet, *GIS Coordination in Montana*, a Power Point Presentation, 2004

## **The Montana Spatial Data Infrastructure (MSDI)**

The federal government, in cooperation with state, regional, local and private sector interests has identified seven geospatial “framework data layers” for the nation. Framework layers follow themes identifying geographic features or characteristics, relating to national, state or regional interests and needs. Geographic features may be either natural or manmade. These layers represent the primary spatial or geographical themes and can be overlaid upon each other to provide varying levels of detail.

The seven layers include

- Cadastral (or land parcels)
- Elevation
- Geodetic Control (a set of known positions with precisely determined locations from which other locations can be referenced)
- Government Units (boundaries of entities such as cities, counties or reservations)
- Hydrography (surface water features)
- Orthoimagery (aerial photographs and/or satellite imagery)
- Transportation

In addition, the state has added six framework layers as follows:

- Geology
- Hydrologic Units (sub-watersheds and drainages)
- Land Cover (Vegetation)
- Soils (Inventory and Classification)
- Wetlands
- Critical Infrastructure and Structures

Together, these 13 layers constitute the Montana Spatial Data Infrastructure or MSDI. These data layers are in various states of development and the completion, dissemination and ongoing maintenance of the MSDI had been identified as a top priority by the entire GIS community. In April of 2006, MLIAC prepared a directive on Theme Stewardship to offer an operational structure in which MLIAC can meet the goal of consistent, accessible, complete geographic data statewide called for in the Montana Land Information Act (Appendix A). The Directive identifies a methodology for the acquisition, formatting, dissemination and maintenance of each of the data layers and for coordination with the National Spatial Data Infrastructure (NSDI).

## **The Federal – State Partnership**

### *United States Geological Survey (USGS)*

Today, a primary mission of the USGS is to meet the Nation’s needs for current base geographic data and maps. Through partnerships with federal, state, and local governments and the private sector, the USGS is committed to providing the Nation with access to current, accurate, and nationally consistent topographic maps and geospatial and remotely sensed data and information to help informed decision making by resource managers and the public. This synthesis of information, products, and capabilities, *The National Map*, will be a seamless, continuously maintained set of geographic base information that will serve as a foundation for integrating, sharing, and using other data easily and consistently.

In light of this, the USGS has entered into a Memorandum of Understanding with the State of Montana, specifically the Information Technology Services Division within the Department of Administration and

the Montana State Library, in support of its mission to establish partnerships necessary and other collaborative efforts for the development, maintenance, dissemination, and use of *The National Map*. The activities covered by this MOU include but are not limited to:

- Data Development
- Data Maintenance
- Database Development
- Data Dissemination and Distribution
- Exchange of Geospatial and Remotely Sensed Information
- Feature Serving and Generalization
- Outreach and Education
- Research and Applications
- Standards Development
- Web Mapping Services and Applications
- Workshops, Training, and Technology Transfer<sup>4</sup>

## **THE STRATEGIC PLANNING PROCESS**

### **Existing Conditions Review**

The first step in preparing this strategic plan was to inventory existing condition with respect to geospatial information management in the State of Montana. The existing conditions report, or “State of the State” document, prepared in 2005 is included as **Appendix B** to this document.

The “State of the State” includes a description of challenges and opportunities facing the state’s GIS community. In contrast with its relatively obscure beginnings and limited focus, geospatial technology is now experiencing rapid changes - as are information management systems in general. These technological developments are in turn spurring exponential growth in the demand for geospatial applications and their derived products by a wide variety of users. These factors present a unique set of challenges and opportunities to the technical specialists in this field and to the clients they serve. As the technology has advanced, there has also been a shift in the way data is collected and shared. This new system can be characterized as “federated”, where a series of independent entities form a cohesive data sharing system. Their connectivity enables them to create a better source of information overall.

The following list of challenges and opportunities was drawn from conversations with MLIAC members and other public and private sector GIS professionals.

### ***The Changing GIS Environment***

Geographic Information Systems are moving from isolated islands or pockets of technologies to a more integrated approach. Formerly, individual GIS specialists were responsible for collecting data and creating and hosting various products. In contrast, GIS personnel no longer work in isolation. They can easily access the state’s Cadastral mapping system or the National Map, for example, via their computer. The potential exists for data to be shared among users at all levels – local, state, tribal, and federal – in a system where everyone shares and contributes information and their connectivity enables them to create a better source of information overall.

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<sup>4</sup> Memorandum of Understanding Between the USGS and the State of Montana for Coordination and Cooperation Pertaining to the National Map, 2003

This federated system, however, will require a great deal of coordination, collaboration, communication, and leadership with a focus on service. The capabilities of GIS need to be examined with an eye towards the restructuring of relationships across traditional agency/organizational boundaries. Properly positioning GIS in the overall Enterprise architecture for the State of Montana will be key to its success.

### *Changing Technology*

GIS technology has, and will continue to, evolve over time. GIS has been changing at a fundamental level, from a database and data sharing approach to a knowledge approach. While Montana has in the past been at the forefront technological development related to GIS, that may currently be less true. In order to work collaboratively with federal, state, tribal and local entities, it will be necessary to adapt to new technologies such as web services and distributed data.

### *Communication and Collaboration*

As GIS technology advances and its applications have become more diverse and widespread, the need for better communication and collaboration among data creation, application, maintenance and distribution specialists is clearly seen as paramount to its successful use. For the last 10 to 15 years, GIS specialists have been working on manipulating and reconfiguring data to make it work in a variety of contexts. In light of new technologies, specialists are now able to focus more on applications and analysis. However data is often developed for one product or application, rather than across a range of potential uses. This results in having to “start over” as new or similar applications are required within other agencies and organizations.

