



IDAHO GIS STRATEGIC PLAN

Idaho Geographic Information Systems

IDAHO GEOSPATIAL COUNCIL – EXECUTIVE
COMMITTEE

A subcommittee of the Idaho Technology Authority (ITA)

Approved by the ITA

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EXECUTIVE SUMMARY

Geographic Information Systems (GIS) have been actively in use in Idaho for nearly two decades. Early adopters were pioneers, implementing this new technology as a dynamic resource for managing and using spatial data in support of agency missions and providing a new level of data management, analytics, and visualization. The role of Geospatial Information Officer (GIO) was created, and Idaho's GIS professionals and stakeholders created a statewide governance council and executive committee. Under the guidance of the GIO and the Idaho Geospatial Council Executive Committee (IGC-EC) in 2009 and again in 2016 two GIS Strategic Plans were written, approved, and implemented to further the maturity, use, and reach of GIS throughout the state.

The overall successes of the prior plans have been limited. The expiration of the 2016 Strategic Plan in 2021 has necessitated the development of this Strategic Plan as a roadmap to continue the journey of GIS integration, acceptance, visibility, and use throughout the state. Writing a Strategic Plan is a difficult proposition and requires the efforts and participation of dedicated GIS professionals throughout the state. The Strategic Plan committee started their work of researching and documenting the current state of GIS in Idaho in February 2021. The submission of this plan to the Idaho Technology Authority (ITA) in December of 2021 is the culmination of several hundreds of volunteer hours across nearly every GIS domain in the state.

The scope of this Strategic Plan is GIS at all levels, in all organizations, for all GIS maturities across Idaho. The research has helped to define the current state of GIS, assess maturity levels, review the successes and failures of prior Strategic Plans, and then to create a strategic roadmap. Agencies, organizations, individuals, and stakeholders that use or depend on GIS for their work and their missions will, if they choose to engage with the Strategic Plan, improve their GIS maturity and unlock the full potential of GIS as a strategic asset for evidence-based, data-informed decision-making.

The vision of GIS in Idaho is to ensure the right geospatial data are available to the right people in the right format at the right time. This is accomplished with the mission to provide access to accurate, authoritative, and relevant geographic information and technologies to address organizational needs, support the GIS community, and demonstrate the benefit of valuable geospatial assets by deriving insights, and intelligence that lead to evidence-based decision-making, data-informed action, increased transparency, and greater collaboration.

The mission can be achieved by focusing on five core principles that keep professionals and organizations focused on achievable goals and objectives to improve governance, data quality and access, training and education, communication and coordination, and to develop sustainable funding.

The Strategic Plan is intended to be carried out during the next five years, with frequent and consistent monitoring and updates to ensure it remains focused and relevant. Efforts were made to learn from the mistakes and failures of past Strategic Plans and to not repeat them.

The strength of the Strategic Plan comes through individual and institutional engagement, and through collaboration and coordination across all GIS professionals and their organizations to seek individually and collectively to achieve the goals and objectives of the plan. This will place GIS in Idaho in a position of strategic strength to successfully achieve mission critical projects and state-wide initiatives that bring about change for the good of the citizens of the state of Idaho.

1. STRATEGIC PLAN DEVELOPMENT- METHODOLOGY AND BACKGROUND

1.1 INTRODUCTION AND BACKGROUND

During the January 2021 Idaho Geospatial Council Executive Committee (IGC-EC) meeting the Idaho Geographic Information Officer (GIO) proposed the formation of a committee to develop a new GIS Strategic Plan for the State of Idaho. The prior Strategic Plan, approved and implemented in December 2016, had an effective term of five years, and was slated to end in December 2021. The GIO proposed the formation of a Strategic Plan Committee (SPC) made up of representatives from state and local governments, tribal nations, and higher education to represent the various GIS stakeholders in Idaho. The proposal was subsequently accepted, and a call went out to the Idaho Geospatial Council (IGC) for SPC volunteer representatives. In addition, an effort was made to coordinate with GIS departments and leaders at the state's three major institutions of higher education to engage GIS students on the committee and potentially earn credit for being involved in this essential activity for GIS in the State.

In the two weeks after the proposal was approved, 15 GIS professionals volunteered to be on the committee to update the Idaho GIS Strategic Plan. Those members included GIS professionals from six different State agencies, two counties, three cities, and two universities ([Appendix A](#)). In addition, three students, one each from Idaho State University, Boise State University, and the University of Idaho volunteered bringing committee membership up to 18 members. Within the first few weeks three members resigned from the committee for various reasons and the final committee was comprised of 15 members.

Details about the planning development process and timeline are in [Appendix B](#).

1.2 PURPOSE OF THE GIS STRATEGIC PLAN

The purpose of a Strategic Plan is to document and synthesize specific goals and objectives that address the needs, challenges, opportunities, threats, liabilities, and obstacles identified by GIS professionals and practitioners, stakeholders and decision-makers for GIS in the State based on the “current state” of GIS use and maturity. Through specific tasks and action plans, it provides a roadmap for achieving the important strategic goals and objectives defined by the GIS community and GIS leaders that outline the desired “future state” of GIS for teams, organizations, and enterprises across the state.

The Vision and Mission statements from previous GIS Strategic Plans were reviewed and examined. The result was that these core statements were redefined with additional focus and specificity. With the goals and objectives of prior plans being largely unmet, necessary Core Values and Goals have been developed with an expectation that, by implementing the Plan, organizations throughout the state can make progress in overcoming roadblocks and systematically achieve the strategic goals and objectives of the plan.

The SPC recognizes the Strategic Plan only becomes a valuable and effective document if GIS professionals, stakeholders, data stewards, and others who use and depend on GIS, actively engage with the plan, and do not just “set it on a shelf” for the next five years. At the state GIS governance level, the IGC and the IGC-EC must focus on activities and actions that help

GIS professionals and their organizations achieve the goals and objectives of the Strategic Plan over the next five years. They can, and should, use the Plan as a guide and a yardstick to achieve the desired “future state” of GIS in Idaho.

It is very realistic, and achievable, to expect that individuals and organizations can, in five years, achieve a new level of GIS maturity and integration within their own organizations and actively move, in collaboration with others, toward the greater vision across the state.

To be successful implementing the Strategic Plan, Idaho must

- Not reproduce the errors in carrying out prior Strategic Plan.
- Engage at the levels of individuals and organizations in their current levels of GIS capability and maturity.
- Not expect every agency/organization to meet a pre-defined standard or level of GIS maturity but work collaboratively both inside and between agencies/organizations to achieve a higher level of GIS capabilities, visibility, and maturity than they have now.
- Individually measure and evaluate organizational improvement on a consistent basis by assessing progress toward achieving the goals and objectives of the Strategic Plan

Detailed discussion of each bullet point above can be found in [Appendix B](#).

2 VISION, MISSION, CORE PRINCIPLES, STRATEGIC GOALS, AND PLAN REVIEW

Based on the research conducted by the various subcommittees and debate within the Strategic Planning Committee, the following vision and mission statements have been approved and adopted to guide and inform statewide goals and objectives, capturing the core of what GIS in Idaho aspires to be and establishing a foundation for the Strategic Plan. The Vision Statement is a portrait of the future. The Mission Statement articulates the things that must be done to paint that portrait.

2.1 VISION STATEMENT

Ensure the right geospatial data are available to the right people in the right format at the right time.

2.2 MISSION STATEMENT

Provide access to accurate, authoritative, and relevant geographic information and technologies to address organizational needs, support the GIS community, and demonstrate the benefit of valuable geospatial assets by deriving insights and intelligence that lead to evidence-based decision-making, data-informed action, increased transparency, improved education, and greater collaboration.

2.3 CORE PRINCIPLES

The purpose of core principles is to provide specific focus areas that inform the required goals and objectives of the Strategic Plan. The goals and objectives keep the emphasis of actions and tasks on achieving the mission and vision. Five core principles have been identified by the SPC that have been, and continue to be, of consistent concern and challenge for GIS professionals throughout the State. These core principles are closely related and highly interdependent. The Strategic Plan defines the need to address them through collaborative efforts to achieve the vision and mission for GIS in Idaho. One example of the interdependence of the core principles is that *Governance* directly influences the development of data standards, which impact *Data Quality and Access*. Subsequently, the entire process will be in jeopardy if there is no *Communication, and Coordination* across the State or *Sustainable Funding* available.

The Core Principles in the GIS Strategic Plan are:

- A. Governance
- B. Data Quality and Access
- C. Training and Education
- D. Communication, Outreach, and Coordination
- E. Sustainable Funding and Funding Opportunities

Each Core Principle has one, or more, focus area defined to keep the emphasis on fulfilling the vision and mission statements of the Strategic Plan.

2.4 STRATEGIC GOALS AND OBJECTIVES

The Strategic Goals and their programmatic Objectives are defined based on information collected by the SPC about the current state of GIS in Idaho and an examination of GIS maturity across the State. The current state of GIS in the State reflects the successes and failures of the goals and objectives from previous GIS Strategic Plans. Examination of GIS Strategic Plans from other state government entities and through discussion with Idaho GIS Professionals about what they envision GIS's future role to be in their organizations, what is holding them back, and what they need from a Strategic Planning perspective to fulfill their GIS business needs, provided important, and needed, context for effective goals and objectives.

After researching the *current* state of GIS in Idaho along with identifying ongoing challenges and recent successes, assessing risks and opportunities, and aligning them with the desired *future* state of GIS in Idaho, gaps became apparent that require attention in the Strategic Plan. After determining the best way to address those gaps, the strategic goals of the plan were grouped by

Core Principle. The specific goals and objectives related to each Core Principle listed in Section 2.3 are outlined and defined in Section 5.

2.5 STRATEGIC PLAN REVIEW, REPORTING, AND UPDATES

Measurement of progress achieving the goals and objectives of the Strategic Plan should be an ongoing process collaboratively overseen by the IGC-EC and the IGO. These two entities will jointly develop an oversight plan to regularly review and document progress on a regular schedule, but no less than once each year. Because the Strategic Plan is intended to be used by GIS professionals and organizations across the state of Idaho, this assessment process will require research and interaction with state and local agencies, organizations, educational institutions, tribal nations, and private industries. An annual report of progress will be presented at one of the semi-annual IGC meetings each year.

3 METHODOLOGY AND RESEARCH

3.1 METHODOLOGY

Over the course of 2021, five subcommittees were formed to address needed information gathering and research activities and provide the information necessary to create a viable Strategic Plan for the aggressive scope defined. The subcommittees were made up of SPC members with one member acting as the chair of each subcommittee. The remainder of this section describes the objectives and methodologies followed for each of the subcommittees. The full report of findings is given in the appendices, and a summary of those findings are provided in the following sections to describe the work performed by each subcommittee.

3.1.1 Task: Review of Past Strategic Plans

GIS in Idaho has operated under two previous Strategic Plans. One was approved in 2009 and the other in 2016. Both Strategic Plans had temporal scopes of five years. A subcommittee was assigned to review and document the achievements, failures, and opportunities for improvement from each plan. [Appendix C](#) provides a full report on the successes, missed opportunities, failures, and lessons learned.

A further in-depth comparison of the previous Strategic Plans was undertaken after the discovery and assessment activities of the SPC were completed and the proposed goals and objectives were identified. The additional review and assessment of the prior Strategic Plans provides significant indications that most of the outcomes envisioned by those plans were not achieved ([Appendix D](#)). There are multiple reasons for the very limited successes of the two previous Strategic Plans. Care should be taken to not replicate those reasons as GIS users and organizations adopt and use this Strategic Plan.

The two prior Strategic Plans and the business plan developed to implement the 2009 Strategic Plan are attached to the end of this document (See also [Appendix N](#)).

3.1.2 Task: Research GIS Strategic Plans from Other States

GIS Strategic Plans for several state and local government entities were reviewed by the assigned subcommittee. A short list of Strategic Plans from Arizona, Nebraska, New York, and Alberta, Canada were submitted for in-depth examination to discover common themes in GIS Strategic Planning and how they are being addressed by those entities. Additionally, this subcommittee proposed the outline format for the Strategic Plan document based on what was determined to be a common layout from successful Strategic Plans. The subcommittee's process and recommendations can be found in [Appendix E](#).

3.1.3 Task: GIS Maturity Survey

A maturity assessment was developed based on the URISA Maturity Model and made available to all GIS Stakeholders in Idaho. At the time of this writing nearly 40 responses have been received. The maturity assessment will continue to be available, and the GIS community will be encouraged to participate and increase the available dataset describing current maturity levels. The SPC has discussed using the maturity assessment at specific periods during the 5-year period of the Strategic Plan to have a vehicle to measure change in GIS maturity levels for those organizations represented in the initial survey period. The analysis of the maturity assessment can be found in [Appendix F](#).

Mature GIS organizations have a combination of highly experienced GIS staff, mature processes for data acquisition and analytics, some level of consistent funding, strong integration within the organization's business processes, and have developed a high level of trust through years of dedicated and high-quality work.

3.1.4 Task: Engage Focus Groups Across the State

During June of 2021, seven focus group meetings were conducted across the state to determine the current challenges faced by GIS professionals in multiple organizations and to inquire how proposed actions in the GIS Strategic Plan could support overcoming those challenges. The focus groups covered four broad categories and asked participants about their current and desired status related to GIS resources, data, education and support, and support from senior management. A total of 39 people participated in the seven focus group sessions, highlighting systemic problems including difficulty finding authoritative data, lack of resources for staffing, and difficulty communicating the benefits of GIS to organization leaders ([Appendix G](#)).

3.1.5 Task: Evaluate the Enterprise GIS Organizational Structure

The current governing and operating organizational model of GIS in the state was reviewed by a subcommittee and an assessment was made to determine if the current organization structure is adequate to the task of enterprise GIS governance and for successfully addressing the goals and objectives of the Strategic Plan. The subcommittee submitted a proposal for changes to the way GIS governance and oversight is organized to better address the coming challenges and strategic needs of GIS across the State. The updates and changes from this analysis are discussed in [Section 5.1](#).

3.2 CURRENT STATE OF GIS IN IDAHO

3.2.1 Assessment of Progress Made

Based on the research completed by the SPC outlined in section 3.1, the SPC made a significant effort to define the collective current state of GIS for organizations and agencies across the state that use GIS. The analyses of the results of this research have shown that there is a wide-ranging continuum of skills, maturity, support, and integration of GIS in business processes and decision-making activities. During the 12 years covered by the two previous Strategic Plans, the several goals and objectives defined in each were, largely, unmet. However, successes with some of the goals and objectives in the previous GIS Strategic Plans, along with the nearly heroic efforts of individual GIS professionals across the State, have resulted in progress and growth of GIS evidenced as viable and valuable data acquisition, data management, and data analytics tools in relatively few organizations across the state.

With the wide range of disparity between GIS maturity and institutional integration, the Strategic Plan recognizes the existence of GIS operations that have very mature processes and procedures, and that are well integrated into their organizations. It also recognizes that there are many more GIS individuals and teams that are on the far end of the maturity scale and lack integration, recognition, training, and understanding by leaders of the full value that GIS analytics can bring to an organization. This Strategic Plan addresses GIS at the organizational level but keeping focus as a statewide resource regardless of how and where GIS systems, processes, and analytics are used. The achievement of the goals and objectives will help drive GIS value across all enterprises and, more importantly, bring value to the citizens of Idaho

3.2.2 Current GIS Status – Past Successes

Unfortunately, there have been very few successes related to prior Strategic Plans as compared to the goals and objectives outlined in those documents (see Appendices C & D in the prior plans that are attached to this document). Most progress has come through the individual efforts of GIS staff and stakeholders, or through state and local agencies working to achieve their individual missions and not specifically driven by a Strategic Plan.

