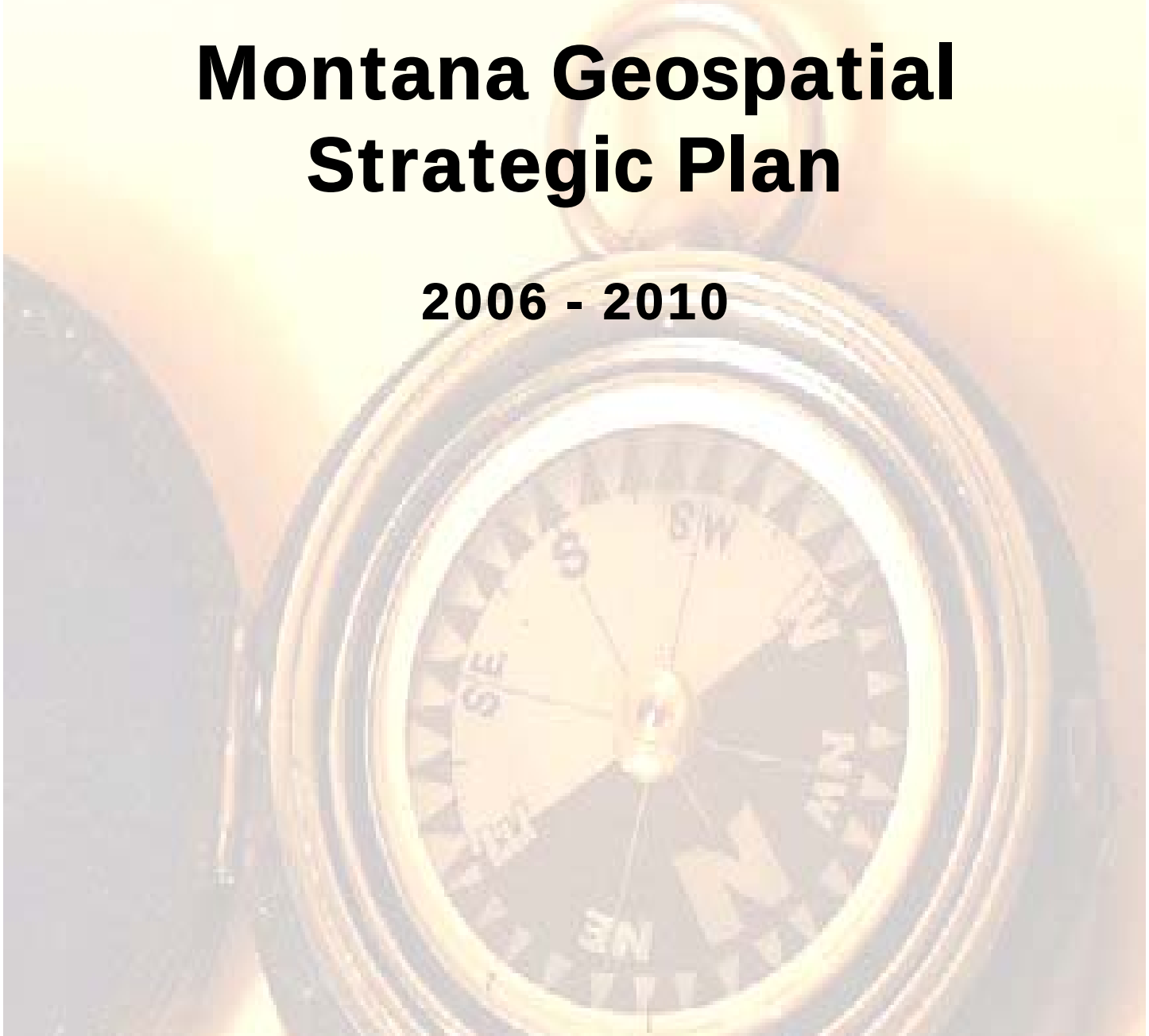
Montana Geospatial Strategic Plan

2006 - 2010



Created with Funding from the Federal Geographic Data Committee to the Montana Department of Administration, on behalf of the Montana Land Information Advisory Council

March 8, 2007

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." [1]

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. 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,

[1] NSGIC, February 28th, 2005

integrated federated system, made up of a variety of entities focused on providing service to users of geographic information.