GIS professionals in Montana have long been aware of the essential need for coordination and have worked together for decades to improve cooperation and information sharing. Yet despite a history of collaborate efforts, there is substantial room for improvement. Chief among these is the need to work towards the elimination of duplication of effort. Strategic planning can help foster the development of mechanisms for information sharing.

### **Shareholder Meetings**

Beginning in October of 2005, four shareholder meetings were held to identify issues and opportunities to be addressed in the Montana Geospatial Strategic Plan. Meetings were held with representatives from local, state and federal government entities and private sector GIS users and service providers.

The state and local government meetings were held in Helena with all participants present. The federal and private meetings were held using Web-Ex technology in association with a conference call. Generally, the meetings followed the same format. Following introductions, the meeting facilitator (Janet Cornish, CDS of Montana) provided an overview of the Geospatial Strategic Planning process. Then, through a series of round table discussions, participants identified issues and opportunities associated with geospatial information and its relationship to their business enterprises. If time permitted, the participants were also asked to draft general goal statements in response to the issue and opportunities identified.

Surveys were conducted using Survey Monkey © prior to three of the meetings (state government, local government and private sector) and for the tribal sector. No survey was conducted in conjunction with

the federal government meeting. Survey results were summarized and presented to participants at the beginning of the meeting to help spur discussion and to provide a framework for organizing ideas.

A complete listing of identified issues, organized by shareholder group has been prepared as a separate document. This listing as well as complete transcripts for each meeting are in **Appendix C** of this document.

The following list of issues (needs, barriers, concerns) and opportunities summarizes the results of this effort by category

### *Education and Training*

The need for educational programs was clearly articulated. Education tailored for GIS technicians as well as end users and the community in general was identified as critical. Specific comments included the need to:

- Learn from others' successes
- Provide education that is specific to users' needs
- Provide education regarding new technologies
- Provide GIS training for the layman (non-GIS technicians) – end users
- Offer general public education regarding the role of GIS

### *Professional Development*

In addition to benefiting from specific training and education, GIS specialists are looking to enhance their roles as professionals in their fields. More particularly, they identified the following concerns:

- Additional forums are needed to exchange information
- Expertise at the entry level is uneven
- The appropriateness of certification programs for GIS technicians should be explored

### *Political Efficacy*

The most commonly identified issue raised at shareholder meetings was the lack of a defined relationship between geospatial technology and the decision and policy makers who allocate resources in support of GIS. Those ultimately in charge of allocating resources to geospatial programs are often unaware of how critical this technology is to public policy making and program implementation. More specifically, shareholders identified:

- The lack of GIS Champions among those in leadership positions
- The fact that the benefits of GIS are not demonstrated to decision makers
- Entrenchment and Turf Issues
- The need for intergovernmental approaches to enhance efficient use of resources
- The need for the highest level of decision makers to be involved in GIS policy decisions
- The lack of a unified voice within agencies
- The need for decision makers to understand how GIS can be successfully applied
- Recognition that public expectations regarding GIS may not match reality
- The need for a voice in GIS policy making on behalf of small/rural communities
- The need for a voice in GIS policy making on behalf of tribal communities

### *Financial Resources*

Clearly additional funding for GIS is needed. More particularly, the following issues related to the lack of adequate financial resources in support of geospatial programs were identified:

- Staffing at all levels of government
- Addressing the mismatch between well-resourced efforts such as Google Earth and under-funded state support for these efforts
- Generating Data
- Addressing rural and small town GIS programs
- Reforming software licensing requirements to lower costs

#### *GIS in the Mainstream*

Meeting participants noted that in many cases GIS programs operated in isolation, further exasperating the problems associated with the general lack of political support for GIS. In order to address this problem, participants pointed to the need to

- Incorporate GIS into the mission of our agencies
- Deliver services efficiently and effectively
- Incorporate GIS into IT generally
- Link GIS to statewide policy making

#### *Coordination and Communication*

The GIS community faces a series of issues related to the lack of coordination among users in all sectors. Coordination and efficiency would be greatly improved by better communication. The participants identified the following areas of concern related to data coordination and communication within the GIS Community:

- Duplication of effort
- The need for collaboration
- The need to share resources
- The lack of coordination across jurisdictional boundaries (e.g., city, county, tribal, state, inter-state, Federal and international)
- The need for support for a statewide data coordinator and a metadata coordinator
- The lack of awareness of GIS, particularly within the tribal sector
- The need for better communication among stakeholder groups
- The identification of partnerships among public and private entities to better serve the GIS community
- The need to clearly define the use and distribution of MLI funds

#### *Technology*

In addition to providing educational programs regarding advancements in geospatial technology, participants noted that there are a variety of tools available to help to better find and share information. However, these tools are often underutilized. They also noted that there were some difficulties associated with communicating among various software types. Suggestions included

- Making greater use of web based services
- Using Geo-Communicator to share information
- Using of Geospatial One-Stop to obtain information
- Encouraging software interoperability

### *Data Management*

Shareholders identified a variety of issues associated with data collection, verification, distribution and maintenance. Issues identified include:

- Development of state data framework themes and layers with clearly defined responsibilities regarding their development and maintenance
- Common Protocols and Standards (national standards)
- Data Stewardship
- Data management geared to high priority issues – Indian assets, energy development, recreation
- Data management geared to business requirements
- Data distribution and sharing
- Easily understood data formats
- Data integrity and accuracy
- Integration of GIS with CAMA data
- The lack of GIS Applications and/or resources for implementation in certain fields (e.g. cultural resources management and tribal resources)
- Inconsistent address information
- Data complexity as a barrier to Enterprise System Development

### *Overall Management and Organization of Geospatial Information*

As GIS technology has advanced, there has been a shift in the way data is collected and shared. This new system can be characterized as “federated”, where a series of independent entities form a cohesive data sharing system. Their connectivity enables them to create a better source of information overall. In addition, participants noted that organizations were taking an integrated “enterprise” approach, looking at how computer based information systems can support the basic business processes, functions and organizational units of an entity. Issues related to these trends include:

- Lack of Expertise as a barrier to implementing an enterprise approach
- The critical role of data access vision in developing an effective enterprise approach

### *Tribal Issues Raised*

Tribal members were surveyed using Survey Monkey © and identified the following issues:

- There are a great number of people on Montana’s reservations who are very excited about and interested in GIS.
- Tribal representatives don’t know what’s going on in GIS on other reservations or in the state generally.
- We need an updated list with everyone involved with GIS including tribal leaders.
- While many are working on GIS, there is no coordinated effort.
- Staff turnover in tribal GIS offices is problematic.
- We must recognize the importance of each tribe’s hierarchy and associated respect for tribal leaders. Include these leaders in GIS policy discussions.

The results of the shareholder meetings were presented to MLIAC on June 27<sup>th</sup>, 2006. Council Members reviewed the key findings and identified additional issues and drafted preliminary vision statements. The results of the June 27<sup>th</sup> meeting are included in **Appendix C**.

## THE GOALS OF THE MONTANA GEOSPATIAL STRATEGIC PLAN

Geographic Information is critical to the business functions of both private and public entities. Imagine trying to design a school bus route, a real estate development or an emergency evacuation plan without the benefit of maps. As the people of Montana define the issues that are most critical to our state, they will rely on maps to help guide policy development. As we work to improve quality and accessibility of geographic products, we are helping the people of Montana and their elected officials to make informed decisions regarding key areas of concerns, including, but not limited to :

(suggestions)

- Education
- Climate Change
- Economic Development
- Affordable Housing
- Energy Development
- Transportation
- (others)

(CASE STUDIES HERE)

The following goals have been drafted to facilitate the ongoing development of high quality geographic products in support of the business functions and decision making associated with achieving a promising future for our state. The potential strategies may be incorporated into Montana's annual Land Information Plans required by the Montana Land Information Act.

### PRELIMINARY STRATEGIC PLANNING GOALS, OBJECTIVES AND STRATEGIES

**PUBLIC POLICY GOAL** – Incorporate GIS into Overall Public Policy Development and Decision Making

Objective #1 – Integrate geographic information into mainstream IT

***Potential Strategies:***

- Work with Montana's Chief Information Officer to develop a methodology for including GIS in overall IT management for state and local agencies.
- Work with the Montana CIO and state agency representatives to promote the integration of GIS and IT at the state agency level.
- Work with the Montana League of Cities and Towns and the Montana Association of Counties to promote the integration of GIS and IT at the local government level.

Objective #2 – Match geospatial information and data needs with public policy formulation (i.e., show how geographic products can inform public policy making)

***Potential Strategy:***

- Identify important policy issues at the regional, state, local and tribal levels (e.g., energy, housing, land use, economic development, transportation, public health and safety) and set

priorities for data collection and management based on policy formulation needs. (relate to Data Stewardship Goal)

**Objective # 3 – Increase support for GIS among decision makers and the public, emphasizing the role of GIS as a “tool” and not an end in itself**

***Potential Strategy:***

- Demonstrate the use of geographic products for planning, policy formulation and design in all sectors by:
  - Using geographic products in presentations to policy makers and the public on critical issues
  - Using geographic products in conjunction with public meetings and other outreach efforts
- Provide enthusiastic GIS technical support for local, state and regional entities and personnel that require geographic products such as planners, city managers, county commissioners and land management agencies

**Objective #4 – Obtain support for a sustainable GIS program**

***Potential Strategies:***

- Demonstrate the return on investment associated with the allocation of resources for GIS programs
- Acknowledge and demonstrate how return on investment is a critical part of a sustainable funding strategy.

**EDUCATION GOAL – Encourage the development of GIS education, outreach and training programs**

**Objective #1 – Foster programs at the elementary and high schools through community partnerships among geographic information professionals, post secondary institutions and local schools**

***Potential Strategies:***

- Identify community liaisons within the GIS Community to work with local elementary and high schools to:
  - Offer curriculum tools (e.g. the “geospatial trunk”) to teachers
  - Facilitate student participation in MAGIP Conferences
  - Identify speakers, field trips and internships in the community to augment classroom programs in GIS
- Continue and Expand Grant programs to elementary and high school teachers working in GIS

**Objective #2 – Promote the incorporation of GIS curriculums into colleges and universities**

***Potential Strategies:***

- Establish a state-wide GIS faculty committee to
  - evaluate current curriculums with respect to geospatial offerings
  - make recommendations for submittal to the appropriate institution and the Montana Board of Regents as appropriate

- identify resources for implementation of recommendations including funding, collaborations, distance learning, sponsorships and internships
- Continue and Expand Scholarship programs to college seniors and graduate students who use GIS as part of their studies.

**Objective #3 – Develop continuing educational programs that support professional development and growth**

***Potential Strategies:***

- Continue to offer conferences, technical workshops and other continuing education opportunities through MAGIP
- Encourage and support broader participation in regional and national GIS conferences and workshops
- Work with local universities, tribal colleges and colleges of technology to offer continuing education courses locally
- Explore a certification program for GIS professionals and make recommendations

**DATA STEWARDSHIP GOAL – Support standardized and sustainable methodologies to collect, maintain and disseminate land information**

**Objective #1 – Establish clearly defined roles responsibilities for the development, maintenance and dissemination of each of the state data framework themes and associated layers**

***Potential Strategies:***

- Implement the April 17<sup>th</sup>, 2006 Directive on MSDI Theme Stewardship prepared by the Montana Land Information Advisory Council (include this in the appendix of the Strategic Plan)
- Provide for ongoing support *to* and coordination *among* the various data stewards
- Review progress on a periodic basis
- Consult with the USGS regarding the development and maintenance of the MSDI with respect to the National Spatial Data Infrastructure and the National Geospatial Programs Office.