Portions of the goals related to the creation and implementation of the State's Spatial Data Infrastructure (SDI) defined in the 2009 Strategic Plan were implemented. This included defining and implementing the current Idaho Framework Themes ([Appendix H](#)), which provided a basic foundational component for GIS data coordination, collaboration, and interoperability, with the desired outcome being to produce and maintain 16 SDI Framework layers that, together, create an authoritative geospatially enabled map of Idaho called "The Idaho Map" (TIM). The Framework themes were defined and organized to be similar to, and interoperable with, the Federal Framework themes. Technical Working Groups (TWGs) were created and staffed by GIS

The value of open communication, shared knowledge, and strong relationships [in Idaho's GIS community] ...is difficult to quantify and has led to a sense of community and of shared purpose and support....

volunteers who had interests and knowledge related to the Framework theme on which each TWGs focused.

Another significant success was the development of a central GIS data web portal. INSIDE Idaho (<https://insideidaho.org>), hosted and maintained by the University of Idaho, contains a substantial amount of data and GIS resources that are central to GIS throughout the state. The staff and students at the University of Idaho have done an excellent job staying current with technology, centralizing Idaho GIS data sets, and linking to statewide open GIS data portals with minimal staff and limited financial resources.

Idaho's GIS governing bodies were defined and organized through prior GIS Strategic Plans and, indirectly, through legislation related to Information Technology and Telecommunications services centralization in State Government. Governance of GIS in the state is discussed in more depth in [section 5.1](#).

Idaho's institutions of higher education have developed mature GIS programs. They have experienced and knowledgeable instructors, and solid GIS program oversight. These GIS programs turn out qualified GIS candidates for geospatial-related jobs in the State and are developing the future GIS workforce for the State. The ongoing strength and maturity of higher education GIS programs are the result of significant effort of individuals and groups to ensure that education and training continue to be available to both traditional and non-traditional students. Professional university staff bring knowledge and expertise to statewide GIS governance as well as active leadership to technical working groups aimed at developing standards, creating and identifying authoritative data sets and related framework layers, and with grant-funded research that adds to the cumulative GIS data in the State.

The amount of communication and interaction between GIS professionals across the state is one of the biggest successes over the past decade. GIS professionals, as a rule, are more interactive, better organized, and more communicative with each other than nearly any other data-related group in the state. The value of open communication, shared knowledge, and strong relationships built through participation in TWGs, IGC, and IGC-EC meetings, university and state sponsored training events, regional and national conferences and user groups, and the state's GeoTech ListServ is difficult to quantify and has led to a sense of community and of shared purpose and support for those who actively engage in the various opportunities and events. The shared comradery and trust provide the foundation for a strong forum for voicing issues and concerns, and for drawing on the knowledge and experience of tenured professionals across multiple disciplines and domains across the state.

3.2.3 Current GIS Status – Challenges, Struggles, and Failures

As successes in GIS have occurred throughout the state, there have also been challenges, struggles, and failures. Failure is a strong word but is used in this document specifically to indicate goals and objectives that were not able to be achieved in previous Strategic Plans. Challenges and struggles are common throughout state organizations and government agencies as they have invested in staff and tools to implement GIS data and analytics into their organizations but whose leaders (for various reasons) have not supported and integrated GIS into their business processes. Anecdotally, there are indications that many organizations had unrealistic

expectations related to the speed that GIS value would be achieved, the real costs involved to mature their initial GIS investments in staffing and system tools, a lack of will to address required business process change management, and a general lack of understanding that GIS is much more than just maps.

Lack of funding and lack of adequate staffing are two of the greatest struggles for GIS across the state...and are primary contributors to the inability to grow and mature GIS in organizations.

As mentioned in section 3.2.2, a statewide GIS governing council currently exists and is made up of a broad representation of state, local, tribal, education, federal, and private industry. The IGC and the IGC Executive Committee (IGC-EC) that leads the council have the responsibility to develop data standards related to the State's Framework themes. Currently only half of the TWGs are active with a chairperson and TWG members who actively meet and work toward defining data standards, identifying and nominating the required data layers, maintaining approved and authoritative data sets, and carrying out ongoing outreach and training for the GIS communities within the State. Up until 2020 there had only been two data standards that were created, reviewed, and approved along with their related authoritative data sets. During the past year there have been three additional standards that have been created and approved along with their data sets. Many more Framework theme standards and data sets are needed and represent both a struggle and an opportunity for the Strategic Plan. The struggle includes the inability of the executive governing committee to hold GIS data stewards accountable to adhere to the approved standards and the inability to provide ongoing audit and compliance monitoring for data that is represented as authoritative by an organization. The opportunities include being able to create, review, and approve the remaining data standards and acquire their related authoritative data sets. Additionally, there is a significant opportunity to educate and drive GIS to comply with standards across all domains across the state, especially in support of crucial statewide initiatives. Success in these opportunities will depend heavily on engaging with a much larger and broader population of GIS practitioners, data users, analysts, and stewards across the State that can lead and manage inactive technical working groups who are tasked with the responsibilities related to developing data standards and identifying authoritative data sets related to the approved Framework themes.

However, the creation of data standards and accountability to those standards are only a small part of data governance. General oversight and standards development only constitute a good start toward true data governance. Over the past decade there has been very little measurable progress to develop a comprehensive data governance process and a data governance organization that crosses organizational boundaries and reaches the GIS operations of organizations and entities across the state. Some of the more established organizations have mature internal governance processes that are unique to their organizations. Most, however, do not have formal governance processes to which they are held accountable. Lack of effective and efficient data governance leads to situations where data are of lower quality, often lack metadata, are not consistent, are not complete, or struggle with accuracy. In situations where no formal governance organization exists, the quality, accuracy, usability, completeness, and trust in the data is often the result of individual effort and attention to detail. However, those data often lack the desired

broader coherency and uniformity when individual organizations seek to ensure the data are fit for a very specific local or internal purpose.

Lack of funding and lack of staff are two of the greatest struggles for GIS across the state. Nearly all survey and meeting participants indicated these two challenges as primary contributors to their inability to grow and mature GIS in their organizations. The ongoing challenge is to find and secure sustainable funding streams dedicated to enhancing GIS integration and maturity levels, provide funding for GIS internships, and for hiring GIS professional staff. Public service salaries have difficulty competing with the private sector which adds another level of complexity to finding and engaging experienced GIS professionals. Those agencies and enterprises where GIS is well integrated into their business processes and are contributing to senior level decision-making within their own organizations are largely those who have sustainable GIS funding and greater numbers of experienced GIS professional staff.

The issue of sustainable funding and appropriate staffing presents a “chicken and egg” dilemma. Without funds and/or appropriate staffing, GIS professionals and stakeholders continually have difficulty proving their value to their organizations. However, without proof of the value of GIS to an organization, funding and staff will not be a priority in budgets.

4 LOOKING AHEAD - OPPORTUNITIES AND CHALLENGES

4.1 INTRODUCTION

Opportunities and challenges are those things that help or hinder an organization’s ability to achieve the goals and objectives of the Strategic Plan. Successes, in the form of completing specific projects, will come organically as individuals and organizations successfully engage with, and achieve, the core principles defined in the Strategic Plan, and when goals and objectives are successfully achieved. Taking advantage of opportunities and overcoming challenges occur when individuals and organizations, individually and collectively, collaborate to accomplish the goals and objectives that are defined for each core principle, proactively overcome roadblocks that stand in the way, and work jointly to reach the desired “future state” of GIS in all their various organizations across all state domains.

Abundant opportunities exist to mature and expand the use and impact of GIS throughout Idaho, to improve the skills, the practical experience, and the knowledge of GIS professionals, to mature and enhance communications about the value of GIS with stakeholders and decision-makers, and to increase the value of GIS data and analytics to organizations throughout the State. Successfully attaining these objectives can best be demonstrated through developing and carrying out mission-critical GIS projects that have broad visibility and are highly valuable to the safety, health, education, and economic well-being of citizens across the State of Idaho.

Several high-profile projects exist that will demonstrate the resolve of individuals and organizations to proactively work toward achieving the goals and objectives of the Strategic Plan. Simply put, these projects have significant value to the State and to its citizens but will require a coordinated and focused effort across organizations and between multiple government entities at all levels to actively embrace the core principles and their defined focus areas by collaboratively working to achieve the goals and objective defined in the Strategic Plan.

Some of the upcoming GIS-related projects that will provide statewide benefits and have significant across multiple programs and initiatives include, but are not limited to:

1. Next Generation 9-1-1 (NG9-1-1)
2. Broadband Mapping
3. The Idaho Address Database
4. Finishing The Idaho Map (TIM)
5. State Parcels Database

4.2 OPPORTUNITIES

4.2.1 Technology and Architecture Improvements

Advances in technology and related architectures provide a mature and viable foundation to support data interoperability, data sharing, data security, and data democratization across the state. The proliferation of cloud-based systems and services, many fully managed, and improved local data-center capabilities are available to help both inter- and intra-organization data collaboration and sharing.

Data that are private can be easily stored and securely transmitted to ensure compliance with privacy laws and regulations. Public, or open, data can reside in repositories in multiple locations and platforms and be available through a single Open Data portal to simplify data searches, data discovery, and data download in a variety of proprietary and non-proprietary formats.

Data can also be stored and organized in a large variety of formats (including non-proprietary formats like CSV, GeoJSON, OGC services, etc.) to simplify access and to ensure standards are kept and will facilitate usability independent of any specific software. Web services and APIs are viable ways to interact with stored data. The technology to store and manage metadata across data sets and data platforms has also improved making data discovery and usability more assured.

4.2.2 Authoritative Data and TIM

Adoption of a data layer for inclusion in TIM as a Framework theme has traditionally been a long and somewhat tedious process that has been carried out by TWGs for their individual Framework themes. In the past year two of the processes, writing Framework data standards and nominating authoritative data sets have been reviewed and simplified. Opportunities exist to simplify the other steps involved in identifying the correct data sources, creating a standard authorization process, and defining/creating delivery mechanisms.

Identifying and collaboratively working with those Framework data layers that have more complex workflow (for example control points and the cadastral layers) and, potentially, multiple data sharing agreements, are opportunities to engage in broader conversations and collaborations across multiple organizations and agencies. The development of standard processes for working with complex data sets will assist in not “recreating the wheel” every time there is a need.

Several individual organizations and a few TWGs have processes in place to ensure that their data are authoritative, but these are often understood only by the data stewards and analysts involved with those data. These groups have published and/or shared important data sets, layers, and other data products within their own organizations or with the larger GIS community. There is a large

opportunity to document data authorization and management processes, so they do not get lost when subject matter experts (SMEs) leave the organization or when long time periods occur between data publication efforts.

This opportunity also includes developing any standards required for data to be considered authoritative and to put in place processes that ensure that data are kept timely and accurate over months and years.

4.2.3 INSIDE Idaho

The GIS statewide data repository and web portal presents additional opportunities. Securing funding and engaging an advisory committee could provide support and relief to current development and management resources at the University of Idaho. Funding development resources for enhancing the user interface/user experience (UI/UX) of the site and other custom development activities, as well as the underlying data architecture and (if needed) the underlying hardware capacity and capabilities, will help to make INSIDE Idaho a showpiece for GIS across the state. An enhanced INSIDE Idaho will also serve as a communication and education tool aimed at decision-makers in state and local governments, education, and the state legislature, in addition to increasing visibility and access to data and GIS success stories.

4.3 CHALLENGES

4.3.1 Cost of engagement

Implementing a statewide Spatial Data Infrastructure (SDI) was initially defined as the desired outcome of the 2009 Strategic Plan and was not realized. In part, this was due to the significant price tag and proposed operational processes changes included in the 2009 Business Plan. A fully realized Idaho SDI is still required to achieve the mission and vision for GIS in the state. The cost of engagement includes both funding and specific efforts to reengineer business processes. Agencies and organizations that have invested in, and integrated, GIS into their business processes have addressed in part, or in whole, the costs of engagement. However, there are many more throughout the state that will need to take a hard look at the value GIS provides, and the fiscal and physical investments to get there. It is recognized that this will be a slow process until there can be funding and adequate staffing at the Idaho Geospatial Office (IGO) whose mission is centralized leadership, support, technology and services resources, standards, training, and coordination for the Idaho GIS community (<https://gis.idaho.gov>). A “GIS service center” is needed to assist individuals, managers, teams, and organizations achieve the goals of the Strategic Plan. A service center would provide inter-organizational support and services to the GIS community and would leverage centralized technology and staff to provide economies of scale, depth of skills, and collaborative services to agencies and other organizations across the state.

4.3.2 Availability and quality of GIS data

Authoritative GIS data are produced and maintained by many public agencies/organizations, and several of those layers, such as road centerlines, address points, and parcels are produced by different agencies with a variety of data schemas. Data quality, as well as the ability and willingness to share these data, varies across the State.

With the increased use of ArcGIS Online (AGOL), many users have indicated they find it difficult to easily locate current, authoritative data. This can lead to maps and data-informed decisions based on data of lesser quality and accuracy.

Often, similar datasets are available from different sources, different time periods, and are produced by different people – many of them not an authoritative data source. This leads users to be overwhelmed and exposes them to the risk of using outdated, incomplete, or inaccurate datasets. This challenge comes with several opportunities as listed in section 4.2.2.

4.3.3 Development of, and buy-in to, standards set by the IGC-EC and the Idaho Technology Authority (ITA)

As part of their functions, the IGC-EC recommends policies, standards, and guidelines to the ITA for GIS data and processes that relate to GIS professionals in Idaho (<https://ita.idaho.gov>). While those policies and other documents are directly applicable to State Agency employees, they should ideally be followed by other GIS professionals and organizations. Non-state organizations and GIS staff often have a hand in drafting the policies, standards, and guidelines that are submitted to the ITA by the IGC-EC. For example, [Enterprise Standard S4220](#), requires GIS data to be accompanied by a minimum set of metadata in a metadata standard specified in S4220.

This challenge speaks to the inability of the current governing bodies to enforce compliance with approved standards and policies aimed at ensuring standards for GIS data and their management, their metadata, data interoperability and sharing, and compliance with privacy and data security laws and regulations. It also speaks to the need for compliance with policies and standards across the GIS landscape, and the value that compliance brings beyond the use-focused needs of individual organizations and agencies. Without compliance with policies, best practices, and standards ensures that data sharing, authorization, usability, and data being “fit for use” (e.g., usable for NG9-1-1) will be inhibited. This will result in additional cost and staff efforts to clean and “fix” data before they can effectively be shared or made interoperable with other data.

4.3.4 Hiring

There is currently a nationwide challenge finding and hiring technology staff across all technology domains where popular skills and years of experience are in short supply. GIS managers may struggle to find appropriate skill sets and experience levels to fill positions that come available through attrition, or new positions that are approved. As educational institutions continue to turn out GIS graduates, hiring managers may be forced to hire less experienced staff and invest in their training through mentoring and on-the-job experience.