GIS Applications ~ Case Studies

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:

- Public Policy Development and Implementation
- Natural Resources Management
- Land Valuation
- Transportation and Housing

Case studies, included as chapter dividers in this document, illustrate how geographic information has been used to improve the quality of information that is used to set public policy in the fields of forest management, housing, land valuation and education.

ACKNOWLEDGMENTS

The Montana Land Information Advisory Council (Members)
Stewart Kirkpatrick, Chief, GIS Services Bureau, Montana Department of Administration
Jim Hill, Director, Natural Resources Information System, Montana State Library
Dick Clark, Montana CIO
Lance Clampitt, USGS
Catherine Maynard, NRCS
Alex Philp, GCS Services
Ken Wall, Geodata Services
Bryant Ralston, ESRI
Michael Sweet, University of Montana

Janet Cornish, Community Development Services of Montana, Planning Consultant

TABLE OF CONTENTS

Case Study #1 ~ GIS & Public Policy – Montana Legislature

One of the primary goals of those who work for lawmakers is to provide them with information with which they can make policy decisions. The Legislative Services Division and the Legislative Audit Division use GIS in a number of ways to accomplish this goal.

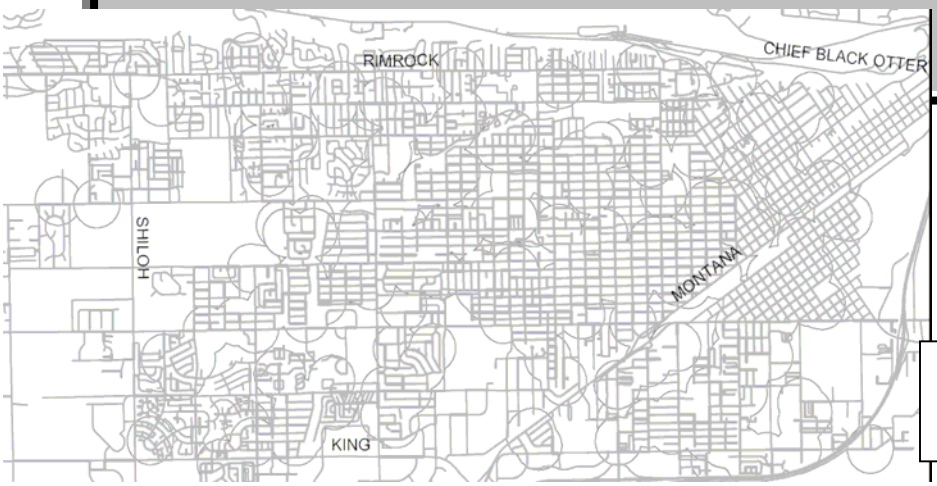
The Legislative Services Division has used GIS to provide analytical context for a wide range of public policy issues. The advanced analytical capability of GIS helps both staff and legislators understand and explain issues more fully.

Floodplain Mapping

Residential and other development within the floodplains of Montana's streams and rivers is a controversial issue in the state. Using cadastral data and federal floodplain maps, an analysis showed the number and value of homes already located within floodplains. The GIS analysis formed the basis of an article that outlined policy issues related to development in floodplains, including the environmental and financial consequences.

Sex Offender Locations

Many states now have laws restricting where convicted sex offenders may live once they are released from prison. The location of sex offenders and licensed daycares was geocoded using state transportation network data. A file of schools in the state was also used. The analysis showed areas where sex offenders would be banned from living if buffer zones in other states were adopted in Montana. The analysis formed the basis of an article that explored the policy decisions surrounding what to do with convicted sex offenders once they are released from prison.

