

Business Plan to Improve Geospatial Data Governance



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Empowering People with Spatial Solutions

Applied Geographics, a division of The Sanborn Map Company, Inc.
33 Broad Street, Floor 4 | Boston, MA 02109
T. 617-447-2400 | info@appgeo.com
The Sanborn Map Company, Inc. | www.sanborn.com
Applied Geographics | www.appgeo.com

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1 Executive Summary

The Montana State Library (MSL) completed a *GIS Coordination Strategic Plan* in 2022. That plan included a goal for MSL to “Develop policies and best practices for geospatial data.” This *Business Plan to Improve Geospatial Governance* describes how principles, policies, standards, and best practices work together as connected parts of state geospatial data governance.

This plan describes what data governance should mean in the context of statewide geospatial coordination, the authority and responsibilities of MSL, other state data authorities, MSL’s partners, and the statewide geospatial community (Section 2 Program Goal). That understanding then helps to establish the scope and boundaries of MSL geospatial data governance (Objective 1) and develops a structure and process for data governance actions (Objective 2). The plan provides examples of data governance principles and policies from other states for background and ideas (Objective 3), offers a template work plan to implement statewide data governance (Objective 4), and describes the time and financial resources which might be required. Objectives 1, 2, and 3 have been largely completed as a result of plan creation.

Data governance is a framework in which rules for managing data are created and adopted. Data governance establishes responsibilities for data and policy around data assets. The Montana Geospatial Information Act assigns MSL the authority and responsibility of governance and management duties regarding geospatial data within Montana. MSL has several partners with related authority and responsibilities, most notably the Chief Information Officer, Chief Data Officer, and the Montana Geospatial Information Advisory Council (MGIAC). MSL also works with a robust community of stakeholders including local, regional, state, federal and tribal government agencies, the private sector, academia, and the Montana Association of Geographic Information Professionals (MAGIP). This plan offers a workflow model for working cooperatively with this complex geospatial environment using the development and maintenance of data standards as a practical example that can be modified to suit other governance purposes and changing specifics.

Geospatial data governance is a subject that is common to all states with centralized coordination. MSL is, therefore, in a good position to benefit from a variety of model policies, standards, and best practices from across the country. These include examples of setting policy, publishing data, creating data standards, and the use of state councils to support data governance. In turn, the provided examples can be used by MSL to create a prioritized list of governance needs (a continuum that consists of principles, policies, standards, and best practices) that are specific to Montana. A template table has been provided for this exercise.

While data governance is a subject that will require the ongoing attention of MSL, much can be accomplished in a relatively short amount of time. Using the workflow model as a guide, and

anticipating a normal cadence of meetings, review periods, and decision making, a new standard, policy, or best practice can move from idea creation to implementation in just over 3 years. Three years may seem quite a long time, but when one considers that there are several cycles of drafting, reviewing, and revision – and that one must allow time for involving stakeholders and peers in review – the time it *might* require is understandable. An urgent governance need, whether a standard, policy, or best practice, might be formulated and approved more quickly if it involves fewer parties in drafting and review or goes through less intensive review cycles.

For most governance needs, human and financial resources should not hinder implementation. In fact, the only identified direct cost is related to travel that might be necessary to convey ideas or gain consensus. No additional staff will be required for governance, although some usual activities may need to be rescheduled to make time for governance activities.

2 Program Goal

In 2022, the Montana State Library (“MSL” or “Library”) created the *GIS Coordination Strategic Plan*. Goal 3 of the strategic plan is titled “Develop policies and best practices for geospatial data”. The goal is described as:

The Library should lead the development of state government policies for geospatial data as part of its statewide GIS coordination mandate (90-1-404). Data governance policies will provide a structure in which state government enterprise geospatial data is managed and shared. The Library can also help form professional working groups that develop best practices and standards for all creators, maintainers, and users of framework geospatial datasets, including those outside of state government. By involving the geospatial community, the Library will help coordinate the creation of policies and practices that are useful, practical, and have community buy-in.

Four recommendations were made toward achieving this goal:

1. Lead the creation of formal data governance policies for state geospatial data.
2. Publicize GIS best practices and educate the geospatial community on them.
3. Coalesce policy and practice-specific working groups with partners and peers.
4. Promote policies that foster the use of authoritative datasets to ensure efficiencies and cost savings.

The goal and recommendations comprise data governance and data management. Data governance is a framework in which rules for managing data are created and adopted. Data governance establishes responsibilities for data and policy around data assets. Data management puts rules and policies into effect. Data management involves operational processes for making data useable, such as data collection, storage, and quality assurance and control. Governance is typically a strategic function led by

business stakeholders, while data management is operational and led by information technology and technical participants responsible for day-to-day implementation. Under the Montana Geospatial Information Act (HB343, 2023), (“the Act”) the Library has responsibilities for both data governance and data management.

Many terms that are part of governance and management can be confused with each other. For the sake of clarity, those of concern in this business plan are:

- Principles – overarching ideas and tenets that may be the source of laws and policies.
- Policies – general statements that make principles effective.
- Standards – specific requirements that support policies by enforcing consistency in content, format, or procedures.
- Best practices – recommended content, format, or procedures that are less formal than standards but still consistent with policies, regulations, and overarching principles and laws.

Data and collections of data, i.e., datasets, are *what* is being governed or managed. Processes and procedures are *how* data and datasets are (or will be) managed. Principles, policies, standards, and best practices can apply to both the “how” and the “what” of data resources.

Figure 1 illustrates that there is a continuum from principles to best practices in both process/procedure and datasets/data. Hypothetical examples of governance and management statements are given along different parts of the continuum. For example, a state government may have a *principle* stating that all authoritative datasets are available to the public barring legal or confidentiality issues. Several governance *policies* may follow from this principle, e.g., a policy that all authoritative data shall be listed in a central catalog. Principles and policies that then apply to datasets and data could include statements that ensure wide availability of datasets and ease of discoverability. These could be *standards* or *best practices*.