**Objective #2 – Establish common protocols, standards and formats for data collection and management and associated metadata**

***Potential Strategies:***

- Inventory the range of existing protocols, standards and formats currently in use by state and local government agencies.
- Review information gathered in comparison to national standards and guidelines
- Make recommendations for the MLIAC for implementation

**Objective #3 – Disseminate Information regarding standardization of protocols, standards and formats**

***Potential Strategies:***

- Convene a standards and protocols “summit” to discuss best practices and a schedule for implementation for standardization

- Publish an electronic newsletter informing the GIS community of standardization efforts
- Provide training through continuing education programs (conferences, technical sessions and distance learning) regarding standardization

Objective #4 – Reduce Redundancies in data collection management and promote sharing.

***Potential Strategies:***

- Create better pathways for data sharing between state and county agencies
- Encourage collaborative projects among local, state and federal agencies to collect and manage data jointly

**COORDINATION, COOPERATION AND ACCESS GOAL** – Foster Communication/ Collaboration/Cooperation Across Jurisdictional Boundaries among local, state, federal, tribal and private sector entities, increasing the accessibility of geographic products for all users

Objective #1 – Inform all user groups and the public of GIS services and applications

***Potential Strategies:***

- Present GIS topics at professional conferences and technical sessions (e.g. engineers, planners, surveyors, real estate professionals)
- Prepare press releases for posting on government agency and organizational websites and in other print media about advances in GIS technologies and sources of information and products

Objective #2 – Develop and promote web based services

***Potential Strategies:***

- Conduct an analysis of web based opportunities associated with the dissemination of geographic information
- More?

Objective #3 – Provide for clear and easy access to geospatial data for all users

***Potential Strategies:***

- Develop and maintain a “one-stop” portal for access to all geographic products available for public use
- Work with existing web based services such as Google Map and Geospatial One-Stop to link Montana initiated web based systems with national resources.

Objective #4 – Achieve clarity of meaning with respect to GIS terms and jargon

***Potential Strategies:***

- Convene a “summit” on GIS terminology to develop standardized definitions for commonly used terms
- Work to replace “jargon” with more universally understood words where appropriate

Objective #5 – Develop and promote a federated GIS model

***Potential Strategies:***

- Work with USGS to identify a workable model based on the national experience (e.g. the National Map)
- Participate in and contribute to the National Map
- Identify geographic products common to a variety of business functions (e.g. growth policies, transportation plans, disaster and emergency service plans)
- Develop standardized map templates for commonly mandated policy tools

Objective #6 Establish feedback loops (more to come)

Objective #7 – Identify and address barriers to inter-jurisdictional cooperation and communication

***Potential Strategies:***

- Evaluate the existing GIS enterprise with respect to its interoperability among local, state, tribal, and national users and make recommendations accordingly.
- Explore the applicability of various incentives to encourage inter-jurisdictional cooperation such as availability of standard products, shared expertise and services and funding for efforts that utilize partnerships among various entities.

Objective #8 – Work “smart” to avoid duplication of effort (relate to objective #4 under Data Stewardship Goal)

***Potential Strategies:***

- Maintain a central inventory of ongoing data collection activities
- Align with Objective # 2 under Public Policy Goal to set priorities for data collection and resources allocation

# **Montana Land Information Plan Fiscal Year 2008**



Produced by the Land Information Plan  
Subcommittee of the Montana Land Information  
Advisory Council in cooperation with the Montana  
Department of Administration

Pursuant to Section 4 (c) of the Montana Land  
Information Act (Senate Bill 98) and Administrative  
Rule IV of the Montana Land Information Act.

January 15, 2007  
(Draft Version: November 27, 2006)

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## **1. PURPOSE**

The purpose of the Montana Land Information Act (MLIA) is to develop a standardized, sustainable method to collect, maintain, and disseminate information in digital formats about the natural and artificial land characteristics of Montana. Land information changes continuously and is needed by businesses, citizens, governmental entities, and others in digital formats to be most effective and productive. MLIA will ensure that digital land information is collected consistently, maintained accurately in accordance with standards, and made available in common ways for all potential uses and users, both private and public. MLIA prioritizes consistent collection, accurate maintenance, and common availability of land information to provide needed, standardized, and uniform land information in digital formats.

## **2. ORGANIZATIONAL APPROACH AND IMPLEMENTATION**

The Montana Department of Administration, hereinto referred to as the "Department" as provided for in Montana Annotated Code 2-15-1001, prepares this annual plan to partially fulfill the requirements of MLIA. The Land Information Plan is an annual plan developed to describe the priority needs to collect, maintain, disseminate and steward land information. This includes the coordination, collection, maintenance, integration, or dissemination of Montana Spatial Data Infrastructure themes or other associated work. The Land Information Plan Subcommittee of the Montana Land Information Advisory Council (MLIAC) advises the Department in the development of the plan. The plan is submitted to MLIAC for review and endorsement, and finalized by the Department. The plan is intended to represent priority land information needs for Montana's citizens. Government and private sector entities or other stakeholder groups within Montana may implement portions of the Land Information Plan.

The MLIA also established a granting process. Grant criteria under this process are established by the MLIAC Grant Review Subcommittee and are based upon goals and objectives from the Land Information Plan. Entities applying for MLIA grants should implement strategies and initiatives that advance the goals identified within this plan. The Department provides state GIS coordination and general coordination and oversight of MLIA grants. Where appropriate, the products of the grants shall be in compliance with general State information technology (IT) and geospatial data standards and/or policies as defined by the Montana Information Technology Act (MITA) and the Federal Geographic Data Committee (FGDC).