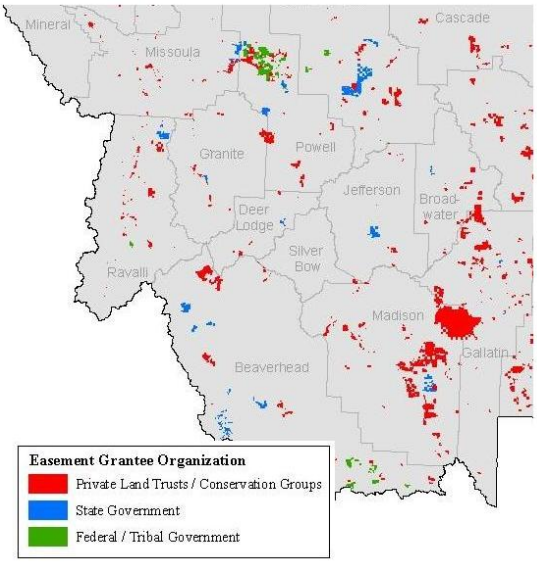


Effect Buffered Exclusion Zones Would Have in Billings, Montana

The Legislative Audit Division has employed GIS in a variety of different situations during the course of performance audit projects. Performance audits are designed to assess whether state agencies or programs are meeting their objectives and whether they can do so with greater efficiency or effectiveness.

Conservation Easements

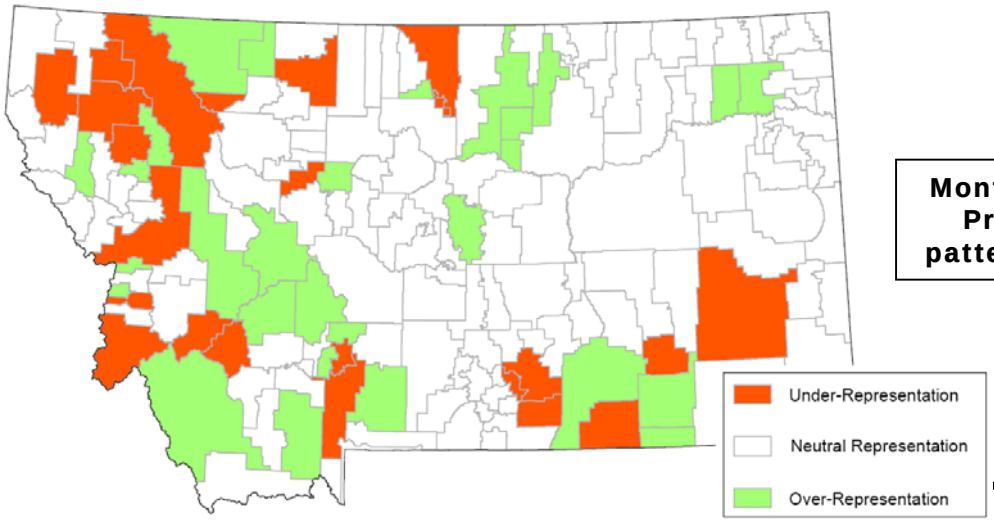
GIS was used extensively during an audit of conservation easements. Use of GIS helped provide important analytical insights into this issue. GIS use also allowed auditors to identify and physically locate lands subject to conservation easements. The audit report provided legislators with information on the location, extent and characteristics of conservation easements in Montana.



Conservation Easements in Southwest Montana

At-Risk Youth Programs

During a performance audit of the Montana Youth Challenge Program, GIS was used to analyze recruitment to the program from the state's population of at-risk youth. GIS analysis identified school districts where the program was either under or over-recruiting based on the number of high-school dropouts. This analysis helped program staff understand where recruitment efforts could be strengthened to better represent the target population from the state's Indian reservations and urban areas.



Montana Youth Challenge Program recruitment patterns by school district

CHAPTER 1. 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 1st, 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 are designed to... efficiently collect, maintain, and disseminate all forms of geographically referenced information."[2] 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

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

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.