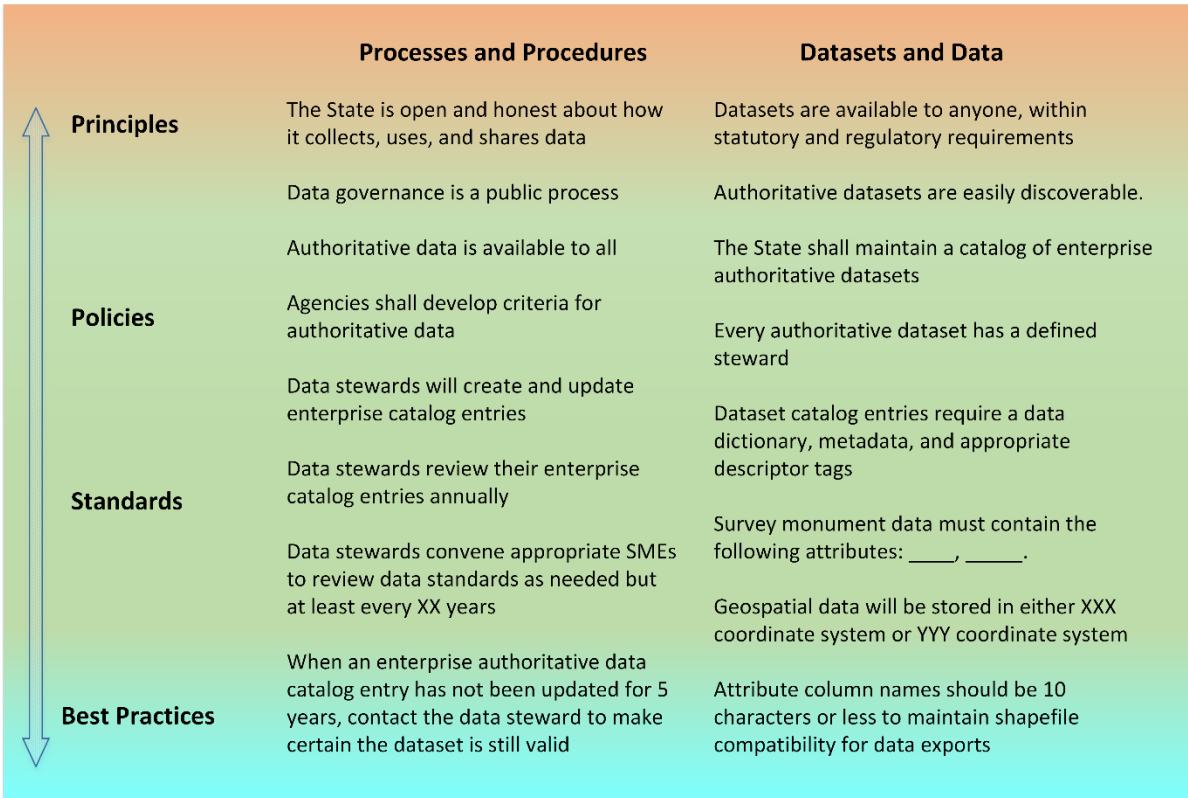


Figure 1. The continuum of data governance and data management from principles to best practices with hypothetical examples in processes and procedures as well as datasets and data.

This business plan establishes four objectives that achieve the recommendations made in the 2022 strategic plan. The plan describes actions that continue the Library’s current leadership in data governance and management, describing how the Library and the Montana geospatial community more generally will benefit from a more formal, open, governance process. Data management, too, benefits from a more formal approach to the development of standards and best practices.

A data governance framework is complicated, spanning from principles all the way to best practices. One way to reduce this complexity is to focus on policies, standards, and best practices aimed at achieving specific ends.

Under the Act, the Library has a central role in making useful geospatial information available to all. I.e., sharing data. *Sharing useful data* is an excellent focal point for developing an overall governance framework and devising specific standards and best practices. Creating, maintaining, and making useful data available to all stakeholders necessarily involves many data governance and management issues such as defining the concept of “useful data” itself, providing for discoverability and access, determining stewardship and maintenance roles, creating standards, and best practices, and selecting techniques to

measure data use. This business plan focuses on governance that enhances data-sharing as a program goal; it is also a model for additional data governance and management efforts.

2.1 Objectives

Four objectives are steppingstones to achieving the program goal (Table 1). Each objective is discussed in more detail, including how the objective will be achieved, in the second part of this section.

Table 1. Business plan objectives

Program Goal	Improve Geospatial Data Governance
Objective 1	Define the scope and boundaries of MSL geospatial data governance
Objective 2	Develop a structure and process for data governance actions.
Objective 3	Develop examples of data governance principles and policies from other states for background and ideas.
Objective 4	Adopt a work plan to establish data governance principles and put policies in place that implement them.

2.2 Achieving Objectives

Objective 1. Define the scope and boundaries of MSL geospatial data governance

Geospatial data governance could cover a wide range of actions within Montana state government and, to the extent they subscribe to governance ideas used at the state level, the GIS community as a whole. This objective sets some limits on MSL’s geospatial data governance. The objective is largely achieved through the following narrative in which the statutory and practical scope and boundaries of MSL geospatial data governance are proposed.

Under the Montana Geospatial Information Act (<https://leg.mt.gov/bills/2023/billpdf/HB0343.pdf>), the Montana State Library is charged with coordinating geospatial data and technologies within state government and, in doing so, also facilitating such coordination throughout Montana governments. The

Act states this plainly, and the amendment broadens the scope of the Act to include any geospatial information not just that information that can be related to land itself:

Section 4. Section 90-1-402, MCA, is amended to read:

"90-1-402. Purpose. 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. Geospatial 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 geospatial 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. Through planning and grant making, this part prioritizes consistent collection, accurate maintenance, and common availability of geospatial information to provide needed, standardized, and uniform geospatial information in digital formats." (90-1-402)

The Act goes on to state that that Montana State Library shall:

...work with all stakeholders, including but not limited to federal, state, local, private, and tribal entities, to prioritize needs and collect, develop, maintain, and disseminate geographic information systems, geospatial information, and geospatial technologies; (90-1-404(b))

Furthermore, in doing so, the Library shall:

(h) coordinate the development of standards for geographic information systems, geospatial information, and geospatial technologies;

(i) serve as the primary point of contact for national, regional, state, and other GIS coordinating groups for the purpose of channeling issues and projects to the appropriate individual, organization, agency, or other entity; (90-1-404(h) and (i))

As the Act makes clear, the Library is charged with both governance and management duties regarding geospatial data within Montana – a very broad mandate. The Act also involves the Library in determining priorities for geospatial information. All actions by the Library are performed in collaboration with the Montana Geographic Information Advisory Committee, which formally represents Montana government and other sectors, and stakeholders in general.

MSL has the mandate to create geospatial data governance policy and standards within State government and, as the Act notes, can also coordinate and serve as a resource for other governments. Geospatial policy within State government must be concordant with overarching data governance initiatives and activities conducted by the State's Chief Information Officer or the Chief Data Officer. Similarly, specific agencies and bureaus may also have policies, standards, and practices concerning

geospatial data that come to light and become more general governance and management practices through coordination performed by the Library. Rather than always creating data governance policy, MSL can adopt and broaden effective existing policies.

The Library assists and works in many ways, formal and informal, with all of Montana’s geospatial community. MGIAC ratifies formal policy and standards for geospatial information. The composition of MGIAC includes representatives from public and private stakeholder organizations including the Montana Association of Geospatial Information Professionals (MAGIP), the state’s geospatial professional organization. Through its own extensive network and through MGIAC, the Library has numerous avenues for collaboration and coordination in building a governance framework that promotes data sharing. The Library can work with stakeholders in many ways, such as:

- State government inter-agency coordination;
- Stakeholder outreach in general;
- Working with MAGIP;
- Collaboration and coordination with other governments in building and maintaining datasets and GIS capacity in a variety of ways including grants; and
- Through MSL’s close working relationship with MGIAC as the formal body that represents geospatial stakeholders.

Within state government, Library leadership in geospatial data governance formation fits with the overall data governance strategy and efforts of the State’s Chief Data Officer. The Library can continue working to break down data governance silos in accordance with statewide data governance. This work can include eliminating inconsistent geospatial data governance policies through drafting consistent, publicized data governance principles and policies for all authoritative, shareable, geospatial data. Standards and best practices become tools that support long-term, consistent, governance and sharing of public data.

The Library’s statutory role in data governance is mostly limited to State geospatial data. For instance, county governments are not bound by state policies, standards, and best practices. However, the Library leads through coordination, education, and leadership, so policies, standards, and best practices can be a collaborative effort joined in by all, to everyone’s benefit.