At mid-year and at the end of the fiscal year for the granting period, the Department will report to the MLIAC the status of the plan's priority tasks and measures of success.

### 3. PROGRAM GOALS - STATE FISCAL YEARS 2007/2008

This first Land Information Plan spans state fiscal years 2007 and 2008. The Land Information Plan goals support the development of the Montana Spatial Data Infrastructure (MSDI) and are recommendations of the Montana Land Information Advisory Council, its Land Information Plan Subcommittee as well as other stakeholders within the Montana land information community. The goals of this plan are to:

- Support standardized and sustainable methodologies to collect, maintain, and disseminate land information,
- Improve and encourage partnerships and collaboration,
- Encourage and support appropriate integration of geographic information systems technology and geospatial data into business processes and public policy, and
- Foster professional development in land information systems, and assess workforce needs and opportunities.

The goals identified in this plan may be accomplished in various ways through the actions of various entities. For each goal, potential strategies are identified. These strategies may become action items of individuals or organizations charged with carrying out the strategy. The strategies outline in this document may be accomplished through various funding and resource opportunities and the scope of these strategies must not solely depend on MLIA funding.

#### **Goal 1 – Support standardized and sustainable methodologies to collect, maintain, and disseminate land information.**

*This goal targets one of the core elements of the Montana Land Information Act, which states “MLIA will ensure that digital land information is collected consistently, maintained accurately in accordance with standards, and made available in common ways for all potential uses and users, both private and public.”*

##### **Strategy 1.1 - Implement MSDI Theme Stewardship.**

*This strategy addresses the business of data stewardship. All stewardship efforts and users benefiting from stewardship need the same infrastructure: a communication structure, a website for outreach, and a location for the distribution of supporting documents and data. This strategy establishes priorities to ensure that the coordination and infrastructure required for accomplishing tasks common to stewardship are in place and helps to implement the MSDI Theme Stewardship document adopted by the MLIAC on July 1, 2007.*

##### **Priority Tasks and Measures of Success**

- a) The GIO, in conjunction with the Department, will provide oversight responsibility for the stewardship of all MSDI layers.
- b) The Department will establish and implement MSDI coordination and communication protocols, and communicate the protocols to MSDI stewardship agencies, leads, working groups, and the MLIAC.
- c) MLIAC will endorse theme stewardship agencies and leads for all MSDI themes.
- d) Theme Agencies and Theme Leads will execute their stewardship roles and responsibilities as described in the MLIAC Theme Stewardship document.
- e) The MLIAC Framework Subcommittee, the Department, and MSDI theme leads will collectively prioritize annual MSDI theme needs, prepare a budget to meet those needs, and forward their recommendations to the MLIAC Land Information Plan Subcommittee.
- f) The Department shall compile an annual MSDI plan describing the dollar value of geospatial assets, performance measures, coordination costs, and measure of geographic and attribute completeness that has been produced for each MSDI theme.
- g) The Department will complete the development of a process to identify and publish the authoritative source of geographic data products and apply that process to data produced through MSDI theme efforts.

### **Strategy 1.2 – Advance the collection and maintenance of MSDI themes**

*This strategy addresses the advancement of all MSDI themes. Themes are at different stages of development, and thus have differing needs. These generally fall into one of three categories: (1) themes that are just starting and need a plan and a prototype, (2) themes that have a plan and have started data acquisition, and (3) themes that are mature in content and development and need resources to maintain what they have.*

#### **Priority Tasks and Measures of Success**

MSDI Theme Stewards and Leads, in cooperation with MLIAC, the Department, and the land information community, will:

- a) **Cadastral:** Continue the maintenance and integration of tax parcel boundaries; continually adjust all cadastral framework data to the Geographic Coordinate Data Base (GDCB) reference layer as accuracy is enhanced. Implement a persistent identifier for parcels to support application development and historical tracking. Determine additional attributes of general interest, or other cadastral related features (water rights, trust lands, conservation easements etc.) and

- implement a process to collect and maintain those attributes or features across jurisdictions.
- b) Critical Infrastructure and Structures: Continue coordination and develop strategies for long term maintenance, continue data loading, populate incomplete data layers, request and obtain pertinent data themes from local providers according to priorities established by the working group, and support distribution of current content. Determine and work on a strategy to coordinate the critical infrastructure data model with the USGS "Best Practices" structures data model.
  - c) Geodetic Control: Geodetic Control supports accurate horizontal and vertical placement of all other layers, particularly Cadastral, by improving horizontal locations. The Geodetic Control team will work with other theme efforts to provide accurate and accepted control data for Montana. Goals include improving GCDB accuracy in priority areas, advancing the Height Modernization program in Montana, promoting public access to public control data including GCDB, promoting the use of standards for reporting control data, developing an on-line database for storing , querying and accessing control data, potentially promoting legislation to require that control generated with public funds be submitted to the public database and promoting training and education opportunities to foster and understanding of the value and use of control.
  - d) Geographic Names: Advance for consideration for inclusion in MSDI and stewardship, and develop a state framework and stewardship plan.
  - e) Geology: Continue to revise and add to the existing digital geologic framework for the state; complete a new geologic map of the entire state; complete 30' x 60' quadrangle maps to provide an integrated geologic framework; continue to respond to request for larger-scale, limited-area maps for land- and resource-use planning to address issues such as chronically short water supplies, slope instability, encroachment upon public lands and wildlife, siting of infrastructure facilities, and the general problems of home-site platting, road construction, waste disposal, burn-site management, and earthquake susceptibility; and continue to seek sources of funding to support both the geologic mapping in the field and the digital processing and production of these data into geologic maps available in the public domain.
  - f) Government Unit Boundaries: Assemble a working group to define this theme, prioritize boundary collection efforts, collect two boundary themes, and investigate the advantages and disadvantages of implementing a separate boundary data model versus incorporation of boundary themes into the cadastral data model.
  - g) Hydrography: Coordinate local efforts to improve hydrographic data. Implement a process for accepting changes to a commonly accepted high resolution Hydrography for Montana. Maintain and distribute the best available, most commonly accepted GIS data about Montana's

surface water. Implement a seamless method of submitting locally developed data for inclusion in a National Hydrography Dataset. Seek cooperative funding sources to maintain a .25 FTE position. Provide support to NHD users throughout Montana. Provide two trainings per year on using the high resolution NHD.