- 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.3

- 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

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

[3] Mike Sweet, *GIS Coordination in Montana,* a Power Point Presentation, 2004

- 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 the in 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

Case Study #2 ~ GIS and Wildland Fire

Montana Wildland Fire Base Map Project, by the National Center for Landscape Fire Analysis, University of Montana, College of Forestry and Conservation

The purpose of the Montana Wildland Fire Base Map project is to prototype the development of a base map data model, standardized map products, and distribution method to provide timely and accurate base data to wildland fire incidents. The NCLFA has developed a cartographic data model that encompasses the data mining, data generalization and representation, graphic refinement, and map compilation processes for the creation of a standardized base map. The implementation of this data model allows the GIS specialist to establish an accurate base map that is recognizable among multiple disciplines, quickly and efficiently; leaving them more time to focus on the creation, display, and analysis of incident and other value-added data. The sources for this base data include Montana and national framework datasets; thus, the data provided is the most accurate and up-to-date data available. The Montana Wildland Fire Base Map will be served to the wildland fire community through the use of an interactive web-based map viewer.

Base Map Data Include (See Following Pages.)

Montana Framework Datasets:

- Transportation—Highways, Ramps, Primary, Secondary and Forest Roads
- Administrative—Cities, County Boundaries, Montana Boundary
- Stewardship—Jurisdictional Boundaries, Special Management Areas, Wilderness
- Reference—Quad Index, PLSS

National Framework Datasets:

- Hydrography—Point Sources, Flowlines, Water Bodies
- Hypsography—Contour Lines, DEM, Hillshade

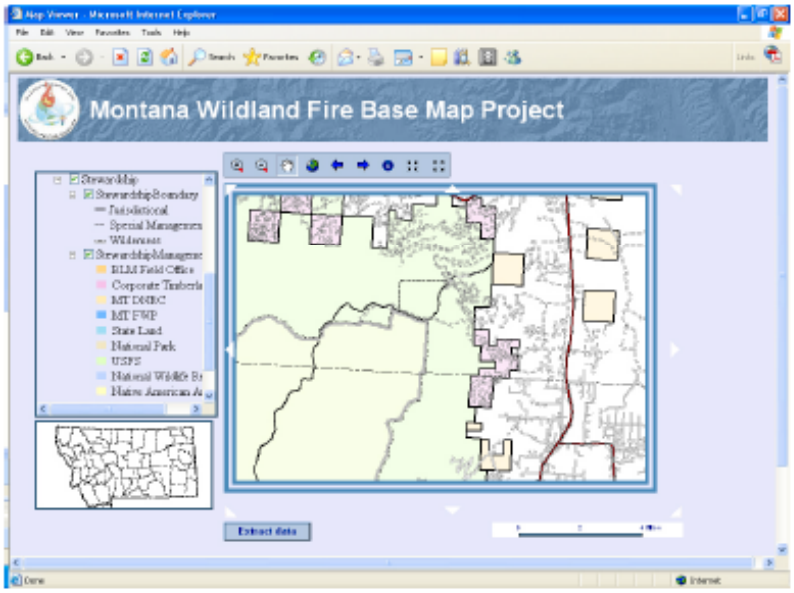
Montana Wildland Fire Base Map

Project Overview

The purpose of the Montana Wildland Fire Base Map project is to prototype the development of a base map data model, standardized map products, and distribution method to provide timely and accurate base data to wildland fire incidents. By focusing on the data infrastructure we will demonstrate how a standardized data model can easily adapt to changing needs and improved data sources while simultaneously improving accountability, reliability and consistency.

The typical wildland fire scenario involves the GIS specialist spending large amounts of time on data acquisition and re-formatting maps. The NCLFA has developed a cartographic data model that encompasses the data mining, data generalization and representation, graphic refinement, and map compilation processes for the creation of a standard base map. The implementation of this data model allows the GIS specialist to establish an accurate base map, that is recognizable among multiple disciplines, quickly and efficiently; leaving them more time to focus on the creation, display, and analysis of incident and other value-added data.

The information products of this project include standardized map products, data in the personal geodatabase format, and a set of layer files. The map products will encompass standardized map templates for the most commonly required wildland fire maps (ex, briefing, IAP, progression, and transportation maps). The personal geodatabase will include the feature classes, annotation, behavior, and rasters of the base map data model for the given extent. The layer files will reference this personal geodatabase and provide the GIS specialist with the data already generalized, symbolized, and labeled to replicate a standard topographic base map. The sources for this base data include Montana and national framework datasets; thus, the data provided is the most accurate and up-to-date data available.