4.3.5 Ongoing and sustainable funding

Most agencies and organizations have desires to grow and mature their GIS operations and capabilities, and to become an integral part of internal business processes. This can only happen with sustainable funding to provide adequate staffing, tools, and systems to support GIS as an operational and strategic asset.

Many teams and organizations, including the IGO, seek funding for different GIS projects through grants. Most grants are project-based or “outcome defined” which means this funding is typically temporary. Grant funding makes it difficult to find qualified GIS staff for temporary,

contractual employment and leads to the risk that projects will be abandoned once funding expires.

The GIS community will continue to struggle to show long-term, consistent relevance and value until there are sustainable funding streams included in annual budgets and allocations.

5 CORE PRINCIPLES

Section 2.3 identified five GIS core principles that identify focus areas of strategic importance and that inform the goals and objectives of the Strategic Plan. The five core principles were identified by GIS practitioners and leaders in surveys and focus meetings as areas that are, and continue to be, of constant concern and challenge in enterprises across Idaho. These are:

1. Governance
2. Data Quality and Access
3. Training and Education
4. Communication, Outreach, and Coordination
5. Sustainable Funding and Funding Opportunities

Building the goals and objectives of the Strategic Plan within the bounds of the core principles keeps the emphasis of actions and tasks on achieving the mission and vision. While they are addressed individually, the core principles are closely related and highly interdependent. As teams and organizations address them individually within their own enterprises, or collaboratively in broader contexts, progress will be made toward achieving the vision and mission for GIS in Idaho.

5.1 CORE PRINCIPLE 1: GOVERNANCE

GIS governance in Idaho has evolved over time as technology and its oversight have changed and the need for statewide coordination and governance for Idaho's SDI were recognized. The 2009 GIS Strategic Plan proposed a governance structure where the Idaho Geospatial Office (IGO) operated under the Office of the CIO that, at that time, was part of the Department of Administration. The governing council for technology in 2009 was the Information Technology Resource Management Council (ITRMC) and it was proposed that the ITRMC recognize the role and authority of the IGC-EC as the governing committee for the IGC and have a seat on that council to represent GIS. The IGO would provide state support for the IGC and the GIO would have a seat on the IGC-EC. A state agency coordination group (chaired by the GIO) and regional GIS resource centers would operate under the coordination and authority of the IGO. Technical Working Groups (TWGs) and ad hoc committees would be organized under the leadership of the IGC-EC to work on SDI Framework themes and other needs related to GIS in Idaho.

In 2018 Governor Little implemented a "modernization" initiative with the intent to centralize Information Technology and Telecommunications systems and services, to reduce costs related to technology, and to optimize technology related staffing and coordination. The Office of Information Technology Services (ITS) was created as the home for centralized technology systems and services for Executive Agencies and the Office of the CIO was moved under ITS, as was the IGO. At that time the Idaho Technology Council (ITC) was created and replaced the ITRMC as the top technology governing body in the state with authority to set standards, policies, and guidelines. The organization for Idaho's SDI did not change and the IGC, IGC-EC, and TWGs remained as they were organized previously.

5.1.1 Governance Defined

In a broad sense, governance is associated with the organizational structure of an enterprise including the governing bodies that are in place to oversee strategic and operational activities, create

and enforce policies, define priorities, represent the organization to higher authorities and to the public, and coordinate the various functional groups to address the needs and goals of the organization.

For additional discussion and references on the definition of governance, see [Appendix I](#).

5.1.2 Current GIS Governance Organization in Idaho

The current statewide organizational structure for GIS governance and operations, and their relationships to the ITS and the Idaho Technology Authority are shown in Figure 1.

Idaho GIS governance derives its authority from the ITA which was created by Idaho statute [I.C. § 67-832](#). Within the mission and vision plan the [Idaho Code I.C. § 67-833](#) grants ITA authority to set standards, policy, and guidelines. The ITA is composed of 18 members and six support staff members. One of the member seats is filled by the Chair of the IGC-EC. One of the ITA support staff members is the State Chief Data Officer/Geospatial Information Officer (CDO/GIO).

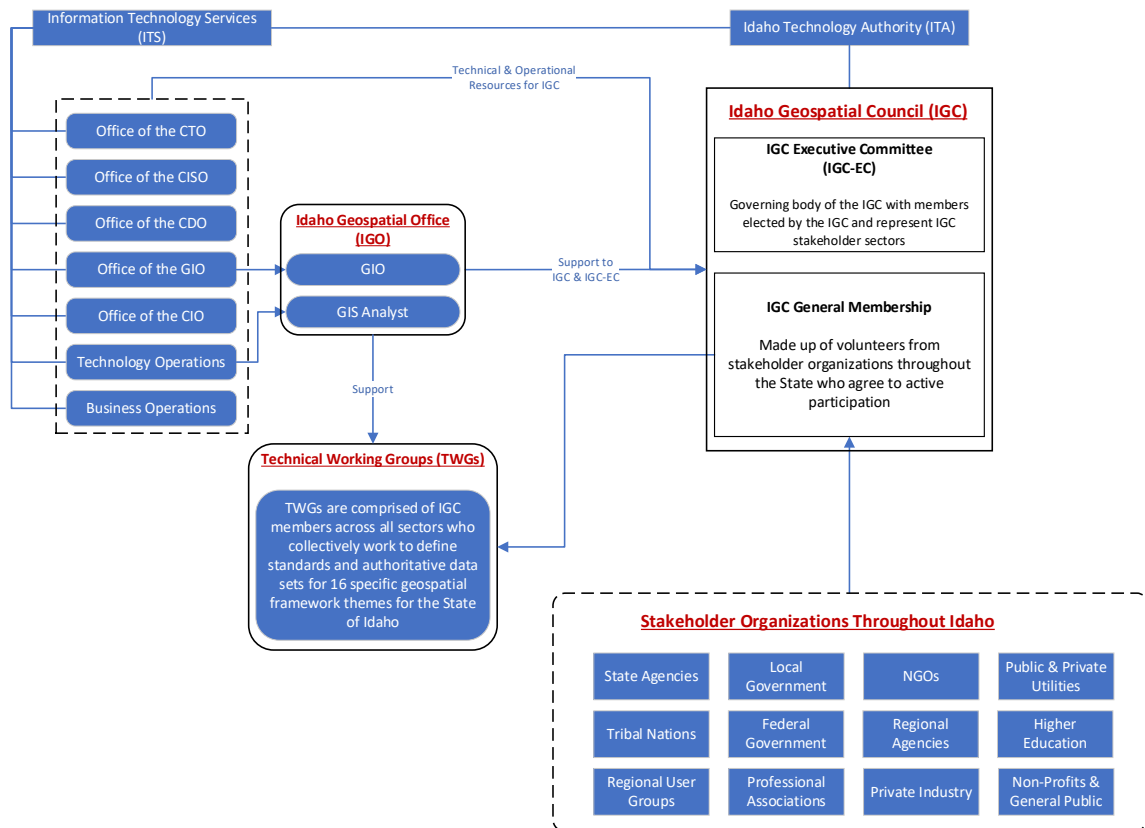


Figure 1: Current Idaho GIS Organization

The key role for governance of GIS at the state level is the position of Geospatial Information Officer (GIO). The GIO leads the Idaho Geospatial Office (IGO) whose mission is to “provide centralized leadership, support, technology & services resources, standards, training, and to coordinate GIS activities for the Idaho GIS community.” (<https://gis.idaho.gov>).

The organization, roles, responsibilities, and relationships of the Idaho Geospatial Council (IGC), the IGC Executive Committee (IGC-EC), Technical Working Groups (TWGs), and the GIS community, along with an overview of current GIS communications platforms can be found in [Appendix I](#).

Idaho has many knowledgeable GIS professionals, many of which are willing to volunteer their time towards helping others and helping to improve GIS value to Idaho. However, nearly all these professionals have full time jobs and often cite lack of time available to volunteer as a deterrent. Additionally, the lack of progress and follow-through experienced during the previous GIS Strategic Plans has led many GIS professional volunteers to give up, disengage, and stop volunteering. In short, the SPC feels that Idaho has not had enough “wins” to keep the momentum going.

Within agencies and other organizations throughout the state there are very few formalized internal GIS governance bodies, processes, policies, or procedures, with the general exception of higher education. The few state and local agencies, and other organizations that have mature and engaged GIS teams and processes have not indicated that they have formalized internal governance policies and processes, but usually adhere to formal standards related to their areas of responsibility and focus. However, those standards do not always mirror the standards approved by the IGC-EC or standards formulated for specific national and regional GIS related initiatives such as NG9-1-1 or the National Address Database. The majority of state GIS professionals and their organizations lack formalized internal governance that includes policies, data standards, standard operating procedures, best practices, or other documentation that are necessary for GIS governance. Mature GIS shops have a management structure to provide guidance and oversight to GIS activities, procedures, and projects in the organization. However, these are a significant minority relative to the total number in the state.

5.1.3 Assessment of Current GIS Governance Gaps and Needs

Several challenges and opportunities came to light with respect to GIS organization and governance during the research done for this Strategic Plan. The goals and objectives that relate to the core principle of governance are aimed at addressing these challenges and opportunities.

5.1.3.1 Leadership

A consistent theme in survey responses and meeting comments from GIS professionals and managers was lack of funding and staffing. This directly applies to both the IGO at the state level and internally to agencies and organizations. Staffing the IGO will reduce the already significant burdens of work done by volunteers who struggle with burnout from the demands of a full-time job and efforts to provide volunteer support of GIS initiatives and activities. Staffing the GIO leadership office at the state level would provide more focused support and resources for TWGs and their framework layers and would take a portion of the load off volunteers while maintaining momentum on important and impactful work.

GIS leaders at all levels do not often have a seat at the executive table, or even the managerial tables, where significant decision-making and operational priorities are set.

GIS leaders at all levels often do not have a seat at the executive table, or even at managerial tables, where significant decision-making and operational priorities are set. Having an authoritative and visible presence at the appropriate management levels will help to elevate GIS as a mission-critical component in fulfilling the missions of state and local agencies and other organizations. Additionally, there will be stronger collaboration and integration as local GIS leadership becomes a viable business partner and not a service team within the organization. Local GIS leadership will be strong influencers in being able to accomplish the many goals and objectives of the Strategic Plan. These types of changes are not easy, do not happen quickly, and require a significant amount of influence to prove the value of changing the makeup of leadership teams. This influence can potentially come from external and/or internal demonstrations of value to the organization and evidence of trust for GIS functions, value, and leadership.

5.1.3.2 Formalize Duties, Memberships, and Missions

It has been discussed during the development of the Strategic Plan that membership in the IGC, the IGC-EC, the TWGs, and other organizational entities are too loosely defined and lack rigorous definitions of rights, responsibilities, and requirements of membership. In past years there have been initiatives and projects that have failed, or have never started, due to a lack of participation or lack of engagement with the statewide GIS organization by those who are identified as “members”. There is a strong and vibrant GIS community in Idaho with many experienced and knowledgeable GIS professionals, students, and stakeholders who are actively participating in furthering the growth and use of GIS in their organizations and through participation with the larger community of the IGC and TWGs. However, there appears to be a larger group that does not actively engage and do not have the benefits of support, learning, knowledge sharing, and participation in beneficial activities that come from active engagement.

See [Appendix I](#) for details related to membership, duties, missions, opportunities, and recommendations for:

1. The Idaho Geospatial Council (IGC) – Membership should have greater recognition, visibility, and value to the GIS community. Membership value and responsibilities should be more explicitly defined and communicated
2. The Idaho Geospatial Council Executive Committee (IGC-EC) – Membership needs additional structure and formalization of rights, responsibilities, and expectations. To achieve the purpose of the IGC-EC as stated in the bylaws will require more active engagement by members.
3. Technical Working Groups (TWGs) - To better support and improve TWG outcomes and deliverables, there is a need to formalize TWG organization, management, and functions. It is proposed that this can best be achieved using a formal TWG charter
4. Standing Committees – These are proposed to provide more direct oversight for improved GIS governance and to provide directed focus for carrying out the goals and objectives in the Strategic Plan

5.1.3.3 Collaboration

Multiple opportunities exist to enable and improve collaboration within and between organizations. Breaking down silos and discovering solutions that positively impact the broader GIS community and benefits the state as a whole can only be accomplished by working together

toward mutually agreed upon goals and outcomes. The GIS community in Idaho already has strong relationships that have been developed over years of working together. It is important to continue to utilize those strong relationships and to develop new trusted relationships as more GIS professionals engage across the state.

Working to ensure unified messaging is crucial to the success of governance in any endeavor. For the purposes of the Strategic Plan generally, and to governance specifically, consistent unified messaging is crucial. By necessity this must happen at and within individual agencies and organizations at the same time as it happens across all GIS domains in the state. Unity in messaging is a powerful indicator of solidarity and ensures that wherever the message is heard, it is the same, that the goals and objectives are the same, that there is a shared vision and a shared mission that will benefit each stakeholder, each team, and each organization. This includes things like websites, open data portals, controlled access portals, clearinghouses, templates, blogs, newsletters, presentation slides and other online resources used for communication, data sharing, documentation, and education/training.

Collaboration also requires the ability to coordinate and share knowledge, experience, and, perhaps most importantly, data. In governments and educational institutions this usually means legal agreements, especially when sensitive and/or proprietary data are involved. Other states have had success simplifying data sharing agreements to a single document that works for all involved instead of multiple unique, one-off agreements that must be created and managed separately. The power of collaboration allows GIS organizations to access and utilize data that often adds additional context and value to analytics products, provides added evidence for more complete and accurate decision-making, and brings new depths and scope to actionable intelligence derived from GIS products.

5.1.4 Governance Goals, Objectives, and Tasks

A. Goal 1: Improve GIS leadership operational capacities and capabilities

1. **Objective 1.1:** Create and define the roles required for the IGO to function as a centralized strategic and operational resource for the IGC-EC to carry out their responsibilities as the GIS decision-making and steering body of the IGC:
 - a) Define Roles, responsibilities, and authorities of a state level IGO
 - b) Determine Budget/Funding requirements
2. **Objective 1.2:** Use the results from Objective 1.1 to develop a model that could be adopted at the agency/organization level
 - a) Expected staffing and budgetary needs
 - b) Note: Multiple models that could be used (or modified for use) depending on the organizational structure, limitations, and abilities of the organization
 - c) Draft a playbook for use at the agency/organization level for how to work toward implementation of improved local GIS governance and operations, and ways for GIS to be included at the strategic and operational management “table”
3. **Objective 1.3:** Draft proposed updates and changes to the IGC Bylaws to address:
 - a) The formation and functions of standing committees and the role of the IGC-EC in their formation, direction, and responsibilities

- i. Define which standing committees will be formed and define the method(s) for additional standing committees and/or retiring them
- b) IGC membership responsibilities, expectations, and benefits
- c) IGC-EC membership responsibilities, expectations, and benefits
- d) TWG responsibilities and functions, standard guidelines, charters, documentation, etc.