Now that MSL’s authority has been defined, a general, simplified, outline can be used to illustrate the scope of the Library’s geospatial data governance activities:

1. Determine the initial focus and goals of Library geospatial data governance.
 - a. High-level policy for State enterprise geospatial data
 - b. Standards and Best Practices
2. Define who these types of governance apply to

- a. High level policy for State enterprise geospatial data
 - i. State agencies
 - b. Standards and Best Practices
 - i. State agencies
 - ii. Segments of the geospatial community
 - iii. Entire geospatial community
3. Coordinate with entities that share data governance responsibilities to define the scope and boundaries.
- a. Chief Information Officer (CIO)
 - i. Verify that CIO understands MSL geospatial data governance role.
 - b. Chief Data Officer (CDO)
 - i. Assess existing CDO policies/practices/tools.
 - ii. If necessary, define boundaries between CDO and MSL responsibilities.
 - iii. Identify CDO involvement.
 - c. Montana Geospatial Information Advisory Committee (MGIAC)
 - i. Educate MGIAC on geospatial data governance needs.
 - ii. Seek MGIAC approval for specific governance proposals.
 - d. Geospatial stakeholder community
 - i. Partner with Montana Association of Geographic Information Professionals (MAGIP) to educate about data governance.
 - ii. Work with MAGIP on specific governance proposals as a conduit to stakeholder community.
 - iii. Work with specific stakeholder communities that have their own authority (tribal governments, counties, municipalities) so that, if possible, data governance is consistent at multiple levels of government.
 - iv. Collaborate and coordinate with other (non-GIS) stakeholders and organizations (e.g., Montana Association of Counties, Montana League of Cities and Towns, other non-governmental organizations, other professional and professional groups), educating and involving them in data governance when and where appropriate.

A practical starting point for defining the scope of Library data governance is to focus on a general, desirable outcome. Based on the principle (expressed in the Act) that geospatial information should be widely available and the policy (implicit in the Act) that one duty of the Library is to make geospatial information widely available, creating data governance policies that enhance *data sharing* is a good initial starting point for developing data governance as a whole.

Objective 2. Develop a structure and process for data governance actions

Three things are needed to develop a structure and process for data governance actions. First, the roles and relationships involved in data governance need to be considered. The second need is to incorporate these roles and relationships into a model workflow for developing data governance policies, standards, and best practices. Sound management suggests a third need: reviewing and revising the work process so that it, too, can evolve with data governance.

Roles and Relationships

The structure of geospatial data governance in Montana, as in other states, involves multiple organizations with authority and responsibilities that sometimes overlap and sometimes are independent of one another, depending on the subject matter and the context. For example, the Chief Data Officer and the Chief Information Officer each have authority and responsibilities related to general data policies, data security, technical infrastructure, etc., that impact the operation of the MSL. Those responsibilities and authorities, while not specifically tied to geospatial data, will nonetheless require consideration as MSL conducts its statutorily defined responsibilities which include the coordination of geospatial policy, standards, best practices, and associated actions.

Additionally, MSL routinely coordinates and collaborates with many stakeholders across the state. For example, MGIAC, along with its subcommittees and workgroups, serves in an advisory capacity to MSL while MAGIP, through its membership, can contribute to statewide geospatial governance by providing a vital communication link between MSL and the statewide geospatial community. Other geospatial community stakeholders include city and county governments as well as tribal nations.

MSL has existing relationships with the diverse and robust group of individuals and organizations that share an interest in geospatial issues. Ultimately, all these individuals and organizations and others, with MSL as the coordination focal point, can contribute to Montana's geospatial data governance.

Data Governance Workflow

The complex structure of authorities, responsibilities, and interests, any of which are subject to change over time, requires a process for geospatial data governance. Figure 2 is a diagram showing a workflow for creating a standard, policy or best practice. The workflow uses a “standard” as an example. A standard could be either external or internal in origin but once proposed, MGIAC (with MSL assistance) decides on a course of action. The workflow is designed to be inclusive of stakeholders: first by involving MGIAC (which represents geospatial interests) and collaborating with MAGIP, then creating a working group of interested parties to create drafts. Peer review groups are yet another juncture at which a proposed policy or standard is vetted, so that it is acceptable and useful. Because the proposed workflow is inclusive throughout, formal adoption should be an easy final step.

The specifics of the workflow can be changed depending on context and adapted as needed for the development of data governance policies and best practices. For example, additional instruction could be provided to the groups that are reviewing the standard, depending on the context of the subject.

Workflow: Geospatial Data Standard Creation and Promulgation (Part A)