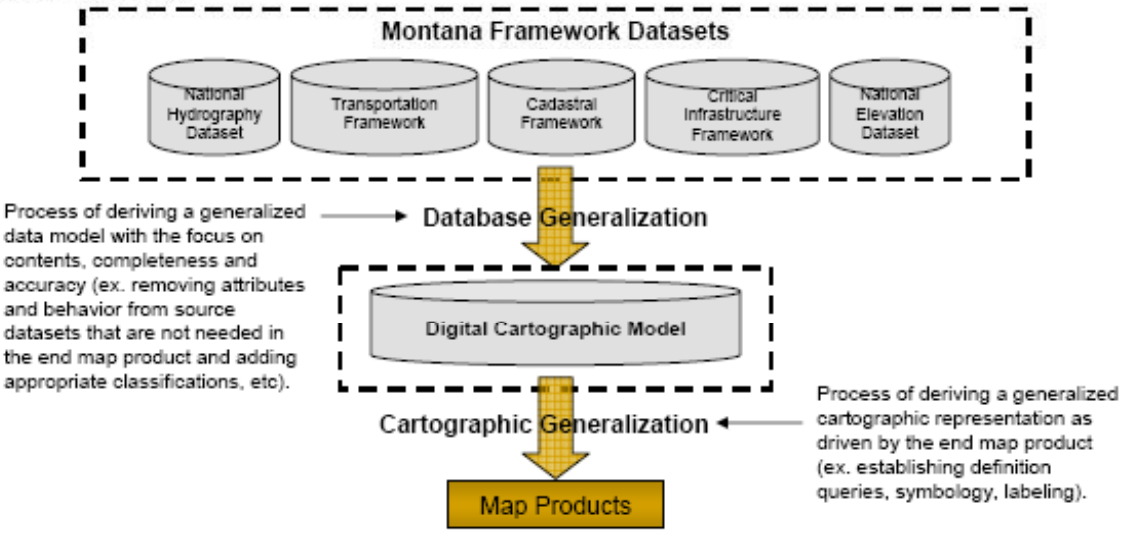
The Montana Wildland Fire Base Map will be served to the public through the use of an interactive web-based map viewer. This map will allow the user to visually identify their area of interest and extract the data and map products for the given extent with the click of a button.

National Center for Landscape Fire Analysis
University of Montana, College of Forestry and Conservation

Lee Macholz, Project Leader
macholz@ntsg.umt.edu

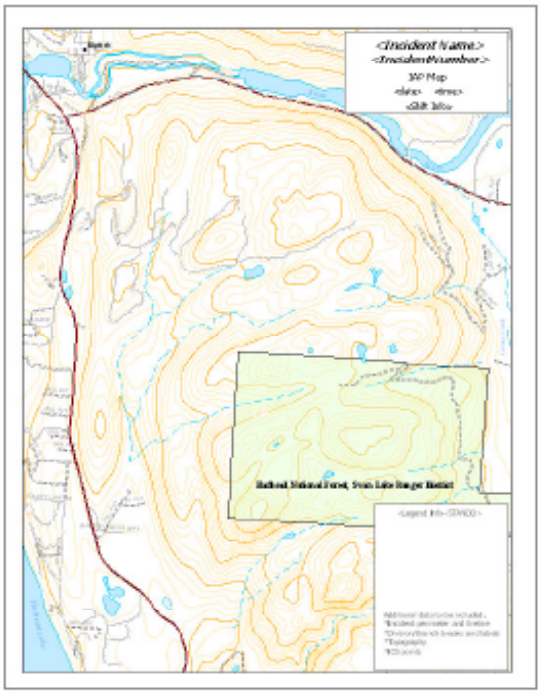
Montana Wildland Fire Base Map

Project Process



Base Map Data Include

- Transportation
  - Highways, Ramps, Primary, Secondary, and Forest Roads
- Administrative
  - Cities
  - County Boundaries
  - Montana Boundary
- Stewardship
  - Jurisdictional Boundaries
  - Special Management Areas
  - Wilderness
- Hydrography
  - Point Sources
  - Flowlines
  - Water Bodies
- Hypsography
  - Contour Lines
  - DEM
  - Hillshade
- Reference
  - Quad Index
  - PLSS