B. Goal 2: Implement the deliverables from Goal 1

- 1. **Objective 2.1:** Create the implementation plan for the deliverables from Goal 1
 - a) Draft legislation (modeled on legislation in other states) that defines and creates authority and funding for state GIS governance and services (See Section 5.4.4 Goal 4 about legislation)
 - b) Follow the requirements for adding, altering, and amending the IGC Bylaws to include the changes drafted in Goal 1, Objective 3.
 - c) Define needs and plan the implementation of additional benefits for IGC membership as defined in Goal 1, Objective 3, task b)

C. Goal 3: Define and create “unified messaging” for GIS value, use, and importance that can be applied at all levels and in all organizations in the state

- 1. **Objective 3.1:** Standard designs and formats for online resources
 - a) Engage a standing committee (if formed) or ad hoc committee to define and document design standards to unify the “look and feel”
- 2. **Objective 3.2:** Define the unified “messages”
 - a) Collaboratively identify and document the “messages” the GIS community needs/wants to support collectively, along with a proposed timeline for implementing
- 3. **Objective 3.3:** Operationalize unified messaging across all GIS domains in the state
 - a) Work with local GIS staff and teams to ensure the local online resources comply with design standards and supports the messaging that is agreed upon
 - b) Provide training for GIS leaders and spokespersons to be able to effectively communicate the unifying messages agreed upon

D. Goal 4: Simplify and encourage data sharing

- 1. **Objective 4.1:** Create a standard data sharing agreement that can be used for GIS data sharing initiatives throughout the state
 - a) The IGC-EC together with the IGO/GIO will draft a proposed enterprise MOU (eMOU) based on successful eMOU’s from other states
 - b) Work with the ITS Deputy Attorney General (DAG) to ensure legal compliance and that the eMOU meets the purpose of its intended use to allow collaborating agencies/organizations to share non-public data effectively and efficiently

2. **Objective 4.2:** Design and implement architecture and infrastructure, or take advantage of existing architecture/infrastructure, that supports and enables data sharing and data sharing accountability for all entities desiring to engage in data sharing
 - a) Assess current technology resources that are available to store, protect, manage, and provide controlled secure access to shared data to approved users
 - b) Create appropriate policies and procedures that define and govern the processes for implementing data sharing between entities and auditing of the same
 - c) Ensure these are appropriate for local agency/organization (intra-organization) level, at the statewide level (inter-organization), and for the public
3. **Objective 4.3:** Implement and encourage data sharing
 - a) Use a standing committee (if available) or an ad hoc committee to explore, define, and document current non-public data sharing opportunities and define/design future data sharing opportunities and their benefits to enhancing analytics and decision-making
 - b) The standing committee (or ad hoc committee) should engage with GIS staff at the agency/organization level to educate about public and non-public data sharing opportunities, help define the standards and requirements, outline benefits, and help them plan processes to engage in data sharing opportunities.

E. Goal 5: Improve interactive communications

1. **Objective 5.1:** Explore opportunities to move beyond ListServ as a unidirectional communication platform
 - a) Identify needs from the IGC membership to better engage in bidirectional communications on issues, opportunities, and collaboration
 - b) Utilize a communications-focused standing committee or ad hoc committee to study and recommend potential solutions for better interactive communications platforms for GIS throughout the state
 - i. Potential solutions could be blogs, chats, group emails, and other group communications platforms/tools
 - c) Identify costs and implementation requirements to support requests for sustainable funding
 - i. If a suitable solution is already being used by part of the GIS community, explore the options for expanding use and usability

5.1.5 How to Measure Progress and Success

Progress and success can be measured by the increase in membership of the IGC and increased engagement by members of the IGC. In addition, progress toward significant deliverables like the eMOU and active progress toward enterprise data sharing will be indicative of progress. Full success will be achieved as standing committees are formed and engage in their work, data sharing becomes the norm rather than the exception, and bylaws are modified and approved.

5.2 CORE PRINCIPLE 2: DATA QUALITY AND DATA ACCESS

At the core of the GIS Vision is getting authoritative data to people (see the Glossary in Appendix M for definition of authoritative data). This implies that the data are of the highest quality. Additionally, these authoritative data must be accessible to those who need them in the format(s) required to be valuable to the enterprise in leading to highly effective, data-informed, actionable intelligence.

5.2.1 Quality Data Are Trusted Data

For data to be trusted, the quality of the data is paramount. Data quality can be defined as the conformance of data to business definitions and business rules. This implies that data are “fit for purpose” or, more simply, are specific for the purpose(s) to which they apply. The primary principle to keep in mind is that data quality is highly dependent on context. For example, parcel data, i.e., boundaries outlining land ownership, are created in Assessor offices across the state to support the assessor’s duty to assign value to property. Even though parcel data are very valuable for other uses, the quality of the data is determined by the use for which those parcels are created. The decision tree for data quality starts with two branches; Are data “good” or are they “bad”? Defining when data are good, and when they are not, is important in the greater scheme of decision-making, and establishing trust in the data. Good data lead to evidence-based, data-informed decisions and to more productive, and effective, actions. Bad data lead to less effective decisions (sometimes to decisions that are outright wrong) and to ineffective and inefficient actions that use up valuable resources with little return. Bad data often lead to confusion due to the creation of conflicting reports and analyses which throw doubt on what the truth really is. They also slow down decision-making that negatively impacts being able to define the correct actions to take. Data quality management is, therefore, a critical and necessary process to ensure that data are fit for purpose and are “good data” that accurately represents reality. To assess data quality there must be qualitative and objective characteristics that provide a measurable (and quantifiable) basis for data quality.

The importance of the dimensions of data quality, characteristics of data that are measurable and that are important to business processes, is discussed in Appendix J. Data trustworthiness and the importance of data stewardship are also discussed in Appendix J.

Data quality dimensions address characteristics of data that can be measured objectively and others that are context dependent or interpreted subjectively. They are characteristics that are important to the organization’s business processes.

5.2.2 Current State of GIS Data Quality and Access in Idaho

Idaho has a mature GIS Data web portal called INSIDE Idaho (<https://insideidaho.org>) that is hosted and maintained by the University of Idaho (U of I). INSIDE Idaho contains a significant amount of data content and is actively being promoted in higher education courses and by the IGC-EC. INSIDE Idaho continues to operate on part-time staffing from the U of I Library. Those that maintain the site have done a good job staying current with technology and linking INSIDE Idaho to Open Data Portals of various agencies in Idaho.

Most public entities with dedicated GIS staff maintain Open Data sites where users can find and access publicly available spatial and other data. ITS maintains a GIS Open Data Portal linked to Open Data Portals at other State Agencies, while INSIDE Idaho is a single point of access with a much broader distribution of connectivity to GIS data from a large number of state, local, and federal organizations.

Most non-public data sharing in the state happens ad hoc through point-to-point memorandums of understanding (MOUs) that define which specific data can be shared and what they can be used for. Based on stakeholder and other feedback in ad hoc interviews, broad non-public data sharing to enable true simultaneous data interoperability between multiple organizations is very rare. Several government agencies actively participate in federal initiatives and provide data to federal databases and conversely are permitted access to those databases that contain data from other states as well. In some cases, federal funding is available to those agencies who support these federally mandated data initiatives.

[Appendix J](#) has details and discussion about the “current state issues” that have been identified with respect to data quality and access which include:

- Locating authoritative data that are complete and/or current
- Lack of standards related to data quality
- The need for data to comply with generally accepted/required standards at the time of acquisition or creation

5.2.3 Assessment of Current GIS Data Quality and Data Access Gaps and Needs

Through the discovery work of the SPC, several gaps were identified related to data quality and access as indicated in the bullets below. Additional detail and discussion for each bullet point can be found in [Appendix J](#).

- Past Strategic Plans have focused on public data specific to the Idaho SDI and TIM, without specific attention to non-public GIS data that are valuable to the enterprise.
- Authoritative data need to be “fit for use” and worthy of trust through proactive data stewardship, data management best practices, and ideally fit into the concept of “create once, use many”.
- Knowing where data are, their quality, and their contexts are the first necessary steps in being able to use data effectively. Finding and cataloging all GIS data will reduce the amount of work spent in finding and validating data required by analysts and other data users.
- Data retention policies are needed to reduce confusion from multiple versions of the same data set, to ensure that available authoritative data are current, and that other relevant data are archived appropriately as defined by law or policy.

Discovery surveys and meetings have led to identification of four focus areas that identify gaps and needs for Idaho’s GIS data regardless of where they physically reside or the data domains in which they are located. Details of these focus areas are also in [Appendix J](#).

5.2.4 Data Quality and Data Access Goals, Objectives, and Tasks

A. Goal 1: Improve/Enhance Data Stewardship

1. Objective 1.1: Identify and Organize GIS Data Stewards

- a) Identify organizations and personnel that are responsible for the stewardship and maintenance of Idaho SDI Framework theme layers of TIM
- b) Identify GIS data stewards, or those who function as GIS data stewards, in agencies and organizations throughout the state (for statewide data domains) or internal for divisions in an organization (for individual agency/organization data domains).
- c) Organize a GIS Data Stewards working group with membership made up of data stewards identified in above, to operate under the oversight of...
 - i. ...the IGC-EC and chaired by a member of the IGC-EC (for statewide data domains)
 - ii. ...the agency/organization governance organization (for individual agency/organization data domains)

2. Objective 1.2: Engage and Train Data Stewards

- a) Task the Data Steward working group to develop, document, and propose standards for data quality, authentication processes, and general and theme-specific metadata requirements that support statewide and/or industry best practices
- b) Develop training and/organize training related to the data steward role, best practices, statewide standards, data quality, etc. for current and new data stewards
- c) Data Stewards should participate in a Framework theme TWG if the data they are stewards over are relevant to that Framework theme.

3. Objective 1.3: Identify and document standard data processing and validation processes

- a) Inventory different processing requirements for GIS data based on purpose and/or types to ensure consistent treatment for similar data regardless of which organization creates or authors them
- b) Document the requirements from step a)
- c) Define what is required to validate data as authoritative and if the requirements differ based on data type or data purpose
 - i. Who validates? How is it documented? What metadata are required? Are there any caveats?
- d) Train data stewards and other GIS stakeholders on standard processes for data handling and validation. Revisit training annually

B. Goal 2: Data Uniformity and Quality

- 1. **Objective 2.1:** Define rules and processes for identification of data provenance to be included in metadata to ensure usability and uniformity in processing and handling for similar data sets

2. **Objective 2.2:** Create a GIS data dictionary for each GIS data set
 - a) Identify data dictionary format that allows documentation of all data field definitions, formats, acceptable values, default values, etc.
 - b) Engage data stewards and analysts to use the standard form to create and maintain the data dictionaries for their organizations and/or data sets
 - c) Link data dictionaries to cataloged data sets to support reliable and accurate analytics
3. **Objective 2.3:** Coordinate on a regular basis the work of the TWGs to ensure minimal overlap and to reduce duplicate work
4. **Objective 2.4:** Make approved schema available to download as an empty file geodatabase feature class
5. **Objective 2.5:** Identify errors, gaps, and other issues in existing GIS datasets and address fixing those issues
 - a) Create and publish a process for data consumers to identify and report errors, gaps, and other issues with data
 - b) Coordinate the process in a) with a standard operating procedure for data stewards to be informed of issues, address them, and close out the report
 - c) For those datasets that are based on aggregating data from multiple sources, identify topology errors and use the identified process and SOP for data producers to fix any gaps in overlaps.

C. Goal 3: Improve and Enhance Data Discovery, Findability, and Reliability

1. **Objective 3.1:** Build and Maintain a Comprehensive GIS Data Catalog System
 - a) Identify funding and staff requirements for IGO to build and maintain a comprehensive data catalog for all shared, and sharable, data sets
 - b) The purpose of a data catalog is to make GIS data findable and to comprehensively manage metadata associated with public and non-public data
 - c) Purchase/Implement COTS or Open-Source cataloging solution/platform
 - d) Engage and train data stewards across all GIS data domains to discover, identify, classify, and catalog public and non-public GIS data resources
 - e) Develop and document data catalog standards, processes, and best practices
 - f) Link or create metadata from Objective 3.2 (below) with cataloged datasets
 - g) Teach and train users to search for data before making efforts to duplicate existing data; create once, use many
 - i. Develop a process to enhance communications and collaboration to reduce duplication of efforts and duplication of data
2. **Objective 3.2:** Require High Quality Metadata
 - a) Review and update (if needed) S4220 – Geospatial Metadata to ensure it is still current from 2005 when it was written

- i. If changes are identified as being needed, then define what are the required standard metadata for all GIS datasets
 - b) Create process for defining additional “special” metadata required for individual datasets if they are needed
 - c) Update current data review and submission proposal processes to include checks for complete metadata required
3. **Objective 3.3: Create Data Retention Guidelines and Policies**
- a) Coordinate with the Idaho Historical Society to re-initialize the data retention project started several years ago
 - b) Discover and document GIS data sets that have not been used for a year or more
 - c) Create policies and guidelines for GIS data retention, archiving, and data destruction
 - d) Train GIS professionals and data stewards on the policies and procedures for data retention. Revisit this training annually

5.2.5 How success is measured

Quantifying success based on the improvement of data quality and accessibility will initially be a subjective process. Objective measures would require a full accounting and cataloging of all GIS datasets that reside anywhere in Idaho. Specific progress can be measured by the number of data stewards that comply with standards and policies related to data, metadata, data dictionaries, and how those data are managed. The number and focus of required new standards that are written, approved, and, more importantly, adopted across GIS data domains will also indicate progress. An important indicator of progress and success will be finalizing data retention policies and their adoption to reduce the sheer volume of unused, incorrect, out of date, and incomplete data sets and their replicated/duplicated copies.

5.3 CORE PRINCIPLE 3: TRAINING AND EDUCATION

5.3.1 Introduction

GIS is a rapidly evolving field, and the GIS professional must remain abreast of current technologies and best practices to be effective. Initially, the entry-level GIS Technician or GIS Specialist will likely have acquired current skills and knowledge through their college or university education. However, within a few years that same individual will frequently begin to struggle if they have not continued their education by attending applicable seminars, webinars, workshops, taking advantage of free or contracted training resources, and/or seeking industry certifications. Assessing the geospatial work force in Idaho is important for this same reason. As a state, the expectation that GIS professionals will remain current is not unreasonable. Furthermore, the state should play a role to encourage individuals and employers to pursue continuing education and thereby build a strong geospatial work force.

One essential part of this process is the need to better communicate the existing opportunities and events across Idaho, and for GIS supervisors and managers to be aware of GIS platform or solution-specific training resources and certification opportunities. A supervisor or entry-level GIS professional may not be aware of workshops and conferences that offer formal continuing education opportunities, the regional user groups that can provide informal education through mentoring, data sharing, and solution sharing, or training resources available through paid licensing or enterprise agreements. GIS leaders should also plan for the potential costs of training and education opportunities during their organization's budgeting cycles.

Early in the new millennia, the Gartner Group released a study evaluating total cost of ownership (TCO) for corporate computing. What they found is (1) the initial capital expenditure for a desktop computer accounts for only 25% of TCO whereas (2) end-user operations (i.e., an employees' ability to use the computer and software effectively) accounted for 40% of overall TCO. The recommendation that came forth from this study was for organizations to build a well-educated and effective workforce. This in turn drives down end-user operations to a targeted 1/3rd of observed costs and concurrently, drive up productivity within the organization.

As with other technical disciplines, there may be value in measuring and validating skills and knowledge against a common baseline. Industry certifications demonstrate that individuals have met a minimum standard of performance and knowledge as compared to their peers. The primary GIS industry certification is the certified GIS Professional (GISP) certification. It is a valuable, easily recognizable certification that shows GIS practitioners have met professional and ethical standards, and therefore should be considered for funding by agencies and organizations.

The result of these education efforts will lead to a better-informed decision process driven by sound data and the resulting information by adding GIS analytics to the decision-making arsenal.