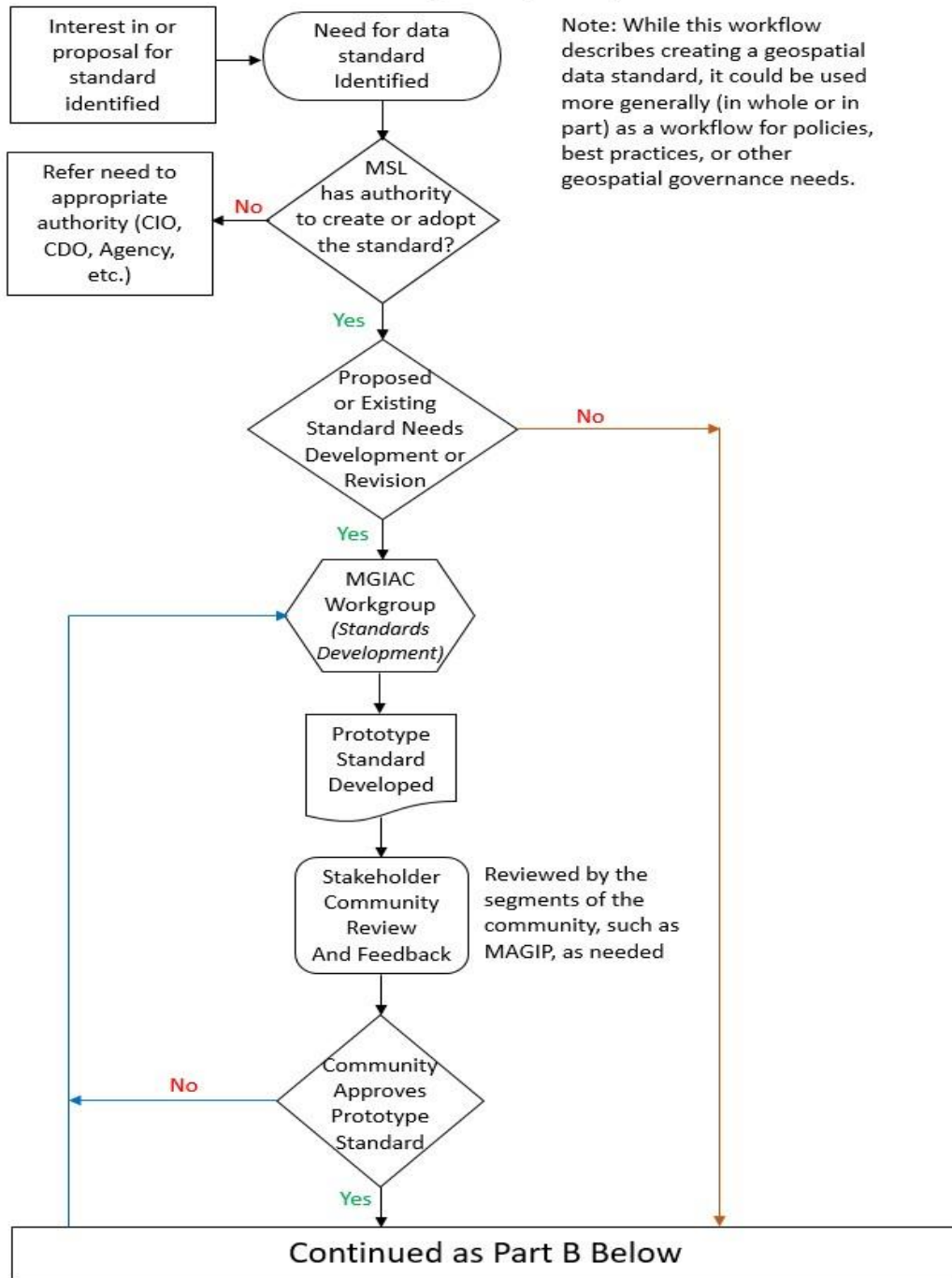
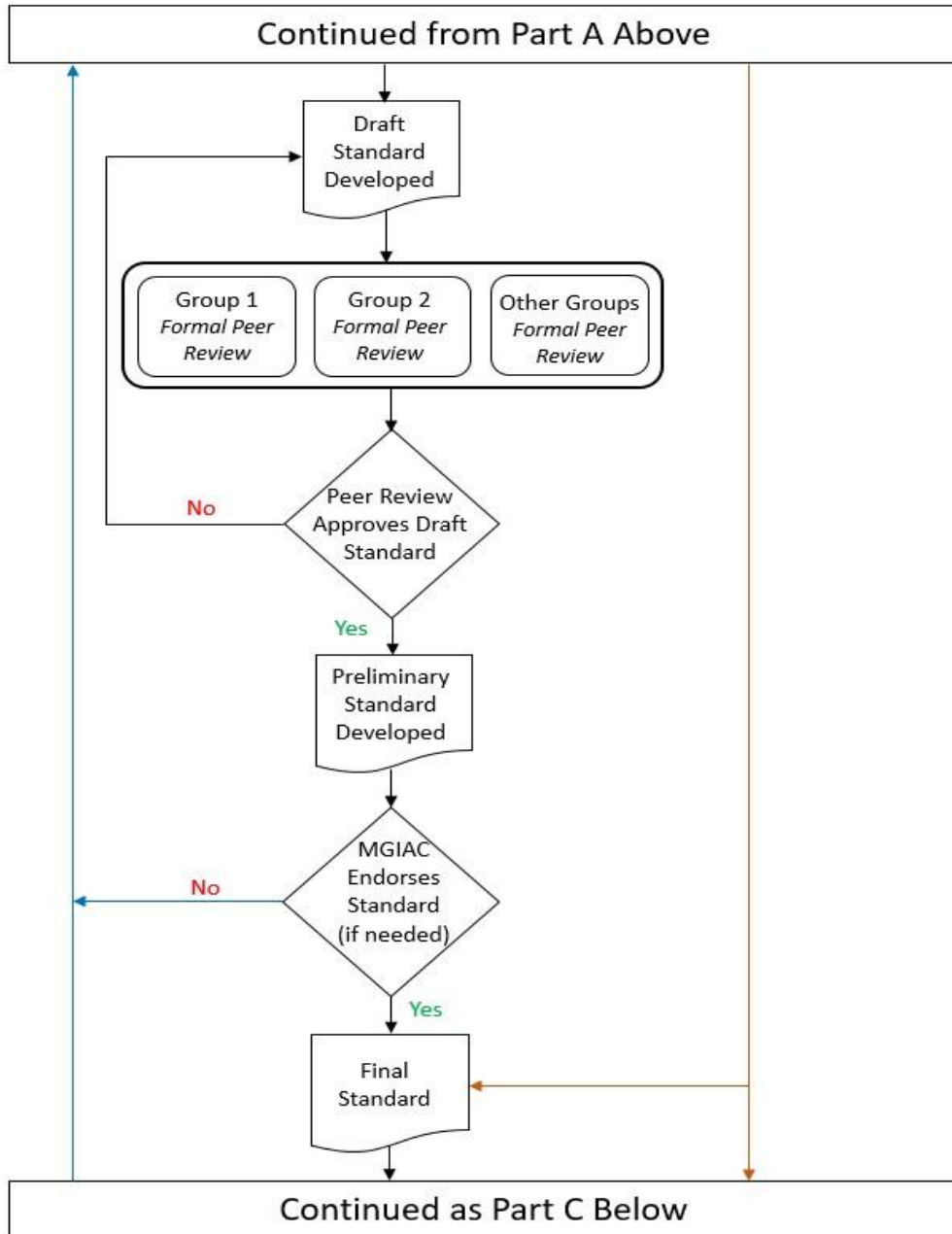
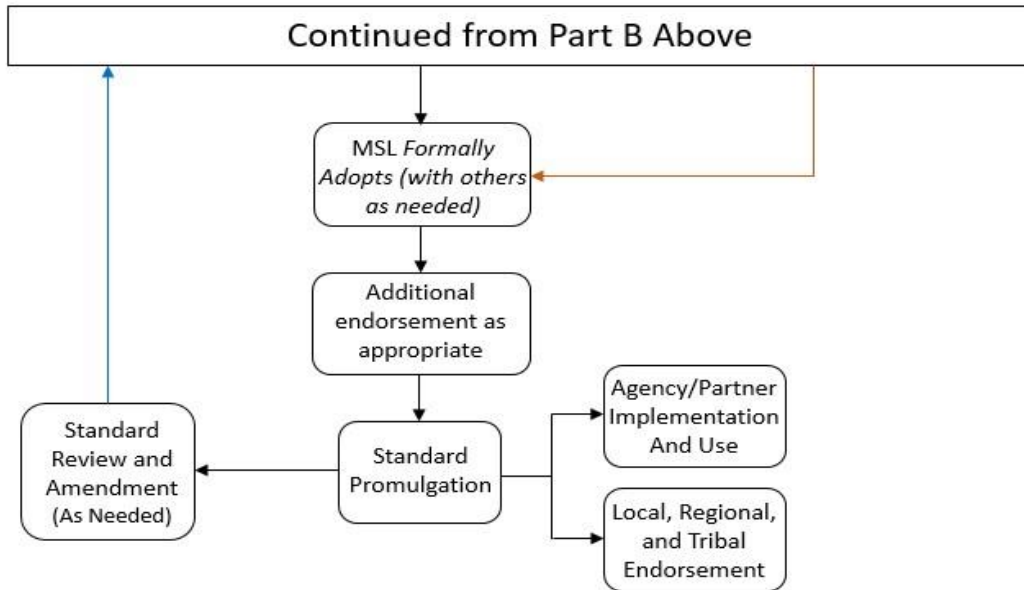


Figure 2. Workflow for data governance actions using a data standard as a practical example.

Workflow: Geospatial Data Standard Creation and Promulgation (Part B)



Workflow: Geospatial Data Standard Creation and Promulgation (Part C)



Periodically Review and Revise Data Governance Development Workflow

The data governance workflow itself should be examined periodically. Over time, the roles involved may change. Experience in using the workflow may indicate ways it can be improved. These review and revision activities are discussed further in Section 5.