National Center for Landscape Fire Analysis
University of Montana, College of Forestry and Conservation

Lee Macholz, Project Leader
macholz@ntsg.umt.edu

CHAPTER 2. THE STRATEGIC PLANNING PROCESS

Existing Conditions Review

The first step in preparing this strategic plan was to inventory existing conditions 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.

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. In particular, 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. Shareholders identified the following issues:

- 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. The following are issues related to the lack of adequate financial resources in support of geospatial programs:

- 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

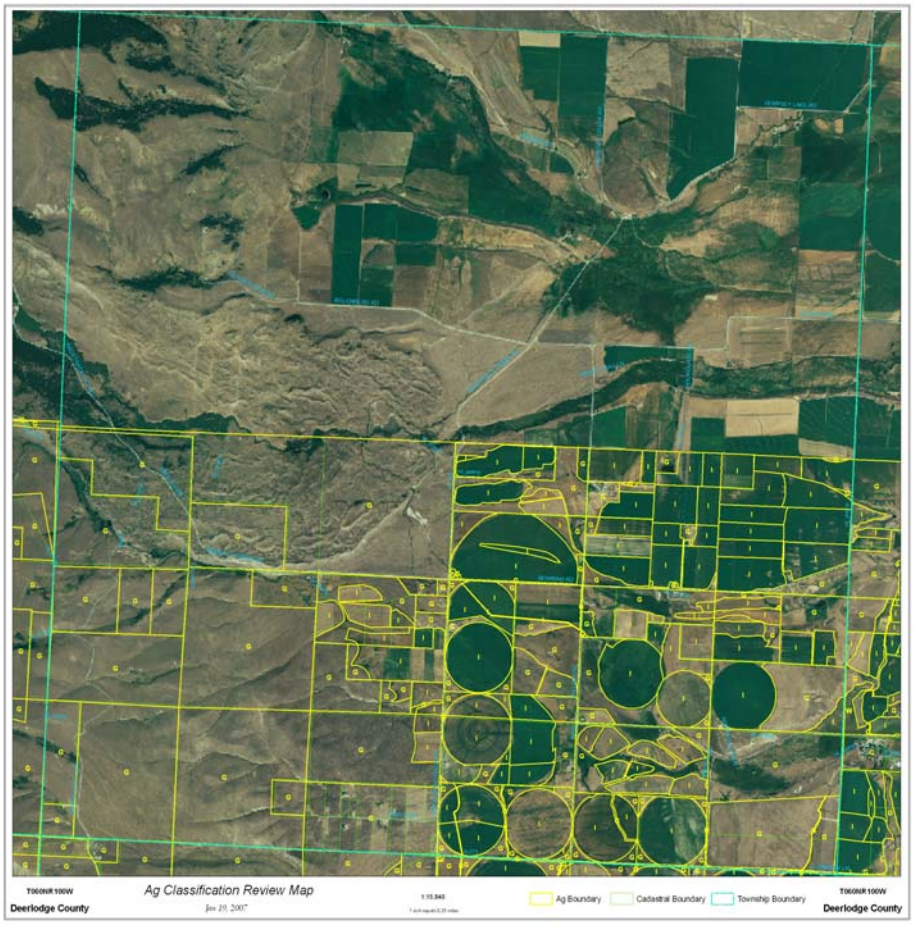
- Tribal members were surveyed using Survey Monkey © and identified the following issues:
- There are a great number of people on Montana's reservations who are very excited about and interested in GIS.
- Tribal representatives don't know what's going on in GIS on other reservations or in the state generally.
- We need an updated list of those 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 27th, 2006. Council Members reviewed the key findings and identified additional issues and drafted preliminary vision statements. The results of the June 27th meeting are included in **Appendix C.**

Case Study #3 ~ GIS and Land Valuation

Maps and spatial data are essential in land assessment and valuation processes. Appraisers use maps to ensure all taxable properties are correctly identified and that all associated appraisal information with the property is correctly recorded.