In addition to educating the geospatial workforce, there is a need to educate and raise awareness amongst the GIS consumers. This is often the decision maker, city council member, county

commissioner, urban planner, land manager, etc. While it is not a realistic expectation, or even a practical goal, to expect everyone to become a GIS professional, the GIS consumer should be sufficiently familiar with data analytics and GIS to understand what it is and what it is not, its capabilities and limitations, and be able to engage in a meaningful dialog with the GIS professional to describe a project or problem that might be addressed using GIS. The result of these education efforts will lead to a better-informed decision process driven by sound data and the resulting information by adding GIS analytics to the decision-making arsenal. To accomplish this, webinars can be provided along with the use of Story Maps and Dashboards including interactive web maps. Additionally, GIS leaders and professionals at all levels must find opportunities to engage in projects that both demonstrate the added value of GIS analyses and captures the attention of project managers, division supervisors, and executive leadership. This is not a passive endeavor and will require active, and proactive, engagement at every opportunity and at every level.

Building the future of Idaho's geospatial work force is important as the need for spatial data and GIS professionals is expected to grow at a rate faster than the national average through 2029 (<https://www.onetonline.org/help/bright/15-1299.02>). To do this, a thoughtful and directed effort to introduce GIS into the Idaho high school curriculum is necessary. This will first require increasing awareness amongst educators and school board officials followed by adoption of GIS into the curriculum. While it might seem that GIS courses are a natural fit within a geography curriculum, limiting GIS to its applications in geography is short-sighted. Today, GIS has applications in statistics, data science, computer programming, and artificial intelligence. Thus, there is the potential for GIS to be integrated into several curricula across Idaho's high schools.

5.3.2 Background/History

The first Strategic Plan for GIS in Idaho was completed with the assistance of Croswell-Schulte and Associates in 2009. In the original plan, very little was written regarding training and education. This was not necessarily an oversight by the Idaho Geospatial Committee members or the consultant but rather an accurate reflection of that period. GIS and the geospatial technologies advanced at a much slower rate and occasional attendance at a professional conference would sufficiently enable the GIS user to readily keep abreast of the field. A revision of the Strategic Plan was begun in 2014 and approved in 2016. This brief revision again did not identify training and education as a primary concern or goal, but it did note the need for increased outreach and awareness as well as the opportunity for Idaho's higher education system to support future training and professional development. A mere five years later (2021) has witnessed tremendous advances in GIS software, web development, and technologies ranging from high precision geolocation, to advances in unmanned aerial systems, and artificial intelligence not to mention the burgeoning use of GIS by ever increasing sectors of society. Based upon these changes and anticipation of the continued acceleration of geospatial technologies, training and education has become a fundamental cornerstone of Idaho's current Strategic Plan.

5.3.3 Current Status of GIS Training and Education

Participants in the surveys and focus group meetings held during the discovery process for this Strategic Plan indicated that the vast majority lack the time, the funds, or both, for adequate and ongoing training. Another nearly universal response theme was that the sheer number of new

system tools and capabilities being added to GIS platforms each year is daunting and they are unable to keep up. There is a significant amount of frustration with the industry bringing too many changes to existing systems and too many new tools too fast for GIS analysts to learn and use them. Deprecation of existing tools that are replaced by new or upgraded system tools and apps also create situations where existing solutions and products have to be reengineered using the new products and capabilities, which requires not only the time to recreate the solution, but to try and rapidly learn the new tool or toolset.

With inadequate budgets and limited staffing, many GIS professionals in Idaho have indicated that they are challenged to keep up with growing workloads while keeping their skills up to date. Operationally this means that GIS solutions and products will not implement most of the emerging technologies and will rely on the current knowledge and skill levels of GIS professionals as their skills fall further behind. The potential outcome of this scenario is that the full value and strength of GIS in agencies and organizations will not be realized. Analytics products, GIS applications and solutions will be limited to existing knowledge and skills and, at some time in the future, may not meet the needs of the organization that the growing complexity of problems and challenges may demand. Additionally, the GIS workforce with the greatest amount of institutional knowledge, will see reduced productivity.

Funding for GIS training is specific to each organization and agency. Funding requests and the processes to request and get training funding vary significantly. State GIS staff have created and delivered several basic GIS training courses focusing on ESRI products, but lack of funds and inadequate staffing at the state level limit the amount of no-cost training that can be effectively developed and offered. The IGO is working to get funding and staffing that will allow the state to provide a GIS Services Center that will also work to provide ongoing GIS training opportunities and to work jointly with the office of the Chief Data Officer (CDO) to collaboratively address the need to build a more data literate workforce.

Currently, the IGO manages the website gis.idaho.gov which has a calendar for training and GIS events throughout the state. It is kept updated as training and event hosts provide the information for their classes and/or meetings and is intended to be a central site for all GIS training opportunities in the state. The state's higher education institutions also periodically provide both free and low-cost training opportunities to the GIS community.

As GIS becomes more mainstreamed as a powerful analytics and decision-making resource, the demand for a trained GIS workforce in Idaho will continue to grow. Over the past several years Idaho's universities and colleges have developed a solid offering of GIS courses to support certificates and majors. Some also have GIS related research opportunities that provide hands-on experience to augment classroom education.

5.3.4 Future State

A well-educated work force is a critical element unpinning the effectiveness of any organization. Currently, most human resources departments do not track the hours spent by GIS professionals on continuing education/professional development, so no baseline figure is available at this time. In light of this deficiency, and the current rate of technology change seen in the GIS field, it is recommended that all GIS employees in the state of Idaho complete a minimum of 20 hours of

professional development annually. This could include one full-day workshop (8 hours) along with 12 hours (1 hour per month) attending relevant webinars or completing online training activities as agreed upon by the employee and his/her Supervisor.

With a well-educated, well-trained workforce the value of GIS will increase as that workforce engages in mission-critical projects, GIS data creation & acquisition, and producing analytical products. Consistent planning and ongoing efforts to increase the visibility and demonstrations of value to organizations are crucial to achieving any desired “future state” of GIS in Idaho. Coordination and collaboration within and between organizations, assisting with the goals under Core Principle #4 in this document, working with IGC/IGC-EC standing committees for outreach and collaboration, and engaging in TWGs are all ways to capture the attention and imagination of decision-makers who have the authority to move GIS into the mainstream as a strong and effective tool in each organization’s data and analytics toolbox.

5.3.5 Goals, Objectives, and Tasks

A. Goal 1: Improve Workforce Training

1. **Objective 1.1:** All GIS employees in the state of Idaho will complete a minimum of 20 hours of continuing education annually (3-year implementation period proposed)
 - a) Discover and identify all GIS professionals across the state of Idaho
 - i. Define and implement processes to maintain the list up to date.
 - b) Discover the breadth of training interests, desires, and needs across Idaho’s GIS domains and GIS professionals
 - c) Provide a variety of venues and mechanisms to inform Idaho’s GIS workforce about training opportunities, webinars, workshops, and activities
 - d) Develop a central capability under the IGO where GIS professionals in the state of Idaho can document and track their continuing education achievements
 - i. Note: These achievements would be documented and assessed following the state’s fiscal year of July 1 through June 30.
 - ii. Investigate and promote how tracking and documenting training and education could be tied into each organization’s professional development/HR office as part of the employee’s records
 - iii. Work jointly with ITS development teams and Idaho’s CDO office to enable the UI/UX and data architecture to support GIS training tracking
 - e) Collaboratively develop a certification program that allows GIS professionals in Idaho to obtain and use that certification for professional development and growth.
 - f) Secure funding to assist Idaho’s GIS workforce to pay necessary fees associated with continuing education
 - i. This funding does not need to cover 100% of the training fees but could subsidize employers for part of the costs associated with professional development
 - ii. GIS leaders in organizations and agencies will identify opportunities to request appropriate budget monies to assist with professional training and development for their GIS professional staff

- g) The IGO will work jointly with the IGC, IGC-EC, and ESRI to utilize the skills of GIS professionals throughout the state and ESRI training resources available through their Enterprise Agreements (EAs), or other software contracts to create both online and live training opportunities
- 2. **Objective 1.2:** Develop agreements with Idaho's colleges and universities to provide workforce training and ongoing training/certification for the GIS workforce across Idaho's GIS domains

B. Goal 2: Educate Decision-Makers

- 1. **Objective 2.1:** Identify and maintain contact information for all relevant decision makers who have executive oversight, budget controls, or depend on GIS products to carry out their missions
 - a) Define the process to keep this data relevant and timely
 - b) Assign the management responsibility to a committee or to individuals in each organization who has visibility to those who have these roles
- 2. **Objective 2.2:** Create and staff the proposed standing committee for GIS Education, Marketing, & Outreach and engage them on this goal
 - a) Assign the committee to develop a comprehensive plan for engaging with decision-makers to actively demonstrate the value of GIS to their organizations, educate about potential future value possible, and engage in conversations about vision and needs of the organization that can capitalize on GIS products and analytics
- 3. **Objective 2.3:** The IGC-EC and the IGO work jointly to implement the plan from Objective 2.2.a
 - a) Refer to Section 5.4.4 Objective 2.4 to recognize and plan for interdependent efforts

C. Goal 3: GIS Engagement in Secondary and Higher Education

- 1. **Objective 3.1:** Create and engage an education working group made up of secondary and higher education staff, educators, advisors, etc. along with GIS state leaders, and Idaho STEM Action Center who can work jointly on designing and deploying a comprehensive program for GIS education initiatives at secondary education institutions, to showcase GIS as a career opportunity for college students, investigate grant opportunities for college GIS research, work with state and local government agencies to find/create internships and volunteer (for credit) programs for college students, and to develop other influence and training points for students to have touch points with Geography and Geospatial learning.
 - a) Include proposed budgets, staff requirements, grant and other funding opportunities, key contacts, etc.
 - b) Investigate opportunities to engage with Idaho Online to develop and distribute GIS curriculum and training

- i. www.idahoednews.org/voices/idaho-online-will-improve-distance-learning-in-higher-education/
- 2. **Objective 3.2:** Over the period covered by the Strategic Plan, implement the plan from Objective 3.1
 - a) Work with the institutions of higher education and the IGC-EC to create an implementation plan to achieve the desired outcomes
 - i. This could engage a standing committee

5.3.6 How do we define progress and success?

The primary indicator of success will come from GIS professionals having access to training and education to keep their skills updated and to learn new technologies that are being implemented. Additionally, as decision-makers and executive leaders learn about and understand the greater value that fully applied GIS resources can bring, progress can be determined by changes in organizations that allow GIS leaders to sit at the leadership tables and GIS funding begins to increase. In education, progress will be made as programs and outreach are more visible and available in secondary education and colleges and universities see increased enrollment in GIS related classes, seminars, certification classes, and degrees.

5.4 CORE PRINCIPLE 4: COMMUNICATION, OUTREACH, AND COORDINATION

5.4.1 Introduction

As in any enterprise, success in achieving the mission of the organization is primarily dependent on communication and coordination both within the organization and with customers, clients, partners, vendors, system providers, and a host of other mission-critical entities. Lack of communication and coordination ensures that different components crucial to the success of the enterprise will be out-of-step with each other. In this scenario, the strengths of each part of the enterprise cannot be used to their best advantage and time-sensitive actions will nearly always fail.

Success with communication and coordination only transpires with proactive planning and sustained action.

Success with communication and coordination only transpires with proactive planning and sustained action. They do not happen spontaneously in the course of carrying out business functions, especially at a large scale. Outreach is the process of making overtures to individuals, teams, divisions, and departments to “open the door” to engage in communication and coordination processes, legislation, and best practices that will ultimately benefit all involved.

Core principle #4 embodies goals that identify, engage, inform, demonstrate, and coordinate for GIS to be leveraged for the benefit and success of engaged agencies and organizations across Idaho. This should also include opportunities for developing and supporting legislation that strengthens GIS governance and GIS coordination in the state.

In addition to strengthening communication, outreach, and coordination in Idaho, there are current opportunities to influence and benefit from federal legislative initiatives that are being coordinated through policy advocacy by the National States Geospatial Information Council (NSGIC), the Federal Geospatial Data Council (FGDC) and others. The influence of states working with their legislative delegations have the potential to garner support and sustainable funding for state SDI implementations and maintenance.

5.4.2 Current Status of Communication, Outreach, and Coordination

Implementation of the prior Strategic Plans has been a struggle. Most GIS users interviewed indicated that the number of web services they have published have increased, but attributed this to their individual agency needs, unrelated to the Strategic Plan. Implementation also continues to be an uphill effort due to lack of understanding of the importance and capabilities of GIS by non-GIS decision makers.

GIS professionals in Idaho have consistently expressed frustration (in both the 2009 and the 2016 Strategic Plans) with insufficient senior and executive management GIS awareness and support. The GIS community is consistent across nearly all organizations expressing that, in most cases, senior officials do not understand GIS technology as more than “just making maps”, nor the capabilities, scope, and potential value GIS brings to the table. There is a significant lack of information that efficiently and succinctly explains the applications of GIS and demonstrates its place to support the overall mission of an organization or across the enterprise. This includes a

lack of identification and understanding about the full scope and the true cost of GIS development and its potential benefits to address a wide range of challenges and needs.

Previous GIS Strategic Plans have not had success in bringing GIS to the forefront in evidence-based decision making in most organizations. Executive level management frequently overlook how visualizing and analyzing data spatially brings insights into patterns and relationships that cannot be obtained with non-spatial data. GIS has powerful tools for data management, field data collection, monitoring, design and planning, and evidence-based decision-making. It is also a mechanism to engage constituents and collaborate within sections of the same entity and between entities. GIS is frequently left as an afterthought when it comes to critical decision-making and funding decisions, which can be attributed to communication, coordination, and outreach efforts, so far, being ineffective.

Currently there are no statutes in Idaho’s legislation that directly relate to GIS as a resource to the state for improved mission support and data-informed decision-making. It is not clear if there have been efforts made in the past to draft and propose legislation that would help to identify and fund GIS to support critical initiatives that have significant impact on the health, safety, prosperity, and education of Idaho citizens.

5.4.3 Needs and Focus Areas

Coordination of outreach and communication efforts are most effective when consistent, targeted messaging is developed that is specific to an individual’s or an organization’s needs and interests. These coordination efforts can have a significantly positive impact on stakeholders and decision-makers when messaging and other communications are coordinated and consistent.

The focus areas for this core principle were identified during the investigation phase of the Strategic Plan development through conversations, focus groups, and surveys. The goals and tasks focus on these focus areas. They are discussed in detail in [Appendix K](#).

- Find and identify GIS stakeholders, create a central contacts database, and keep the list of GIS professionals, stakeholders, and decision-makers up to date
- Develop a “marketing strategy” to engage leaders and decision-makers with appropriate information about GIS solutions that can help with current and long-term challenges, through online resources, operational meetings, seminars, legislation, and targeted messaging.
- Demonstrate and showcase successes where GIS played a significant role in that success.
- There is a need for a communications and messaging coordination function that coordinates online communications solutions and unified messaging content, develops targeted messaging, and is a resource for uniformity and consistency used for outreach and communication engagement opportunities.
- Create uniformity in passive communications methods and platforms, both in the look and feel of communications as well as content for consumption by a broad and diverse audience

The challenge for GIS professionals and leaders is to create and maintain these various processes and resources in the long-term.