Objective 3. Develop examples of data governance principles and policies from other states for background and ideas

As is a common practice within the geospatial industry, learning from others is an efficient way to gain information that is practical and has been proven by experience. This tactic applies well to a data governance business plan. There is much to be learned from the experiences of geospatial leaders across the country, particularly in the areas of data governance principles and policies. This section of the plan will present several established policies and practices as examples, thereby supporting this Business Plan to Improve Geospatial Data Governance as well as connecting to the Strategic Plan elements 3.2 *Publicize GIS best practices and educate the geospatial community on them* and 3.4 *Promote policies that foster the use of authoritative datasets to ensure efficiencies and cost savings*.

Geospatial data governance policies are high-level guiding statements that are devoid of extended details, attempt to be technology agnostic (because technologies change quickly while policies should endure for long periods of time), and are written at a level so as to be independent of other variables which, by definition, are changeable.

Montana has several principles and policies around geospatial data. For example, the legislation that establishes the Natural Resource Information System and the Water Resource Information System (MCA 90-15, see [Statutes \(mt.gov\)](https://legis.mt.gov/statutes)), lays out principles for sharing data:

"...agencies shall provide data requested by the library for purposes of the natural resource information system and the Montana natural heritage program. If an agency does not possess requested data or is unable to locate requested data, the agency shall inform the library" (90-15-303)

(1) Except as provided in subsection (3), the library shall make information from the natural resource information system available to local, state, and federal agencies and to the general public. (90-15-304)

Montana's existing policies have been excellent in promoting data-sharing through frameworks established in statute. Nonetheless, it is instructive to look at other states too, glean ideas for new or improved explicit policies and standards.

Policy Examples

In 1996, the executive branch of **New York** instituted a policy directing state agencies to share geospatial data using the state clearinghouse unless the data was otherwise protected by state statute.

The state of **California** requires address data to be geocoded and, as much as possible, requires that tabular data is spatially enabled.

California's transportation agency, **Caltrans**, extends state data governance through an enterprise data governance program known as CTDATA (Caltrans Data is Authoritative, Trusted, and Accessible). CTDATA actions work to enable staff to provide reliable, accessible, shareable, quality-controlled, and documented data for use by Caltrans and its partners that supports analysis and decision-making. It is governed by the following goals which also serve as policies:

- Data Value - Increase the value of agency data for decision-making by establishing and supporting data stewards responsible for improving data relevance, quality, usability, discoverability and accessibility.
- Data Sharing - Maximize sharing of existing data across agency business units by building awareness of agency data resources and encouraging data re-use.
- Data Literacy - Build agency staff awareness of available data sources and capabilities to make effective use of data.
- Data Efficiency - Reduce data redundancy by establishing single authoritative sources for data elements and encouraging collaboration across business units on new data collection or acquisition efforts.
- Data Consistency - Increase data consistency and interoperability through standardizing data definitions and formats.
- Data Protection - Protect sensitive and confidential data from unauthorized access.

The **United States Environmental Protection Agency (EPA)** has a detailed document describing its policies and standards, including their implications for data management ([Geospatial Policies and Standards | US EPA](#))

Recent conversations within the member community of the National States Geographic Information Council (NSGIC) provide additional governance examples from around the country (Table 2).

Table 2. Example policies, standards, and best practices from other state geospatial programs.

State	Document Name	Document Link	Governance Type	Comments
Massachusetts	Best Practices for Publishing Web Mapping Services	Best Practices for Publishing Web Mapping Services Mass.gov	Best Practice	"These best practices were developed by a working group of Massachusetts executive branch agency GIS staff. They were further informed based on suggestions from other state GIS offices."
Minnesota	Becoming a Publisher	Become a publisher gisdata.mn.gov	Best Practice	"We want to encourage publishers of data, applications and maps to share them on the Commons. We don't want to make it too difficult, but there are some basic expectations of publishers on the Commons."
Maryland	MD iMAP Policies and Procedures	Policies and Procedures MD iMAP Portal (maryland.gov)	Policies and Standards	"This document has been created by the Maryland Department of Information Technology (DoIT) Geospatial Services Team to provide policy and guidance on standards and the use of ArcGIS Online for Maryland (AGOL) by State agencies."
Oregon	FIT Standards Development Process, 2012	Microsoft Word - FIT standard development process -v1.1.docx (oregon.gov)	Process for Developing Standards	"The scope of the document is limited to the process for geospatial standards development."
Oregon	Oregon Metadata Standard	Standard for public comment 2 (oregon.gov)	Metadata Standard	"The purpose of this document is to specify the format and minimum elements that comprise Oregon's geospatial metadata standard."

These examples are helpful when thinking about governance guidance, such as principles, policies, standards, and best practices, that will help MSL to strengthen its statewide data sharing environment.

Priority Geospatial Data Governance Elements for Montana

Statewide geospatial data governance, while a complex and sometimes abstract subject, can be organized in a straightforward and practical way that lends itself to planning and implementation. During the development of this business plan, Table 3 below was collaboratively created with MSL and represents MSL’s priority geospatial data governance elements examples. This table is also included as a spreadsheet in Appendix A to allow MSL to actively edit and update the table. These are provided for several categories of data governance constructs to illustrate how each contributes to governance. In this context, principles are the high-level guiding statements from which specific policies can be created. Standards are the accepted models of data and processes. Best practices are procedures that are accepted, prescribed, or recommended as being correct or the most effective way to accomplish a task or objective. Activities describe specific steps that can actualize a governance construct. In this table, responsibility identifies the party or parties tasked with making sure that a specific set of principles and policies are established and implemented.

Table 3. MSL Priority Geospatial Data Governance Elements

Principle	Policy	Standard	Best Practice	Activities	Responsibility
Policy and principles are developed in a coordinated and collaborated fashion	Stakeholders have input to the processes that create policies and standards			Develop processes for policy and standards creation	MSL and MGIAC
Information products (e.g., paper and web maps) should be easy to understand	Maps will follow style and cartographic conventions	Cartographic and style standards for map content		Ensure content guidelines are in standards library	Agencies will build and follow standards for their information products; MSL publications will follow MSL standards
	Products are reviewed for consistency and ease of use	Map publication checklist and workflow		Share example checklists and workflows	Agencies will build and follow standards for their information products; MSL

Principle	Policy	Standard	Best Practice	Activities	Responsibility
					publications will follow MSL standards
Best data should be discoverable, documented, available, and used	All datasets will have metadata	The metadata will follow the State GIS metadata standard		Update. Convert from best practice to standard.	Each agency
	Framework data are the preferred data sources for all uses		Use framework data as much as possible	Promote and educate use of framework data; Seek IT Board endorsement of use of framework data	MSL (overall); each agency for framework responsibilities
Statewide authoritative framework data has a defined structure	Each theme has a defined structure	Address standard (non-spatial)			SOS and MSL
	Each theme has a defined structure	9-1-1- NENA Standard			SOS and MSL
	Each theme has a defined structure	Projection standards		Create a standards document that follows updated statute SB 398	MSL

State Geospatial Councils

State geospatial councils deserve special mention because of the critical role that they can play in data governance. State councils can be an especially effective partner of state geospatial leaders to provide a forum for coordination and collaboration among stakeholders and to help develop and disseminate policies and standards for the collection, management, and dissemination of geospatial data. Councils can also provide guidance on the use of geospatial data and technologies to support decision-making processes.