The **Montana Department of Revenue** is using GIS data from a number of different GIS data custodians to value agriculture and timber land. The GIS data is being standardize and analyzed by the department to determine how an agriculture operation should be valued. Cadastral delineation, ag/timber operation boundaries, imagery, soil type and productivity are all reviewed in the process.



CHAPTER 3. THE GOALS OF THE MONTANA GEOSPATIAL STRATEGIC PLAN

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 17th, 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 Strategy:

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

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

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)

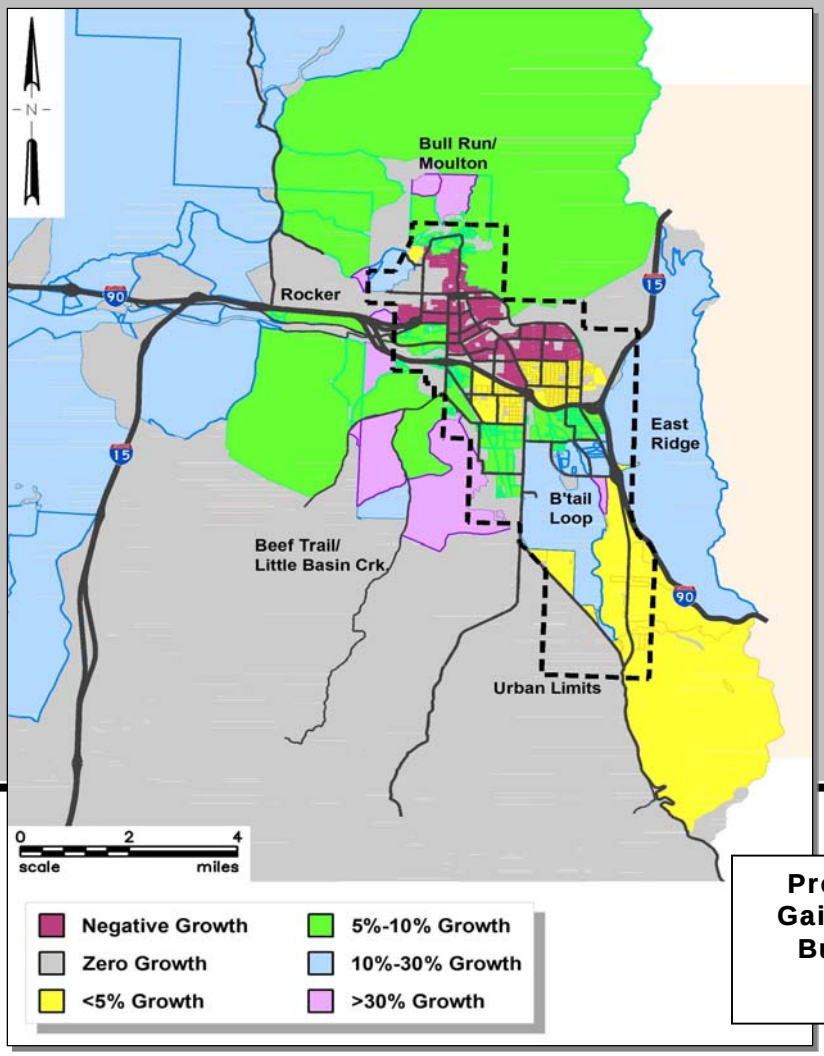
Potential Strategies:

- 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

Case Study #4 ~ GIS and Community Planning

Land use planning and community development activities rely on the availability of maps. Plans for housing, economic development, transportation, infrastructure development and land use rely on the ability to produce informative maps. Maps are a critical component in the development of community policy and are essential to providing opportunities for thoughtful public input.

In **Butte, Montana** maps were used in conjunction with a recently completed transportation plan for the community. The ability to visually display socio-economic and housing data was particularly important in developing recommendations for the development of transportation infrastructure.



Projected Housing Gains and Losses in Butte-Silver Bow County