5.4.3.1 State and Federal GIS Legislation

Other states, counties, cities, municipalities, tribal nations, and other government entities that have a strong and vibrant GIS ecosystem are linked by one commonality – statutory authority and sustainable funding.

There exists an opportunity for the GIS professionals and stakeholders across all state domains to collectively work to positively influence the future of GIS through the legislative processes at both the state and federal levels.

The details about these opportunities are further outlined in [Appendix K](#).

5.4.4 Goals, Objectives, and Tasks

A. Goal 1: Standardize GIS communication structure and oversight

1. **Objective 1.1:** Identify and implement infrastructure needed for standard, unified, and targeted communications
 - a) Identify all potential communication vectors that are planned to be used for both targeted and passive communication processes
 - b) Using state data architecture standards (Office of the Chief Data Officer, ITS), architect a contacts and communications database for storing, tracking, and using contact data for GIS professionals, data stewards, stakeholders, decision-makers, and others who will be recipients of targeted and other communications including outreach efforts
 - c) Identify/create a central storage location where standard templates and other shared digital resources can reside and be accessed by all organizations and agencies to ensure a shared source of approved, authoritative digital resources for end users
2. **Objective 1.2:** Define and implement best practices and standards to drive consistent and unified messaging
 - a) Develop a guideline that outlines the purposes and structures for both active and passive standardized messaging
 - b) Design the “look & feel” of the GIS communication standards that will be used on all communication mediums (i.e., web page templates, email templates, logo(s), font, colors, layout designs, etc.) that will unify all communications and be consistent across the state
 - i. The design should be flexible enough to allow for “personalization” so that individual organizations can use it to comply with both the statewide standard(s) but also allow a minimum level of local identification and personalization
 - c) Draft and get approval for a shared standard participation and data use agreement that will help ensure that proprietary contacts data and information are used only for the approved purposes of this core principle and related goals

3. **Objective 1.3:** Organize and direct oversight for GIS outreach and communications
 - a) Under the auspices of the IGC-EC, create a working group or ad hoc committee to create the guidelines and procedures associated with oversight and management of unified GIS communications and outreach efforts. The committee will propose:
 - i. An oversight governance structure
 - ii. Reporting and auditing functions for communications and outreach oversight
 - iii. Standard processes for using both passive and targeted communications

B. Goal 2: Engage with Stakeholders

1. **Objective 2.1:** Identify stakeholders
 - a) Using existing GIS staff in agencies and organizations to...
 - i. ...identify decision-makers at all levels in their organizations and collect/store their relevant contact information
 - ii. ...ensure that all GIS professionals and data stewards in their organizations are identified with contact information stored
 - iii. ...create a process to maintain contact information current as people and roles change
 - b) Using the knowledge and contacts of IGC members, expand the reach to identify and initiate contact with agencies/organizations that have GIS staff that are not engaged with the IGC to encourage participation and collect/store contact information
 - c) Identify GIS contacts who are willing to be contacted about their areas of expertise
 - d) Engage with local and regional user groups to identify underrepresented communities and other entities who may lack resources to implement GIS to discover decision-makers as potential targets for outreach and collaboration
2. **Objective 2.2:** Engage the public
 - a) Use the IGC, IGC-EC, a standing committee, and/or the TWGs to identify when and how to engage the public
 - b) Identify platforms and the best ways to utilize social media
 - c) Use open data platforms to communicate messages, not just to deliver public data and data products
 - d) Develop plans and processes to increase exposure to the IGC, the ListServ, user groups, and the Strategic Plan in secondary and higher education
3. **Objective 2.3:** Update and/or enhance web presence
 - a) Update website(s) to create a stronger web presence
 - i. This will require collaboration across multiple stakeholder communities to ensure consistent messaging
 - ii. Review and update content, update layout and formats to be more informative and readable

- iii. Implement one or more curated Idaho GIS blogs with focus on different GIS organizations (i.e., State, City, County, Tribal, Higher Education, Federal support of state, Utilities, etc.)
- b) Create a Hub presence that tells the GIS story
- c) Enhance or expand ListServ capabilities to improve outreach
 - i. Create rules for correct usage of the ListServ (i.e., should it be used for advertising the services and/or products of for-profit companies?)
- d) In conjunction with Goal 1, create an Idaho GIS “brand” to use on the web and to brand TIM layers

4. **Objective 2.4:** Showcase successes in GIS

- a) Continue identifying and sharing the Map of the Month using Idaho maps where feasible and appropriate. Sharing other state or federal GIS map products could also be used to demonstrate the strength of GIS as a tool for the state.
- b) Consider identifying other map related GIS products and applications as “GIS product of the Month”
- c) Create a section on gis.idaho.gov or utilizing ESRI open data resources to publish Story Maps and to publish one-page success stories for GIS in Idaho
 - i. Develop communications and reporting processes so that these can be identified and reported across the state for recognition and publication
 - ii. This could be managed by the proposed standing committee for GIS Education, Marketing, & Outreach Committee

C. Goal 3: Discover/Develop and use communication and coordination tools

1. **Objective 3.1:** Identify tools and methods

- a) Identify and define existing systems and tools that are available and are being underused for communication, outreach, and coordination
- b) Assess why they are underused and the roadblocks. Determine a plan to overcome roadblocks to better, and more fully, realize the full potential of existing resources
- c) Create a communications plan for GIS to use existing system tools and identify other tools that are needed and how they would be used

2. **Objective 3.2:** Identify, create, and schedule messaging

- a) Create a schedule for regular communications efforts
 - i. Targeted communications will most likely need to be “on-demand” as prime opportunities are identified to influence decision-makers and promote the value of GIS in an organization, across multiple organizations, or across the state.
 - ii. Create and manage a web content update schedule
- b) Create simple messages that are easy to convey and understand
 - i. Use standards that unifies messaging
- c) Create a timeline for communicating and updating the Strategic Plan

3. **Objective 3.3:** Manage communications

- a) Identify who has authority to manage communications on different platforms and via different mediums
- b) Identify a communications contact/liaison between communications management and individual organizations/agencies
- c) Develop a method to engage resources in targeted communications when the opportunities arise, to get the strongest, most effective messaging out to the target audience in an acceptable timeframe
- d) Identify follow-up opportunities and coordinate responses with appropriate SMEs, state resources, and local GIS professionals
- e) Create a list of use cases, and the resources available for those use cases, for passive and active communications as a resource for GIS professionals to reference when opportunities come up

D. Goal 4: Get Involved with State and Federal GIS-related Legislation

1. **Objective 4.1:** Develop a coordinated plan for appropriate legislation

- a) IGC-EC and the IGO work jointly to create a detailed plan for what the desired outcomes of legislation should be
- b) Investigate GIS related legislation in other states to find the common themes that are being successful in statutes
- c) Develop a plan for ongoing tracking and visibility for state GIS legislation opportunities when they arise

2. **Objective 4.2:** Operationalize the plan and develop oversight

- a) Identify the entity that will take operational control of the plan (committee, office, team, etc.)
- b) Document the operational controls and reporting required to ensure proper support and oversight
- c) At the appropriate time, draft potential legislative language for review by the IGO and IGC-EC in preparation for introduction to legislative sponsor(s)

3. **Objective 4.3:** Identify potential legislative sponsors

- a) Utilize existing relationships between GIS leaders and teams with current legislators to build a list of contact points
- b) Create a communication plan for utilizing the contact list for ongoing unified messaging related to GIS value and potential
- c) Coordinate potential legislative sponsor “touchpoint” opportunities across all state GIS domains through comprehensive communications with GIS stakeholders

4. **Objective 4.4:** Coordinate advocacy efforts internally and with national GIS organizations to support passing relevant GDA amendments or other relevant federal legislation

- a) Work with NSGIC policy advocates and other organizations (as identified) on needs from states to support major federal GIS initiatives for governance and sustainable funding
- b) Coordinate Idaho's efforts to advocate with its congressional delegation and create unified messaging that can be used individually and collectively
- c) Develop a plan for ongoing tracking and visibility for federal opportunities when they arise

5.4.5 Measuring Progress and Success

The successful implementation of the communication, coordination, and outreach goals can be measured through progressively completing specific tasks. Some tasks may be completed quickly while other tasks will require persistent efforts due to the dynamics of communication and outreach.

To improve communication, coordination, and outreach, identifying key decision makers is crucial. Communicating the GIS community's "wins" with those decision makers will be accomplished by using one-page summaries, emails, and story maps, which will also be posted on the Idaho GIS web page. These successes will be shared among the GIS community as well, using social media to market GIS. Improving coordination will start with establishing a contact list of agencies and organizations across the state. Small and underrepresented cities who may not have the resources to implement GIS will be identified through local and regional user groups so that outreach can be coordinated. Additionally, there will be more emphasis in higher education on exposure to the IGC, the listserv, user groups, and the Strategic Plan goals.

5.5 CORE PRINCIPLE 5: SUSTAINABLE FUNDING AND FUNDING OPPORTUNITIES

5.5.1 Introduction

Nearly all respondents in the focus groups held in July 2021 mentioned lack of funding resources as the primary challenge preventing them realizing the full value of GIS on behalf of their organizations. Identifying sustainable funding streams and other funding opportunities are paramount for the full value of GIS to be achieved in individual agencies/organizations and collectively for the benefit of the citizens of the state.

As organizations depend more and more on technology to drive business success, and as existing technologies become more complex and more powerful, they also become more valuable to the organization...and more costly.

There are three primary areas where funding, especially sustainable funding, can have a significant positive impact on the creation and sustainability of greater GIS value. These are staffing, technology, and training. The assessment of status and current needs for each of these areas will be discussed in the following section. Secondly, funding is needed for the acquisition of mission-critical data sets, usually purchased from third parties and that can be used by multiple agencies and organizations, which are needed to complete incomplete data sets, update aging data, and to be used to generate locational intelligence on a broader scale with greater accuracy.

The return on investment (ROI) for funding additional GIS professional staff can be significant by increasing the quality, value, and “speed to market” of GIS products and analytics, and by reducing staff turnover. Sustainable funding is required as technology costs continue to escalate and the demands for advanced technical solutions, systems, and services proliferate. Unfortunately, as organizations depend more and more on technology to drive business success, and as existing technologies become more complex and more powerful, they also become more valuable to the organization...and more costly. With increased complexity and usefulness, technology comes with a higher price tag. The increased costs are not only related to hardware and software but include the need for ongoing training to keep staff skills up to date, to build new skills required to support/use updated technologies, and to provide greater value to business functions and the technologies that support them. In addition, there is a general business need for a more data literate workforce at all levels and in all roles to better understand and utilize analytics and the data that power them.

Other than the GIO position, there are no dedicated funding streams designated to support statewide GIS coordination, data collection and aggregation, data sharing and other collaborative efforts in Idaho. Indeed, Idaho lacks the resources and the political will to implement things like the required GIS component of crucial public safety initiatives like Next Generation 9-1-1 (NG9-1-1) on a statewide level.

5.5.2 Current Funding Status and Needs Assessment

Section 5.5.1 mentions the three areas that represent primary needs for GIS-related funding. Because of the way that state and local governments handle budgeting and manage their

individual funding requirements, the discussion related to funding in the context of this core principle refers mainly to funding available to individual agencies and organizations. However, future funding needs include dedicated and sustainable funding for statewide services and support, coordination for statewide initiatives and their implementations, and to support the technology and infrastructure required to democratize GIS data and resources making them interoperable and shareable based on accountability to accepted data standards and supporting the concept of “create once, use many.” Additionally, there are growing needs for centralized infrastructure and systems to support statewide initiatives such as NG9-1-1, broadband services, disaster response, and to sustain and improve existing centralized GIS data portals like INSIDEidaho.org.

Appendix K provides additional information and specific details about the needs and challenges related to sustainable funding for GIS staffing, technology, and training. Working to obtain sustainable funding in these three areas will help to ensure the current and long-term value of GIS to the citizens of Idaho.

5.5.3 Goals, Objectives, and Tasks

A. Goal 1: Create and manage GIS funding governance and collaboration

1. Objective 1.1: Create a GIS business plan

- a. Document proven ROI's for existing GIS use cases
- b. Show and/or quantify non-intuitive value
 - i. Benefits of collaboration between organizations/agencies (statewide); or between divisions/teams (organizations)
 - ii. Cost savings related to reducing duplication of data and duplication of efforts
- c. Link funding requirements at state and local levels to implementation of the Strategic Plan
- d. Include a viable timeline for implementation
- e. Create communication plan for reporting to stakeholders at all levels (agencies, executive leaders, legislature, etc.) to account for successes, savings, and efficiencies related to activities enabled by increased funding

2. Objective 1.2: Build funding accountability governance and funding opportunities discovery processes

- a. Define funding collaboration model to include agencies/organizations GIS functions, state government GIS resources, IGC, and IGC-EC
- b. Implement a standing committee for Sustainable Funding and Funding Opportunities (see section 5.1.3.2) tasked with the following:
 - i. Collaborate with agencies and organizations to understand current GIS related funding and define existing funding needs related to implementing the goals and objectives of the Strategic Plan
 - ii. Research/Discover potential funding streams for implementation initiatives associated with the Strategic Plan
 - iii. Draft proposed legislation template(s) that can be used at state and local levels to propose establishment of GIS-specific funding to agencies, education, local and tribal entities, and state GIS governance and coordinating entities (IGC, IGO, etc.)

- iv. Investigate federal funding opportunities for specific initiatives (i.e., COVID, NG9-1-1, Transportation, National Address DB, Broadband, etc.) and maintain a list of potential opportunities on gis.idaho.gov

B. Goal 2: Implement effective/efficient GIS budgeting

1.Objective 2.1: Create a viable GIS budget

- a. Work collaboratively with GIS at all levels (statewide or for the organization.) to create a proposed multi-year anticipated budget that is tied to funding the implementation of the Strategic Plan
 - i. Include existing staffing costs, hardware upgrades/refresh, software maintenance, professional services, etc.
 - ii. Identify additional needs for staff, infrastructure (hardware/software/licensing), training, professional services envisioned over the next five years
- b. Build “what if” budget scenarios (including best case and worst case...and “in-between cases) identifying benefits and value for funding the requested budget line items and what will not be possible and the limitations that will be imposed if funding is not available

2.Objective 2.2: Document and identify cost reduction opportunities and strategies

- a. Social costs
 - i. These may include the impact of inadequate or erroneous decisions resulting from insufficient or inaccurate data
- b. Diseconomies (or spillover costs)
 - i. These may include the cost of data consumers being compelled to become data producers of commonly needed feature data, with associated inefficiencies and sub-optimal resource allocation
- c. Sunk Costs (which are ignored in cost-benefit analyses, based on industry practices)
 - i. These may include investments already made, for example, existing data, software, and/or hardware
- d. Proactive data management
 - i. Identify duplicated (the same data collected by different teams) and replicated data (multiple copies of the same data) and the costs associated with physical storage and staff costs for data management
 - ii. Promulgate the idea of having a single source of truth for data sets where they are created once and used many times by many different users

3.Objective 2.3: Create standard budgeting processes

- a. Define and document standard processes and best practices for collaboratively tracking and updating the budget identified in Objective 2.1 above

C. Goal 3: Review/Improve Contracts Costs

1.Objective 3.1: Identify opportunities to aggregate contracts to improve pricing and benefit from economies of scale

- a. ESRI EA's across state and local government entities
- b. Inventory other contracts and technology tools that are commonly used across GIS domains to determine if there is value in aggregating licensing for greater economy
- c. Identify which (if any) should be centrally negotiated and managed

2. Objective 3.2: Explore the viability of creating regional data centers to support GIS infrastructure for smaller organizations who lack full IT support and maintenance functions

- a. Hardware, network, security, etc.
- b. Portal and other ESRI infrastructure components that can be leveraged as multi-tenant solutions
- c. Create detailed cost analysis and proposed budgetary plan to identify costs to those organizations who would want to participate
- d. Identify other systems and services that could be shared across organizations to strengthen their GIS implementations

5.5.4 Tasks and how success is measured

The ultimate measure of success is obtaining sustainable funding streams that allow for addressing deficiencies in staff, technology, and training. Progress can be measured by tracking the tasks listed in the previous sections and through formal reporting by GIS leaders in organizations, the IGC, and the IGC-EC. To achieve many of the objectives and goals will require significant collaboration and communication to effectively gather and aggregate all of the cost and budget information to accurately produce viable budgets and target assessments that the GIS communities can work towards.