Councils can be self-formed through grass roots interest, as in the case of the [Indiana](#) Geographic Information Council with a mission “to work through its membership to advance and improve the practice of GIS across Indiana to benefit Hoosiers throughout the state”. Alternatively, as in the case of the [North Carolina](#) Geographic Information Coordinating Council, councils can also be formed through a formal state government process such as state legislation or other official methods of recognition. However formed, a council can play a key role in ensuring that geospatial data is managed effectively and efficiently across the state.

Montana has well established examples of both types of state geospatial groups: a self-formed professional association and a formally constituted council. The Montana Association of Geographic Information Professionals (MAGIP), formed in 2004, has a self-assigned mission “to stimulate, encourage, and provide for the advancement of an interdisciplinary approach to the use of geographic information.” The Montana Geospatial Information Advisory Council (MGIAC), was created by state statute “to advise the State Librarian and the State Library Commission on issues related to land information” and “to identify, evaluate, and prioritize requests received from state agencies, local governments, and Indian tribal government entities to provide development and maintenance of services relating to the GIS and land information.” Both organizations facilitate geospatial data governance in Montana, albeit in different ways, by working closely with MSL as bilateral conduits of information and as partners to establish and encourage acceptance of data governance principles, policies, standards, best practices, and actions.

Here are two additional excellent examples of how state geospatial councils facilitate data governance.

Nebraska Geographic Information Systems Council

The Nebraska Geographic Information Systems Council was established by the Legislature in 1991 (Reissued Revised Statutes of Nebraska, 1943, §86-569 through §86-573). The Council serves as the state's primary oversight group for the development of standards, strategies, and policies as it relates to the creation and use of geospatial data and technologies. The Council emphasizes cooperation and coordination among agencies, organizations, and government entities. These coordinated efforts lead to

creating public and private partnerships, greater geospatial productivity, less redundancy, and more informed policy across all disciplines and business lines involving geospatial data and technologies in the state.

Mission

Encourage the appropriate utilization of GIS technology and to assist organizations to make public investments in GIS technology and geospatial data in an effective, efficient, and coordinated manner.

Representation

- *State of Nebraska Agencies*
- *Local and County Government*
- *League of Municipalities*
- *Natural Resource Districts*
- *Public Power Districts*
- *Federal Agencies*
- *Nebraska GIS LIS Association*
- *Private Industry*

(Source: https://nitc.nebraska.gov/gis_council/about.html)

Arizona Geographic Information Council

The Arizona Geographic Information Council (AGIC) was established by Executive Order 89-24 as Arizona's primary forum and oversight group for geographic information and geographic information technology issues and coordination efforts. In 2009, AGIC was established in legislation. Changes to Arizona Revised Statutes Title 37 modernized the original statutory language. ARS 37-173 emphasized enterprise GIS, ARS 37-178 introduced language to enhance geospatial data sharing, and ARS 37-177 established AGIC in statute. AGIC identifies standards, development and implementation strategies to provide a framework in order to optimize the State's investment in geographic data and technology. Through cooperation and partnerships AGIC facilitates the acquisition, exchange and management of geographic information and technology for the State of Arizona to benefit state agencies and the Arizona GIS community. AGIC meets on a regular basis and conducts an Annual GIS Conference to address and coordinate statewide geographic information and technology issues, requirements and solutions.

(Source: <https://agic.az.gov/agic/about-agic>)

Objective 4. Adopt a work plan to establish data governance principles and put policies in place that implement them

The following is a logical work plan to establish data governance principles and put policies in place that implement them.

1. Identify the top priority policies and associated standards and/or best practices that MSL wishes to implement. This step was taken in earnest during the development of this business plan. See Table 3 above.
2. For each of these, continue to update Table 3
 - a. Define who is responsible for making sure that a specific set of principles and policies are established and implemented.
 - b. Define how it will be accomplished, i.e., identify activities that should be taken to achieve the desired outcome.
3. Select a priority policy, standard, or best practice to work on and for that one target,
 - a. Implement the Template Policy Implementation Plan (see Table 4 below) for the selected policy, standard, or best practice.
 - b. Evaluate how the process worked for the first couple of policies, standards, or best practices. Alter and improve this process using lessons learned from that experience, if necessary.
4. Move on to the next priority target policy, standard, or best practice and start at step 3 of this work plan.

Template Policy Implementation Plan:

For each policy, standard, or best practice that MSL will lead the implementation of, this template policy implementation plan, along with the model workflow provided in objective 2, may be used to help manage the process. This template is also provided as a spreadsheet in Appendix B so that it may be easily re-used for each occurrence. The status field may be used to track progress using a % complete methodology or a standard set of status values such as In progress/Complete, or whatever is most useful to MSL. Similarly, the schedule for each task may be defined using absolute dates, or it may be converted to a Gantt chart by weeks, months, or quarters increments.

Table 4. Template Policy Implementation Plan

Task	Responsibility	Status	Schedule
1. Follow the model workflow provided in objective 2 of the business plan			
a. MSL works with CDO / CIO to see if they are interested in the process, the outcome, or both	MSL		
b. MSL and MGIAC work together to define:	MSL		
i. MGIAC subcommittee or working group (if needed)			
ii. Who the “stakeholder community / communities” is/are			
iii. Peer review groups			

Task	Responsibility	Status	Schedule
2. Use the model workflow as a guide to build a schedule for draft, peer review, and completion, including who is responsible for each part of the process.	MSL		
3. Execute the tasks in the model workflow, following the timeline			
a. Prototype Development			
b. Stakeholder Community Review and Feedback			
c. Draft Development			
d. Peer Review			
e. Preliminary Standard Development			
f. MGIAC Endorsement, if needed			
g. Revisions, Finalize			
h. MSL Adopts			
i. Additional Endorsement as appropriate			
j. Promulgation			
i. Agency/Partner Implementation and Use			
ii. Local, Regional, Tribal Endorsement			
ii. Geospatial professional organizations (e.g., MAGIP) and other stakeholder organizations and professions			

3. Requirements and Costs

Business plans generally rest upon some assumptions. Recognizing these assumptions early helps avoid problems later in the plan’s implementation. Business plans almost always require some resources to implement, such as funding, labor, and time. Details on how funding, labor, and time combine to put the plan in place are part of its implementation (Section 4).

3.1 Assumptions

The need for this business plan became clear during MSL’s 2022 strategic plan formulation. The only assumption concerning the business plan’s importance is that the situation described in the strategic plan, where this plan was called for as a recommended action, is essentially unchanged.

3.2 Resource and Funding Requirements

Much of this involves coordination and project management activities. So, the sorts of costs already associated with collaboration and coordination are probably typical for this work. One could look at adding data governance as an added cost, or as simply an existing cost that displaces another activity, i.e., an opportunity cost.

Travel and other direct costs may be involved depending upon the kind of governance action, standard, or best practice being developed. For example, one might need to visit emergency service managers in different parts of the state to discuss address standards.

Table 5 shows the estimated resources and funding requirements for the business plan. Because Objectives 1 through 3 are largely accomplished, the hours shown are for ongoing coordination and education. For Objective 4, hours and costs are estimated for MSL staff and others, for development of a single policy. The total hours for MSL staff would be 412 - 720 hours. Estimates for non-MSL hours cannot be made because the number of participants will almost certainly be different for each development process.