- h) Hydrologic Units: Complete the certification process and make the final product available to the public. Extract fourth-code sub-basins and fifth-code watersheds from the watershed boundary dataset and integrate with National Hydrography Dataset.
- i) Hypsography: Develop a state framework plan and define theme and derivative products, coordinate with local, state, federal governments and the private sector to advance elevation data holdings in Montana, manage the Elevation Spatial Data program in Montana, improve the accuracy of elevation data in Montana as opportunities present themselves, develop and maintain the infrastructure to support access to elevation data, coordinate state and USGS elevation requirements and submit those requirements to the USGS on an annual basis.
- j) Landcover: Develop a state framework plan beginning with a Needs Assessment, obtain funding to hire a full-time coordinator, continue regular meetings of the landcover working group with increased participation from more stakeholders (especially from the private sector), provide interpretive information for the Ecological Systems classification, coordinate with USGS and other interested parties to plan and develop land cover updates every five years, investigate and institute methods to integrate land cover with a land use legend and finer scale mapping like National Wetlands Inventory and USFWS riparian mapping, increase coordination with stakeholders, integrate data sets from other organizations to enhance the land cover/land use theme, establish a vegetation plot repository with active outreach to vegetation data collectors so that a centralized statewide database is available for spatially accurate ground truth data.
- k) Orthoimagery: Provide for storage, maintenance, access and distribution of existing orthoimagery products pertaining to Montana. Implement a statewide acquisition and maintenance cycle that is coordinated with federal image acquisition programs. Expand upon the archiving, distribution and maintenance of other types of geo-referenced imagery. Investigate the accessibility, accuracy, integration, and application of imagery data collected via emerging technologies.
- l) Transportation and Addressing: Complete the integration and validation of address range data with road segments, improve road geometry and topology, determine attributes of general interest in the application of the transportation theme and implement a process to collect and maintain those attributes across jurisdictions, add railroads, add trails, identify address maintainer(s) in local governments and state agencies, and initiate a process to create and sustain a statewide master address file with address points in cooperation with providers.

- m) Soils: Soil surveys are being completed and published by the NRCS on a continuing schedule. Under a recently enacted national initiative, all soil surveys in the U.S. will be completed by 2010 and will include national parks and wilderness areas. Soils data posted via the NRIS Clearinghouse will be kept updated and current on a monthly basis. Additional interpretive maps and query tools emphasizing use and management information are being developed and will be made available via the NRIS Clearinghouse.
- n) Wetlands: Develop and maintain an up-to-date wetland layer for Montana that complies with USFWS National Wetland Inventory standards to be used in planning, monitoring, and resource management by agencies, local governments, and the public; create a wetlands theme working group; continue current mapping from the 2005 NAIP CIR orthophotography; ensure funding for NAIP CIR orthophotography is institutionalized into state, federal, and tribal programs so that updates occur every five years; and devise a strategy for continued funding of the Montana Natural Heritage Wetland/Riparian Mapping Center.

### **Strategy 1.3 – Maintain and strengthen MSDI funding mechanisms.**

*This strategy addresses locating sustained funding other than MLIA grant funds for advancing MSDI.*

#### Priority Tasks and Measures of Success

- a) State Coordinator and Theme Leads, in cooperation with MLIAC, shall meet with Agency Directors and determine theme funding history, needs, responsibilities, and options.
- b) MLIAC will recommend funding priorities to local, state, and federal agencies and the Montana Congressional Delegation for possible incorporation into their funding plans.
- c) MLIAC, in cooperation with the Department, will leverage current MSDI and MLIA funding to obtain additional funding resources.

### **Goal 2 – Improve and encourage partnerships and collaboration.**

*This goal targets strengthening institutional relationships through outreach as an active rather than passive process. This goal recognizes that the success of the Montana Land Information Act relies heavily on the participation of all stakeholders.*

#### **Strategy 2.1 – Foster a widely accepted understanding of the current State operational environment, priorities, resources, and activities**

**about land information. Specific to this strategy is coordination and collaboration with and the support of tribal and local governments.**

*This strategy addresses the need to actively engage both tribal and local governments in achieving the goals of the Montana Land Information Act, and that Tribal and local governments have a shared interest in land information to which they contribute to and benefit from.*

**Priority Tasks and Measures of Success**

- a) The Department in cooperation with MLIAC will implement strategies to engage tribal and local governments to insure they become stakeholders in and help shape the adopted land information strategy.
- b) The Department in cooperation with MLIAC will support outreach events to inform local and tribal stakeholders of land information resources.
- c) The Department will produce a document explaining to all stakeholders the federated approach for land information under MSDI in Montana.

**Strategy 2.2 – Establish formal and structured lines of communication for Montana in regard to national and regional land information issues.**

*This strategy addresses the need to make certain that MLIAC has an active dialog with congressional representatives to ensure federal initiatives work to (financially) support MSDI/NSDI, that MLIAC is adequately represented at important national strategy meetings like the National States Geographic Information Council (NSGIC) and Western Governor's Council, and that MLIAC is an active voice in national and regional initiatives.*

**Priority Tasks and Measures of Success**

- a) MLIAC will establish a protocol for regularly communicating with Montana's Congressional Delegation regarding federal geographic information and policy initiatives that meet the purpose of MLIA.
- b) MLIAC will establish a protocol for regularly communicating with regional and national organizations regarding geographic information and policy initiatives that meet the purpose of MLIA.