Success can also be measured by the number of organizations and GIS staff that actively seek and win grants and other funding resources that will allow them to complete specific projects and that will allow them to grow their capacities and capabilities for the benefit of their organizations. This could include funding that would allow, along with cost contributions from the various regional participants, the creation of regional data centers to provide missing infrastructure systems and support for those organizations.

CONCLUSION

The value of geographic information systems to the state of Idaho and the geospatial data that power them has the potential to influence public policy, laws, governmental programs, and budgets. In addition, they can have a powerful influence for good on commerce, health, public safety, education, transportation, and a host of other economic, social, and physical systems and services that benefit the citizens of Idaho.

GIS systems and services have been in place in the state since the early 2000's and has continued to expand its systems and services. Unfortunately, the full value of GIS to the state and its citizens has yet to be realized. Until government decision-makers and business leaders understand the power of what is available to them, GIS will continue to lack support, funding, and visibility in many individual agencies and organizations.

The Strategic Plan focuses on addressing fundamental and interdependent principles to provide a detailed roadmap for GIS professionals and their organizations that can begin to bring GIS forward as a valuable business asset with the power to transform the enterprise through insights that can generate actionable intelligence. Learning from prior Strategic Plans is important in order to not replicate the mistakes and failures from past years.

It is not the intent of the Strategic Plan to set an artificial standard for all entities to achieve...[but] to move us each ahead...to be better tomorrow than we are today and taking each step forward with intentional vigor and vision.

The strength of the Strategic Plan comes through individual and institutional engagement. As GIS professionals, stakeholders, and decision-makers individually, and collectively, seek to achieve the goals and objectives of the plan, they will be strategically in a position of strength to successfully achieve mission critical projects and state-wide initiatives that bring about both internal and external change for good.

Strategically aligning governance with enterprise data management best practices and with ongoing education and training sets the stage for consistency and integrity of enterprise GIS data through compliance with standards and quality controls. These are necessary to enable simplified, dynamic data sharing and interoperability, exponentially increasing the value of already valuable data assets. Success in building the integration and maturity of GIS across all domains in the state is only possible by making sustainable funding a strategic imperative to meet the needs for funding staff, technology, and training. By strategically aligning communications, outreach, and coordination across the enterprise publicly reveals the value that GIS brings to each organization...and to the state. It provides intentionally coordinated control of the narrative of GIS successes to the forefront to influence decision-makers and stakeholders when considering budgets.

It is not the intent of the Strategic Plan to set an artificial standard for all entities to achieve during the next five years. Rather, it is intended as a tool and a guide to move us each ahead on our individual and collective GIS journeys, to be better tomorrow than we are today, and taking each step forward with intentional vigor and vision. In this way the strength and viability of the whole becomes much, much greater than the sum of its parts.

6 APPENDICES

6.1 APPENDIX A – MEMBERS OF THE GIS STRATEGIC PLAN COMMITTEE

Below are the dedicated GIS professionals, students, and stakeholders (alphabetical by first name) who contributed many hours and attended many meetings to conduct the research needed for the Strategic Plan and to outline, write, review, edit, and correct this document. Many thanks for their dedication and service.

Name	Association
Adrianna Gibson	Student – Idaho State University
Angela Vander Pas	City of Lewiston
Angie Schmidt	Idaho Dept. of Fish & Game
Bradford Minich	Student – Boise State University
Bruce Godfrey	University of Idaho
Gail Jorgenson	Ada County Highway District
Jacqueline Malloy	City of Chubbuck
Jeff Cook	Idaho Dept. of Parks & Recreation
Keith Weber	Idaho State University
Kelly Green	Blaine County
Linda Davis	Idaho Dept. of Water Resources
Michael Woodford (Chair)	Idaho Office of Information Technology Services
Spencer Seibel	Student – University of Idaho
Sydney Lewis	Idaho Dept. of Transportation
Wilma Robertson	Idaho Office of Information Technology Services

6.2 APPENDIX B – STRATEGIC PLAN DEVELOPMENT – METHODOLOGY AND BACKGROUND

6.2.1 Planning Development Process and Timeline

On February 10, 2021, the committee held a kick-off meeting to outline the scope and proposed timeline, and to elect a chairperson. The state's GIO was elected to be the chair and the committee began regular meetings on a bi-weekly basis. Meetings were held virtually to enable members from locations around the state to participate. The committee defined the scope of the new Strategic Plan to address GIS needs and challenges across the state and in all GIS domains in the state, with the intent of crafting a Strategic Plan that could be used by all GIS staff, professionals, stakeholders, and decision-makers regardless of the organization they work for or their organization's GIS maturity.

To reach the target completion date of December 2021 for approval of the revised Strategic Plan, a timeline was drafted to allow for approximately four months of information gathering and research with an initial draft document being started in early July. The final draft of the Plan was due from the SPC in early September and was scheduled for presentation to the IGC during their October 2021 meeting. After presentation to the IGC-EC, the draft was made available to the IGC general membership, and a three-week comment period allowed the committee to review and assess comments. The final draft was presented to the IGC-EC at the November 2021 meeting for final approval. The GIS Strategic Plan was then presented to the Idaho Technology Authority (ITA) in their December 2021 meeting for final approval of the Strategic Plan and for it to be enacted.

During the 4-week discovery phase of the Strategic Planning process, five subcommittees were created to perform the crucial information gathering and discovery work required to deliver feedback and objective data to the SPC and inform the scope and strategic focus areas relevant to the GIS communities in the state. Specific work done by the subcommittees contributed significantly to the foundation of the Strategic Plan. Specifics about the work of each subcommittee are outlined in [Section 3](#) of this document.

6.2.2 Purpose of the GIS Strategic Plan

The purpose of a Strategic Plan is to document and synthesize specific goals and objectives that address the needs, challenges, opportunities, threats, liabilities, and obstacles identified by GIS professionals and practitioners, stakeholders and decision-makers for GIS in the State based on the “current state” of GIS use and maturity. Through specific tasks and action plans, it provides a roadmap for achieving the important strategic goals and objectives defined by the GIS community and GIS leaders that outline the desired “future state” of GIS for teams, organizations, and enterprises across the state.

The Vision and Mission statements from previous GIS Strategic Plans were reviewed and examined. The result was that these core statements were redefined with additional focus and specificity. With the goals and objectives of prior plans being largely unmet, necessary Core Values and Goals have been developed with an expectation that, by implementing the Plan, organizations throughout the state can make progress in overcoming roadblocks and systematically achieve the strategic goals and objectives of the plan.

The SPC recognizes the Strategic Plan only becomes a valuable and effective document if GIS professionals, stakeholders, data stewards, and others who use and depend on GIS, actively engage with the plan, and do not just “set it on a shelf” for the next five years. At the state GIS governance level, the IGC and the IGC-EC must focus on activities and actions that help GIS professionals and their organizations achieve the goals and objectives of the Strategic Plan over the next five years. They can, and should, use the Plan as a guide and a yardstick to achieve the desired “future state” of GIS in Idaho.

To be successful in creating a new Strategic Plan that does not reproduce the errors of prior plans and provides guidance and opportunities to all GIS professionals and GIS-enabled organizations across the state, there must be a change in the narrative. Prior Strategic Plans focused on achieving a pre-defined “future state” on a statewide scale and defined success as a “global” event. This plan seeks to work on a smaller scale for the larger good. Individuals and organizations that engage with the Strategic Plan “where they are” with the intent to move toward a viable improvement in GIS engagement and maturity, will contribute to the “global” good for GIS in the state. As internal successes occur to enhance maturity and engagement, those organizations can then look outside themselves to coordinate and collaborate on a larger scale in a pattern of systemic growth and improvement.

It is important to recognize that the ongoing growth and maturity of GIS in Idaho depends largely on individuals, teams, and organizations embracing the plan. By working collaboratively, both internally and externally, toward achieving the defined strategic goals and objectives contained herein, organizations and individual will achieve those things that have the most value to them. It is naïve to think that every government entity, every college and university, every tribal nation, and every other organization that uses and/or depends on GIS in their business processes will achieve a pre-set standard over the course of the next five years. However, it is very realistic, and achievable, to expect that individuals and organizations can, in five years, achieve a new level of GIS maturity and integration within their own organizations and actively move toward the greater vision across the state in collaboration with others. This can be done by collectively embracing the principles and tasks in this Strategic Plan, and individually engaging in active participation and, through collaborative efforts, put into action the steps that will bring about change. Those organizations that have greater levels of internal integration and GIS maturity can, and should, turn their vision outward and help with work toward the broader needs of GIS at inter-enterprise levels across the state. They can help counsel and assist others, mentoring those who are not as far along their GIS road, and to help build the relationships, resources, technologies, and processes to enable greater collaboration and data sharing. Those entities that are less far along, that have little or no business integration, fewer resources, or have not had opportunities to demonstrate value to their organizations, can focus on accomplishing the actions and tasks for internal growth and GIS maturity.

The bottom line is no one at the state/enterprise level can define where each organization or entity should be in a defined time period. However, a statewide vision does provide a target of opportunity where teams and organizations can aim as they actively engage with the principles and goals of the Strategic Plan. As long as an entity’s “current state” makes consistent incremental progress toward its “future state” then the GIS Strategic Plan will be a tool for

success. Individuals, teams, and organizations can use the Strategic Plan as a roadmap to outline their own journeys, to define where their current starting point is and where their desired GIS destinations will be in five years, then use the plan to plot waypoints. As this happens, disparate organizational GIS realities will better focus on the ideals defined in the Mission Statement and will converge on the vision for GIS defined in the Vision Statement. Periodically there will be calls for help and assistance which, in a spirit of collaborative support, the community can come together to assist each other, to plan and discuss, to train and educate, to use individual experiences, resources, and tools for the greater good of the enterprise.

A fundamental success factor of engaging with the Strategic Plan is to measure and validate improvement periodically and consistently. This can be done by gauging the progress of tasks and action plans with regular periodic progress assessments. The value of assessments assumes a baseline against which progress can be measured along with an effective implementation plan for achieving each of the strategic goals. Consistent measurement of progress accomplishes two things. First, it generates accountability measured against tasks and the timeframes for completing those tasks. Second, it initiates conversations with the larger GIS community and promotes assessments to make sure the GIS community is actively engaged and is on the right track. Action plans must be regularly evaluated to ensure they stay viable and current in the existing technical and business environments. The success of the Strategic Plan depends heavily on individual successes along with collaboration throughout, and across, the GIS community and working together for collective achievement. Success or failure of the GIS Strategic Plan will hinge on the breadth of adoption and involvement by individuals and organizations to move the needle individually and collectively. Realistically, the sum of the incremental improvements of the parts always ensures a greater whole.

6.3 APPENDIX C – ASSESSMENT OF PROGRESS FOR PRIOR STRATEGIC PLANS

6.3.1 Introduction

The Idaho GIS Strategic Plan subcommittee 3 includes: Angie Schmidt (Idaho Fish & Game), Wilma Robertson (Office of IT Services), and Jackie Malloy (City of Chubbuck). The purpose of this subcommittee was to assess and document the progress made under the current and prior Strategic Plans. Through interviews with GIS professionals and subcommittee discussions, we have a solid understanding of the current state of GIS, successes, missed opportunities, and the scope of the current and prior Strategic Plans. From these discussions and interviews, we have established recommendations for future GIS Strategic Plans.

6.3.2 Current State of GIS

INSIDE Idaho is generally recognized as the GIS Data web portal, this is actively being promoted in higher education courses. The goal of the previous plan was to combine and consolidate datasets such as: parcels, address points, PLSS, etc. There have not been new datasets added to INSIDE Idaho stemming from the 2016 Strategic Plan. Metadata did not noticeably improve, although FGDC data is required by federal partners. Funding for INSIDE Idaho is now easier to justify because of the exposure of it as Idaho's data web portal, but no additional funds have been secured. There has not been a significant increase in datasets provided to INSIDE Idaho by the GIS community.

A large group of knowledgeable GIS professionals who are willing to volunteer to work towards an Enterprise system was identified as a goal for successful implementation of the Strategic Plan. Nearly all these professionals have full time jobs and often cite lack of time available to volunteer as a deterrent. Centralized GIS personnel with the drive and dedicated time are necessary to move the Strategic Plan forward.

As for increasing the number of web services used, this has increased but is attributed to individual agency goals, not driven by the Strategic Plan.

6.3.3 Successes and Missed Opportunities

A goal set in the current 2016 plan aimed to get people talking about GIS and to network with each other. Communication and collaboration have increased, which is partially attributed to participation in events such as career fairs and GIS Day activities as well as IGC related activities such as IGC-EC meetings, Technical Working Groups and bi-annual IGC meetings. Additionally, Geotech, a list server maintained by the Idaho Geospatial Office has helped connect people.

A subcommittee of the IGC-EC formed in 2019 researched and presented findings to the IGC-EC about the value of a Geographic Information Officer. A strong recommendation was made about the need for Idaho to hire a full-time GIO to replace the previous GIO. This is a common theme, experienced by GIS professionals in multiple agencies, where there is a communication barrier about the value of GIS between GIS professionals and non-GIS decision makers.

An effort to get a "parcels project" off the ground was near completion. Nearly a dozen counties signed agreements to share data with government agencies, and a slimmed down version of their parcel dataset with the public. Additionally, a parcel specific website was developed by Access Idaho where people could browse and purchase parcel datasets. The project ultimately failed because of lack of momentum, leadership, and follow-through.

6.3.4 Scope and Vision

The scope of the prior plan fit within its vision and mission. The vision and mission are concise and well written, but the plan lacks any implementation goal(s), and an implementation plan. The scope is broad enough to evolve with advances in technology, and specific enough to create actionable tasks from.

6.3.5 Lessons Learned

The missed opportunities from previous Strategic Plans can be boiled down to three main causes. The first being, there is no dedicated staff focused on implementing the Strategic Plan and volunteers have limited time to provide help. Second, there is a struggle to communicate the value of GIS, and the importance of implementing the Strategic Plan to non-GIS decision-makers and as a result this perpetuates the lack of dedicated resources. The third is that prior plans did not include a plan for implementation.

Participation for getting anything moving on the Strategic Plan has been low and there is a lack of follow-through on the goals established in the plan. In other words, there are no real “wins” to motivate people to keep going towards implementation of the plan. There are no metadata standards or minimum requirements for submissions to INSIDE Idaho.