Table 5. Resources and Funding Requirements

Task	Resources	Level of Effort (Hours)	Direct Cost
Objective 1 (quarterly, ongoing)			
Coordination with CIO, CDO, MGIAC	MSL GIS Coordinator	8 (per quarter)	
Objective 2			
Periodically review and refine the structure as needed, and educate necessary stakeholders about the structure (can be done in normal course of coordination efforts, hours estimate to develop additional speaking and educational materials)	MSL GIS Coordinator	16 (per year)	
Objective 4 (For each policy, standard, best practice)			
MSL works with CDO / CIO to see if they are interested in the process, the outcome, or both	MSL GIS Coordinator	8	
MGIAC and MSL work together to define: (a) MGIAC subcommittee or working group (if needed); (b) stakeholder communities; (c) peer review groups	MGIAC	16	
	MSL "Project Manager/Coordinator"	24	

Task	Resources	Level of Effort (Hours)	Direct Cost
Follow the model flowchart to build a schedule for development, draft, peer review, and completion, including who is responsible for each part of the process.	MSL "Project Manager/Coordinator"	16	
Execute the tasks in the model flowchart, following the timeline	MSL "Project Manager/Coordinator"	120 - 240	\$0
	SMEs (each)	120 - 240	\$0
	Subcommittee or working group (each)	48 (4 hrs per person per month)	\$0
	Stakeholders (each)	8 - 16	\$0
	Formal peer review groups (each member)	8 - 24	\$0
Publication to MSL web site and other locations (web site update)	MSL web site maintainer	8	\$0
Associated Direct Costs	Travel – remote meetings (MSL "Project Manager/Coordinator")	40 (5 meetings and travel time)	\$0
	Vehicle		\$1000 (1400 @ \$0.60 and fuel)
	Per diem		\$600 (4 days @ \$150)

4. Implementation Plan

The implementation plan consists of the four program goal objectives with tasks identified as necessary. Each task has a timeline. Some of the steps needed to implement this plan were completed by MSL and AppGeo during the development of this business plan. Therefore, only the implementation steps remaining to complete are presented with a timeline. The implementation plan assumes that Objectives 1, 2 and 3 are substantially completed and that this business plan has been endorsed by MGIAC. That leaves mostly Objective 4 with tasks still to be implemented as follows in Table 6.

The timeline is based on allocating the resources recommended in this business plan. If fewer resources (labor or funding) are allocated or defers the start of a work step, the timeline necessarily stretches out. Conversely, if more resources are brought to bear, this will usually speed up the timeline. The workflow proposed for developing governance does take time, though, and moving through the workflow faster may make it less inclusive. Review and comment steps may be more compressed or skipped altogether.

Table 6 is a timeline (in quarter-years). It is a baseline for this business plan. As shown in the table, the development of a single policy, standard, or practice following all the steps shown in Figure 2 could take as long as 3.25 years. This seems too long a time, until one considers the probable duration of *each* step in Figure 2. These are shown in Figure 2 and, as the chart shows, total to more than three years.

Table 6. Implementation Plan Timeline.

Action	Status Notes	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Timeline Notes
Objective 1. Define the scope and boundaries of MSL geospatial data governance																
Define MSL's Authority	Complete															
Determine the types of geospatial data governance MSL will focus on	Complete															
Define who these types of governance applies to	Complete															
Coordinate with entities that share data governance responsibilities to define the scope and boundaries																
Objective 2. Develop a structure and process for data governance actions																
Consider the roles and relationships between the roles involved in data governance	Complete															
Develop a flow chart to define the process for data governance actions	Complete															
Periodically review and revise the structure and process for data governance actions as appropriate.	Annually															
Objective 3. Develop examples of data governance principles and policies from other states for background and ideas																
Research and develop examples of other states' governance	Complete															
Objective 4. Adopt a work plan to establish data governance principles and put policies in place that implement them																
Identify the top priority policies and associated standards and/or best practices that MSL wishes to implement.	Started															
For each top priority, define who is responsible and how it will be accomplished	Started															
For each priority, implement the Template Policy Plan																Note that this process can be expedited if needed; the timeline shown below is an assumed typical timeline for a single policy, standard, or best practice.
Idea --> CIO, CDO, MGIAC Involvement Decision																This probably spans 2 MGIAC quarterly meetings – present the idea and discuss MGIAC involvement, then in the next meeting,
Identify Stakeholders and Peer Review Groups																
Build a Project Plan and Initial Work Group / SME Engagement																Actually convening a work group/SMEs probably does not happen until late in that quarter (3 months after MGIAC decision).
Prototype Development																For anything beyond trivial best practices, the SMEs and working group devise a prototype policy. This will probably take 6 months.
Stakeholder Community Review and Feedback																
Draft Development																
Peer Review																
Preliminary Standard Development																
MGIAC Review, Endorsement, if needed																
Revisions, Finalize																
Final Adoptions (CIO, CDO, MSL)																
Promulgation																
Evaluate and improve the process, if needed																

MSL may choose to work on more than one policy, standard, or best practice at a time. However, it is recommended to try to resist launching too many governance processes at the same time unless the appropriate number of qualified resources are available, otherwise the process will stall.

4.1 Managing Implementation

Implementing this business plan, like implementing any plan, requires management effort. This section discusses how to manage putting the Policies Business Plan into practice.

4.1.1 Project Management

A key resource for the successful implementation of any governance activities is a Project Manager. A Project Manager should be identified, and they should treat this business plan implementation like a project. Solid project management will result in the best outcomes and experience for MSL, and all other stakeholders involved.

It is recommended to use business systems to support Project Management best practices. At the outset of the project, MSL should tailor the optimal combination of these systems for providing project transparency and streamlining communications:

- Task management
- Video conferencing
- Web-based data and document libraries
- Time management and reporting systems
- Gantt charting and project planning tools

The partners and implementation team will vary depending on which policy, standard, or best practice is being worked on. An agreed upon plan for communication with partners and the implementation team should be established. Establish a cadence of regular check-ins on the status of the project, addressing the frequency, scope and content of routine communications and task level reporting. For example, a monthly status meeting for the internal team, if applicable, and a quarterly check-in with the working group/SMEs.

Use the implementation plan and template policy implementation plan with the schedule of project tasks as a guide. Measuring progress along this schedule should be a core objective of the regular project management meetings.

Project success is closely tied to staying on schedule and preventing or mitigating unforeseen problems. MSL's project manager should proactively manage schedule and risk in the following ways:

- Potential project risks and causes for delay are identified at the outset of the project.
- If unforeseen roadblocks arise, they are immediately reported to the project manager for swift discussion and action.

- The project schedule is kept up to date throughout the project, to keep everyone on the team aware of the current schedule.

4.1.2 Risk Management

The elements of a business plan are subject to risk. The more that these risks can be contemplated and understood in advance, the better the chances are to effectively mitigate each risk. Table 7 below outlines several risks, evaluates the potential level of impact from those risks, and proposes measures to mitigate each risk. This risk register is also included as Appendix C.

Table 7. Assessing the business plan risks, impacts, and mitigation.