**Goal 3 – Encourage and support the integration of geographic information systems (GIS) technology and geospatial data into business processes and public policy.**

*This goal targets strengthening the integration of land information with business operations and public policy development by highlighting the value of land*

*information and the role of geographic information systems and related technologies as a contributing factor.*

**Strategy 3.1 – Promote the benefits of geographic information systems and present business cases to government agencies, universities, private sector, and citizens.**

*This strategy addresses the to need engage both the technical and non-technical user community in developing a mutual understanding of the relevance of land information and related technologies.*

**Priority Tasks and Measures of Success**

- a) MLIAC and the Department will produce marketing materials highlighting the integration, use and benefit of spatial data in business processes.
- b) MLIAC will establish a working group to strengthen the relationship between the information technology community and the geographic information community and will encourage a strong GIS presence at the State IT conference,
- c) MLIAC will identify sectors where geospatial technology is underutilized and develop action plans to encourage the utilization of geospatial technology.

**Goal 4 – Foster professional development in land information systems, and assess workforce needs and opportunities.**

**Strategy 4.1 – Advance GIS professional development and education opportunities in Montana.**

*This strategy addresses the need to assess where the gaps are in skills, knowledge, and abilities, and works with the public and private sector on strategies to fill that gap. Montana may face a significant gap in both the acquisition and retention of the skills, knowledge, and abilities to collect, maintain, disseminate, and utilize digital land information.*

**Priority Tasks and Measures of Success**

- a) MLIAC will work with other entities and organizations to support improved educational and professional development opportunities.
- b) MLIAC will work to identify the skills, knowledge and abilities required to support present and near-term workforce demands.

#### **4. ANNUAL PROGRAM COST AND BUDGET**

The spreadsheet starting on page 12 represents a best ESTIMATE of costs associated with accomplishing the goals and objectives of the 2008 Land Information Plan. It is submitted with the following caveats.

1. The bulk of the costs associated with this plan are related to the stewardship, collection, maintenance and distribution of MSDI themes. These costs were developed at a Theme Steward Workshop November 16, 2006. The Department has not attempted to verify these estimates. The spreadsheet from that meeting is included in this document as Appendix B.
2. Theme Stewards were asked to submit estimates based on FULL funding - a best case scenario that assumed adequate funding was available to advance all themes.
3. Where existing funds are known to be available to cover the identified costs, the cells are shaded green. Where some existing funding was either identified, or assumed in the case of federal funds, the boxes are shaded blue. The extent of existing funding needs additional investigation.
4. Costs for some line items, for example 2.1a (engaging local and tribal governments) may increase depending on MLIA grant criteria and whether grant requests are submitted in those areas.
5. Department staff costs associated with supporting committed work requirements is calculated at \$70,000 per staff member annually.
6. Department costs for data warehousing have not been calculated.

**Fiscal Year 2008 Montana Land Information Plan**

<b>Montana Land Information Plan - 2008</b>							
<b>Estimated Budget per Task</b>							
<b>Task</b>	<b>Brief Description</b>	<b>Personnel</b>	<b>Software and Equipment</b>	<b>Consulting Contracting</b>	<b>Travel</b>	<b>Existing or Potential Funding Source</b>	<b>Notes</b>
1.1a	MSDI Oversight	49000	3000	0	2000	MLIA coordination	Department assists stewards; provides research, development, contract administration and data hosting services;
1.1b	MSDI protocols	14000	0	0	0	MLIA coordination	Could entail - standardized web templates, collaboration software (sharepoint), web update
1.1c	MLIAC stewardship endorsement	0	0	0		NA	Motion to endorse 12/14/06
1d	Theme Agencies and leads to execute roles and responsibilities	0	0			NA	Costs defined in Section 1.2
1.1e	MSDI Prioritization	7000				MLIA coordination	Work with MLIAC Framwork Subcommittee to prioritize needs, prepare budget(s)
1.1f	MSDI plan	7000				MLIA coordination	Develop MSDI plan including dollar value of assets, performanc measures, coordination costs - work with all MSDI stewards to accomplish this
1.1g	Authoritative Source	7000				MLIA coordination	Develop and test a process to define authoritative source and publish authoritative source(s) of MSDI theme products
1.2a	Cadastral	106000	8000	350000	6000	MLIA Grant BLM Grant	Grant application will be filed as per MSDI plan
1.2b	Critical Infrastructure	116000	4100	140000	12500	MLIA Grant Other Grants	Grant application will be filed as per MSDI plan
1.2c	Geodetic Control	0	25000	35000	0	BLM Grant	Personnel costs included in 1.1a
1.2d	Geology	116000	25000	25000	25000	MBMG	
1.2f	Boundaries	47000	7000	140000	4300	SBA Grant BLM Grant	Theme stewardship and data development covered under SBA Grant

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1.2g	Hydrography	30000	1500	0	5000	MLIA Grant USGS Grant	MSL has an existing grant with USGS that may be continued
1.2h	Hydrologic Units	0	0	0	0	NA	
1.2i	Hypsography/Elevation	12000	3000	0	2000	Federal Funding	
1.2j	Landcover/Landuse	143000	7250	7350	10600	MSDI Grant Other Grants	
1.2k	Orthoimagery	13500	43000	0	3000	MLIA Grant? - Existing Agency Budgets	Some coordination costs included in 1.1a Host imagery, develop partnerships, contract management if required <b>- DOES NOT INCLUDE ACQUISITION COSTS ESTIMATED AT APPROXIMATELY 3 MILLION DOLLARS FOR COLOR AND COLOR IR IF THE STATE IS FLOWN IN THE SUMMER OF 2008 - STATE SHARE OF 2005 ACQUISITION WAS ABOUT \$800,000</b>
2l	Transportation	135000	6000	40000	10000	MLIA Grant Other Grants	Grant Application as per MSDI Plan
1.2l	Addressing	0	3000	36000	5000	Unknown	Personnel costs included in 1.1a
1.2m	Soils					Federal Funding	
1.2n	Wetlands	70000	2000	300000	5000	MSDI Grant Other Grants	
1.3a	MSDI funding	7000	0	0	0	MLIA coordination	Meet with State Agency Directors to determine funding history, needs, responsibilities and new funding source options
1.3b	MLIAC recommends funding priorities to others	0	0	0	0	NA	
1.3c	Additional MSDI funding	14000	0	0	5000	MLIA coordination	Grant investigation and writing, marketing proposals
2.1a	Engage Tribal/Local Stakeholders	7000	0	0	3000	MLIA coordination	Work with Local and Tribal GIS policy makers and produce needs assessment

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2.1b	Support Outreach Events	14000	0	0	3000	MLIA coordination	MAGIP fall technical meeting, MAGIP Eastern Montana outreach; Work with educational community; support additional workshops
2.1c	Federated Approach Doc	3500	0	0	0	MLIA coordination	Research other federated approaches, produce document describing Montana's federated approach
2.2a	MLIAC communicates with congressional delegation	0	0	0	5000	MLIA coordination	
2.2b	MLIAC communicates with regional and national organizations	0	0	0	0	NA	
1a	Marketing Materials	7000		10000		MLIA coordination	Assumes that actual materials are developed through contract. Costs will vary based on number and content - If done in house this would take additional staff time
	SUB-TOTAL	925000	137850	1083350	106400	2252600	
	Less Available <b>KNOWN</b> Funding shaded green	169500	35000	575000	22300	801800	
	<b>TOTALS</b>	<b>755500</b>	<b>102850</b>	<b>508350</b>	<b>84100</b>		
	<b>TOTAL FUNDING NEEDED FROM MLIA AND OTHER SOURCES</b>	<b>1450800</b>					

## 5. APPENDICES

### Appendix A - Acronyms used in this Document

CIR - Color Infrared Imagery  
FGDC - Federal Geographic Data Committee  
GCDB - Geographic Coordinate Database  
GIS - Geographic Information Systems  
GIT - Geographic Information Technology  
IT - Information Technology  
MITA - Montana Information Technology Act  
MLIAC - The Montana Land Information Advisory Council  
MLIA - The Montana Land Information Act  
MSDI - Montana Spatial Data Infrastructure  
NAIP - National Aerial Imagery Program  
NHD - National Hydrography Dataset  
NSDI - National Spatial Data Infrastructure  
NSGIC - National States Geographic Information Council  
NWI - National Wetlands Inventory  
USGS - United States Geological Survey  
USFWS - United States Fish and Wildlife Service

## Appendix B - MSDI Theme Steward 2008 and 2009 Budget Estimates

THEME - YEAR 1		SOFTWARE/EQUIP	CONSULTING/	
	PERSONNEL	SUPPLIES	CONTRACTING	TRAVEL
Cadastral	\$106,000	\$8,000	\$350,000	\$6,000
Critical Infrastructure and Structures	\$116,000	\$4,100	\$140,000	\$12,500
Geodetic Control	\$0	\$25,000	\$35,000	\$0
Geographic Names				
Geology	\$166,000	\$25,000	\$25,000	\$25,000
Government Unit Boundaries	\$47,000	\$7,000	\$140,000	\$4,300
Hydrography	\$30,000	\$1,500	\$0	\$5,000
Hydrologic Units	\$0	\$0	\$0	\$0
Elevation/Hypsography	\$12,000	\$3,000	\$0	\$2,000
Landcover /Land Use	\$143,000	\$7,250	\$7,350	\$10,600
Orthoimagery	\$13,500	\$43,000	0	\$3,000
Transportation	\$135,500	\$6,000	\$40,000	\$10,000
Addressing	\$9,400	\$3,000	\$36,000	\$5,000
Soils				
Wetlands	\$70,000	\$2,000	\$300,000	\$5,000
Sub Totals	\$848,400	\$134,850	\$1,073,350	\$88,400
THEME - YEAR 2		SOFTWARE/EQUIP	CONSULTING/	
	PERSONNEL	SUPPLIES	CONTRACTING	TRAVEL
Cadastral	\$106,000	\$8,000	\$350,000	\$6,000
Critical Infrastructure and Structures	\$116,000	\$8,100	\$140,000	\$12,500
Geodetic Control	\$3,500	\$10,000	\$15,000	\$0
Geographic Names				
Geology	\$166,000	\$25,000	\$25,000	\$25,000
Government Unit Boundaries	\$52,500	\$7,000	\$85,000	\$4,300
Hydrography	\$30,000	\$1,500	\$0	\$5,000
Hydrologic Units				
Elevation/Hypsography	\$12,000	\$3,000	\$0	\$2,000
Landcover /Land Use	\$85,550	\$1,500	\$0	\$8,150
Orthoimagery	\$47,000	\$76,000	\$3,000,000	\$3,000
Transportation	\$135,500	\$6,000	\$0	\$10,000
Addressing	\$9,400	\$3,000	\$40,000	\$5,000
Soils				
Wetlands	\$70,000	\$2,000	\$300,000	\$5,000
Totals	\$833,450	\$151,100	\$3,955,000	\$85,950
GRAND TOTAL	\$1,681,850	\$285,950	\$5,028,350	\$174,350

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OVERALL TOTAL	\$7,170,500			
Finalize input				
Full funding available				
Some funding available				
A little funding available				