Risk	Potential Impact	Mitigation
Slow action or failure to reach agreement on action by MGIAC	Moderate. Given the advisory nature of MGIAC, slow or failed agreement on action would not prevent MSL from moving forward. It would, however, represent an additional complication.	The key to mitigating this risk is to ensure comprehensive and continuous communication between MSL and MGIAC regarding the need for change and its benefit.
Involvement of CDO, CIO, or state government processes with overlapping authority	Moderate to High. Overlapping authority, real or perceived, can create unclear lines of responsibility. This, in turn, may result in a lack of appropriate action.	The best time to clarify roles and responsibilities related to the work of MSL is before the need for action develops. This discussion may be one that is long term or even continuous, but it is necessary.
Involvement of CDO, CIO, or state government processes with other timelines	Moderate. Because of the close relationship between the work of the CDO and/or CIO and MSL, it is conceivable that MSL initiatives may be affected by current or contemplated efforts of the CDO/CIO. That is to say, CDO/CIO efforts may impact the timeline of MSL efforts.	Communication between MSL and the CDO and/or CIO should include creating awareness of each of efforts that may be impacted by the efforts of the others. Once known, the MSL timeline can be altered as needed to compensate, and expectations can be reset for the affected communities.

Risk	Potential Impact	Mitigation
Lack of consensus among stakeholders or peer reviewers regarding drafted policies or standards	High. A lack of consensus of the general GIS community would signal either a lack of understanding about the need and benefits of the change or a lack of agreement. Either would require a reassessment of communication efforts or of the change itself, or both. Either situation would put the acceptance and adoption of the change at great risk by the community.	Re-evaluate the cause of the lack of consensus then re-evaluate the communication strategies regarding the need for change and the expected benefits or revise the drafted policy or standard to remove the barriers to consensus and acceptance. Change the timeline to accommodate the extra effort.
Community resistance to implementation of a policy or standard	High. Community resistance to a proposed policy or standard change will greatly limit the likelihood of the change being accepted and adopted.	Determine the cause of the resistance by communicating with the statewide community and work to gain consensus and acceptance of the proposed change. This may require some level of compromise.
Insufficient resources to support development of policy, standard, best practice	Moderate. Required resources are primarily the time of existing MSL staff or costs related to travel, or both. Without adequate resources available within the required timeframe, timely development cannot occur.	This risk can be mitigated by a combination of creating a more flexible timeline that better accommodates the availability of existing MSL staff, or by completely or partially replacing in-person travel with remote meetings.
Lack of volunteers to support development of policy, standard, best practice	Moderate. Statewide geospatial coordination inevitably relies on the efforts of volunteers, some efforts more than others. If those volunteers are unavailable or unwilling, the desired development is slowed or stopped.	The mitigation of this risk can involve changing the timeline to provide more time for the work of volunteers or moving some (or all) of the work of the volunteers to paid staff at MSL or partnering organizations.

Risk	Potential Impact	Mitigation
Policy or standard at odds with existing policy or standard	High. This risk would indicate that either an underlying assumption about the current situation was wrong, or that additional work is required to first change the existing and conflicting policy or standard before the proposed standard can move forward.	This risk can be mitigated by ensuring that existing policies and standards are considered before proposing a new policy or standard. If an existing policy or standard exists that is at odds with the proposed standard, then one or the other needs to be modified to eliminate the misalignment. The earlier such a misalignment is understood, the less impact it will have on the overall timeline.

5 Measuring Success

As with all planned activities, it is important to measure success and adjust the plan and its implementation as necessary. Two levels of success should be monitored and measured, and two types of refinement should be considered.

5.1 Monitoring Progress

The first level of success is the implementation of the program Goal and associated objectives.

Monitoring the progress being made to accomplish each objective and task, and therefore implementing the program goal, is straightforward by comparing progress to timeline to produce a measure of percent complete. The Project Manager role identified for each objective's implementation team can assist with this monitoring using the standard project management tools employed (e.g., schedule, task manager, status meetings, etc.). Strategies and resource levels can be adjusted as needed to meet the timelines provided.

Measuring progress and success are important; measuring effort is also important. One could create an ancillary set of measurements that track:

- Number of policies, standards, practices proposed, in progress, completed
- Percentage of each standards workflow that is completed (based on workflow steps, Table 6 and Figure 2)
- Number of collaborators involved in each standards development effort
- Number of organizations (and individuals) who implement the governance practice

The second level of success is to look at spatial data governance as a whole, as the strategic plan did.

Questions one might ask here include:

- Is this Goal and its associated objectives achieving the affect that was desired? Does the Goal or objectives require modification to reflect changes in MSL’s existing environment?
- Are the lines of authority and responsibility clearly defined, especially in the areas in which authority is shared among MSL, the CDO, the CIO, and other units of federal, state, and local government?
- Is framework geospatial data easily and freely contributed and accessible to the statewide geospatial community? If not, are the reasons attributable to data governance issues?
- Have data governance practices in other states changed or been created that rise to the level of a recommended best practice for Montana?
- Has the data governance situation in Montana changed enough to require a reconsideration of existing policies, standards, and best practices?

Think about measuring success as an accountability measure – how are we doing on priorities? This could even be a wall chart approach in which the table of priorities (see above Table 3) is updated over time, with new items added, older items retained but marked as “done” because it is inspiring to see progress.

5.2 Refinement

These monitoring points, whether proactive or reactive, represent opportunities to modify the data governance strategy to produce a greater level of success across the state and can take the form of:

- Working with partners to clarify authority, responsibility, and expectations with regard to data governance
- Identifying successful data governance strategies from other states as well as other levels of government
- Creating new policies, standards, and best practices
- Modify existing policies, standards, and best practices

While some refinement can occur through discussion and agreement, other refinement will require following a process such as the one provided in Objective 2, above.

Business plan monitoring is a combination of reviews at regular intervals, such as annually, and reviews because of situational changes. Regular reviews are proactive, reviews caused by situational changes are reactionary but normal given the many moving parts of data governance, an abundance of stakeholders and partners, an ever-changing political environment at all levels of government, funding changes, and shifting statewide priorities.

Hence, refinement can occur in two ways, necessitated by their cause and their timing. *Ad hoc* refinement is caused by an unforeseen event or set of events that require rapid intervention. A situation is presented which requires adjustment to Objectives, Tasks, or Timeline.

The other type of refinement is routine and planned. MSL should review its objectives, tasks, and timelines for refinement on a regular, recurring basis such as annually. This review should include the addition of new Objectives and Tasks to replace the Objectives and Tasks defined in this document as they are accomplished or completed. It also includes the self-assessment of mission success described above as an annual activity. Ideally, this refinement opportunity would follow MSL's annual review of the GIS Coordination Strategic Plan so that it could reflect adjustments to that document.

In any event, refinement usually includes changes to one or more of the following areas:

- **Strategies.** Has the big picture changed? How do the changes affect planned courses of action?
- **Priorities.** Perhaps events require that objectives or tasks be realigned in time, or that more (or fewer) resources are required due to complexity or a new understanding of criticality.
- **Resource levels.** Resource levels often include human resources, but financial and technical resources may also need to be refined.
- **Objectives.** Are the planned objectives still the right ones to pursue? Should an objective be added or removed, or simply realigned?
- **Tasks.** Tasks are associated with objectives and may require adjustment if an objective is changed.
- **Schedules.** Is the length of time that has been planned to implement an action or accomplish an objective still appropriate given the current environment?

Appendix A. MSL Priority Geospatial Data Governance Elements Spreadsheet

Appendix B. Implementation Plan Spreadsheet

Appendix C. Policies Risks and Mitigation Spreadsheet