6.3.6 Recommendations

This subcommittee has recommendations for the new Strategic Plan that address the lessons learned from the previous plans:

1. To address low volunteer participation and implementation, there should be dedicated staff working on implementing the Strategic Plan. Requests from volunteers should be specific and small.
2. While a standard for metadata exists within the ITA policies, more emphasis should be given to this in higher education GIS courses so that students are aware of those standards, the importance of adhering to those standards as well as how to write decent metadata.
3. The GIS community could benefit from having a directory of GIS contacts at agencies throughout the state and the contact’s area of expertise. These areas of expertise can include consultations about metadata standards, how to secure funds, grant writing help, etc.
4. The existence of the IGC-EC and how to participate should be communicated better to keep momentum and get more people engaged. For example, “GIS in Idaho”, which includes information about the different GIS User interest groups, list servers as well as the work and role of the IGC-EC, should be part of any GIS course curriculum in Idaho.
5. There also needs to be greater focus on the importance of GIS and why the Strategic Plan is important. This subcommittee recommends sharing success stories as they relate to the Strategic Plan, specifically successes that overlap goals between agencies and the Strategic Plan.
6. Outreach to decision makers is another recommendation, this can include creating dashboards to get them involved and show why GIS should be important to them or creating a map of the legislature. Simple one-page summaries of successes could be shared or presented in an ongoing Story Map. The importance of reaching out to and showing value of GIS to decision makers should be part of the mission.
7. Future Strategic Plans should include an implementation plan. Implementation plans should include specific deliverables tied to timelines and have measurable results.

6.4 APPENDIX D – COMPARISONS OF PREVIOUS STRATEGIC PLANS

6.4.1 Introduction

GIS in Idaho has operated under two GIS Strategic Plans that have been in force for the previous twelve years. The first Strategic Plan was developed using Cooperative Assistance Grant (CAP) funds awarded from the [Federal Geographic Data Committee](#) (FGDC) for “Strategic and Business Plan Development in Support of the NSDI Future Directions Fifty State Initiative.” The grant funds were used to engage an IT consulting firm to assist in development of the Strategic Plan. Meetings and surveys were used to gather information from a wide spectrum of Idaho’s geospatial user community. The results of the meetings and survey responses were used to draft the plan to address the needs and challenges identified by the user communities. The plan was approved and enacted in May 2009.

The second GIS Strategic Plan was self-defined as a revision of the 2009 plan “to renew the strategic goals, objectives, limitations, and obstacles outlined in the 2009 Strategic Plan to better reflect current priorities and needs of Idaho’s statewide GIS community.” The work of gathering information and feedback from the GIS community was done by a sub-committee of the Idaho Geospatial Council Executive Committee using a “nearly identical survey” to that which was deployed to GIS communities as part of the information gathering activities for the development of the 2009 Strategic Plan. The results of the survey “were used to craft the Strategic Plan revision.” The revised plan was approved and enacted in December 2016 by the Idaho Technology Authority (ITA) for a period of five years, “after which it must be reviewed and, if necessary, updated.”

6.4.2 Comparing the Previous Strategic Plans

Each of the prior Strategic Plans had the same vision and mission statements.

Vision Statement	Mission Statement
<i>Idaho’s Spatial Data Infrastructure (SDI) is fully developed, maintained, and managed and supports the missions of Idaho organizations through easy access to high-quality geographic information and related services.</i>	<i>With leadership by state government and active participation from stakeholders statewide, we will develop, deploy, and efficiently operate the Idaho SDI with a focus on meeting the geographic information needs of users and delivering real, substantial benefits to a comprehensive spectrum of organizations and individuals in Idaho.</i>

Even though each Strategic Plan has the same vision and mission statements, they focus on different, yet complimentary, outcomes.

The 2009 plan “...establishes a long-term path for SDI development and operation in Idaho.” SDI refers to the Spatial Data Infrastructure, which is defined in [OMB Circular A-16](#) as “The technology, policies, standards, human resources, and relative activities necessary to acquire, process, distribute, use, maintain, and preserve spatial data.” The focus on the SDI is further indicated in section 1.1 which states that “The main objectives...are to...guide full development and deployment of the Idaho SDI”, and “The main goal of the SDI is to improve statewide coordination and access to geographic data and services to support the business needs of Idaho stakeholders by building on existing GIS capabilities and spatial development in Idaho.” In short, this plan’s focus is to define, develop, and implement the underlying technical and

organizational infrastructure that allows GIS data, systems, governance, and services to be operationalized successfully within the rules and procedures of a defined SDI framework. The scope of the 2009 plan is much more holistic in its identification of strengths, weaknesses, opportunities, challenges, limitations, obstacles, and potential business drivers, to the point of being almost overwhelming. The Strategic Plan also has numerous references to a business plan that provided the “how to” of achieving the goals and objectives outlined in the Strategic Plan. The business plan outlined a 5-year project for developing and implementing the Idaho SDI in its entirety. The current state of Idaho’s SDI indicates that the business plan was not carried out.

The primary focus of the 2016 plan was the development, management, and availability of GIS data through the SDI Framework layers for The Idaho Map (TIM). These framework layers are made up of high quality, authoritative spatial data shared through GIS services and applications (specifically ESRI products). Where the 2009 plan focuses on the foundation of GIS operationalization and the SDI, the 2016 plan focuses on GIS data including quality, availability (sharing), management, and the development of authoritative data products for Idaho.

Because each plan had a different, but complimentary, focus, they contain different, yet similar, guiding principles, goals, and objectives. The similarities between the two plans indicate that some of the goals and objectives defined in the 2009 Strategic Plan were not accomplished or still needed attention so were included in the 2016 plan.

For comparison purposes, the tables below show the strategic components of each plan.

Values and Guiding Principles	
2009 Strategic Plan	2016 Strategic Plan
<ul style="list-style-type: none"> ➤ Attention to quality and responsiveness to users of SDI data and services ➤ Inclusive and open communication ➤ Attention to quality in the creation, maintenance, and archiving of SDI data and services with continuous quality improvement ➤ Optimize efficiency in all aspects of development and implementation ➤ Incorporate or develop best practices ➤ Actively seek collaborative approaches ➤ Data is appropriately accessible 	<ul style="list-style-type: none"> ➤ Seek to clearly represent the interests of my organization with other governing bodies and organizations ➤ Inclusive and open communication throughout Idaho’s GIS community ➤ Optimize efficiency in all aspects of GIS data development and use ➤ Seek resources from county, regional, state, and federal agencies that will benefit Idaho’s GIS Community ➤ Seek solutions to issues of common concern ➤ Act collaboratively on programs or activities that can be better accomplished through collaboration or teamwork

Summary:

Common themes for Values and Guiding Principles in both Strategic Plans include...

- ...open and inclusive communication
- ...optimizing efficiency
- ...behaving collaboratively

In the 2009 plan, quality and responsiveness to users, attention to data quality and accessibility, and the development of best practices are additional key principles.

Representation of organizational interests, discovery of resources, and finding solutions that help the larger community are additional principles defined in the 2016 plan.

Strategic Goals & Objectives	
2009 Strategic Plan	2016 Strategic Plan
<ul style="list-style-type: none"> ➤ Develop a strong business justification to cultivate high-level support and sustained financing for the SDI. ➤ Implement an improved SDI management and coordination structure with appropriate legislation, policies, and management practices that support full SDI development and its ongoing operation, and which promotes statewide participation and collaboration. ➤ Define standards for and complete development of Framework data and establish tools and procedures for perpetual data maintenance and appropriate access. ➤ Leverage emerging technologies to enhance access and use of SDI data and services. ➤ Connect and integrate state and local/regional activities by establishing region-based resources that provide practical help, enable professional networking, disseminate best practices, and act as a consistent, multi-directional channel of communication. ➤ Increase awareness of and support for the 	<ul style="list-style-type: none"> ➤ Create/support a robust geospatial data clearinghouse for sharing current and historical TIM Framework and other authoritative data layers <ul style="list-style-type: none"> ○ Have a designated clearinghouse administrator who can reach out and support TIM/authoritative data stewards, review datasets and documentation and help keep them current, and maintain the clearinghouse website; acquire and maintain dedicated funding for this position ➤ Provide best available statewide TIM Framework layers <ul style="list-style-type: none"> ○ Create an inventory of Framework data layers currently available from metadata; reinvigorate the Framework Leadership Team; start with the top 10 (as defined by current survey results) and work with the associated agencies/TWGs to get the data layers nominated – host TIM nomination workshops and TIM metadata workshop; host the Framework data layers in the geospatial data clearinghouse and

<p>SDI and its benefits.</p> <ul style="list-style-type: none"> ➤ Encourage, provide guidance, and help establish financial support for development and maintenance of non-Framework geographic data that enhance organizations' use of and benefits from GIS technology. ➤ Expand the awareness of the GIS technology and integration of geographic information in organizations, disciplines, and applications in which GIS use is not common but where substantial benefits may be achieved. ➤ Maintain current knowledge about GIS and information technology trends and industry offerings to take advantage of new products, tools, and practices. 	<p>brand as TIM</p> <ul style="list-style-type: none"> ➤ Improve geospatial data quality <ul style="list-style-type: none"> ○ Increase education on and encouragement to follow State GIS policies and standards; education on proper metadata; education on transition to web services ➤ Improve delivery and accessibility of GIS services and information <ul style="list-style-type: none"> ○ Explore the use of data sharing applications such as Esri Open Data and data.gov; encourage not only GIS staff, but others to use tools like Story Maps and Web Map Applications to relay geo-information to their customers and the public; encourage the use of mobile-friendly templates; funding for and encourage data stewards to use ArcGIS Server/shared State GIS Server and enterprise ArcGIS Online accounts
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6.4.3 Summary

There is very little crossover or similarity between the goals and objectives in the two Strategic Plans. The 2009 plan outlines GIS goals in broad strokes to address the SDI at an enterprise level. The 2016 plan is much more specific and focused on precise outcomes.

- The 2009 plan goals focus heavily on SDI development, operations, and sustainability
 - Management and coordination structure, legislation, policies, and best practices
 - Developing high-level support and sustainable funding
 - Define standards and establish tools and procedures that leverage emerging technologies to enable/support maintenance and access to systems and services
 - Build regional bases of resources to connect/integrate networking, best practices, training, and communication
 - Ongoing knowledge of, and training in, new system tools and technologies
 - Develop awareness of the benefits GIS can bring to organizations
- The 2016 plan goals and objectives speak primarily to developing and improving TIM layers which includes
 - Developing authoritative framework data layers using high-quality GIS data
 - Sharing the data layers through a geospatial data clearinghouse
 - Provide training
 - Increasing accessibility of GIS data and services using ESRI products

6.4.4 Analysis

Each of the previous Strategic Plans have the same vision and mission statements. With some minor deviations, the guiding principles are the same or closely related. However, the goals and objectives in the two plans diverge significantly to go down differing, though related, paths.

Some issues to consider in assessing the wide separation in approaches to achieving the same vision and mission can be attributed to changes in the organizational structure of the state's information technology governance and organization between 2009 and 2016. In addition, those individuals who made up the governing body for GIS and who filled GIS positions (analysts, stewards, stakeholders, etc.) throughout the state also changed significantly.

Given that technology advances at a near exponential rate, systems and tools for data and analytics have matured and changed over a relatively short timeframe. Advances in both hardware and software provide powerful, high-performance platforms that support the development of innovative and integrated applications that naturally increase the potential for GIS-related analytics/products. Advancements in technology together with the increasingly mature skillsets of GIS professionals provide both advantages and challenges for data and analytics Strategic Planning in the state.

6.4.4.1 2009 Strategic Plan

The 2009 GIS Strategic Plan was strong in intention but arguably limited in execution over the seven years it was in force. The plan was well written and detailed with history and accurate assessments of the then-current situation with regards to GIS in the State of Idaho. The plan states:

“An evaluation of the status of SDI development, current GIS use, and the needs of stakeholders statewide has revealed a number of important limitations and obstacles that inhibit SDI development, and which prevent users from achieving the full range of potential benefits from GIS technology and statewide geographic information sharing. These obstacles and limitations create a starting point for planning—to ensure that strategic goals and implementation initiatives focus on the critical areas that will contribute to SDI success.”

The documentation of the main limitations and obstacles to SDI Development (2009 Strategic Plan - Appendix D) were realistic in their scope and proposed impact, as were the opportunities for Idaho's SDI with respect to overarching business drivers and to program-specific business drivers (2009 Strategic Plan - Appendix E). In most of the cases listed in the appendices mentioned, not much has changed. As seen in this Strategic Plan (2021), the limitations and obstacles are the same as, or similar to, those identified in the 2009 plan. Likewise, many, if not most, of the opportunities listed in Appendix E of the 2009 plan can still be considered as opportunities in 2021. However, in some cases, agency GIS organizations have capitalized on several of the opportunities and expanded on them for their respective agencies.

At the time of writing the 2009 Strategic Plan there existed only eight Framework themes, with six more noted as being proposed by the Idaho Geospatial Office (IGO) for acceptance as Framework theme data.

6.4.4.2 2016 Strategic Plan

The 2016 GIS Strategic Plan addressed “changes in the opportunities and challenges of meeting Idaho's geospatial stakeholder's needs since the initial version was implemented in 2009”. The plan identifies that the changes came about “because of the expansion of open data sharing, innovations in data collection, management, processing, and dissemination, application development advances, and the growing industry of geospatial technology and services.” The plan's primary focus was on

operationalizing the Framework themes that were identified as crucial parts of the Idaho SDI in the 2009 plan. The 2016 plan calls out the limitations and obstacles that were identified in the prior Strategic Plan and compares the survey responses between the two surveys, identifying that the most pressing issues were (see Section 5 and Appendix A in the 2016 Strategic Plan):

1. Funding limitations
2. Staff limitations
3. Problems with data quality, “currentness”, and data updates
4. Insufficient opportunities for training and education

This plan also compares the business drivers in the survey responses, noting improvements in some areas, while also identifying those that still need attention (Section 5 and Appendix A in the 2016 Strategic Plan).

Where the 2009 Strategic Plan placed significant emphasis in its goals on lack of funding, lack of awareness and understanding by senior decision-makers and leaders about the value of GIS, GIS data governance, and statewide collaboration and coordination, the 2016 plan’s goals moved away from these areas of emphasis and focused specifically on The Idaho Map and the Framework layers/data, their quality, and their accessibility. Both plans reference the same strengths, weaknesses, opportunities, challenges, limitations, obstacles, and business drivers. The 2016 plan provides comparison visualizations related to these items based on survey responses which indicate that the feedback from the GIS community about the importance of addressing the issues remained essentially equal across the seven years between surveys.

6.4.5 Conclusion

The two prior Strategic Plans essentially agree on the mission-critical components of a successful, dynamic, and active SDI for Idaho. Data discovery activities related to this document (GIS Strategic Plan 2021) indicate the same constraints, issues, and challenges that were identified 13 years ago. While the 2009 plan was ambitious and comprehensive, the proposed business plan to achieve the goals and objectives failed to consider that the desired outcomes were not achievable with a 100% volunteer organization. Also, its enormous price tag assumed that several significant and sustainable funding streams were available and into which the GIS community could tap. As a result, little progress was made, and the subsequent 2016 Strategic Plan identified that the same issues and challenges continued to exist. The 2016 plan attempted to make headway by focusing on developing Framework theme standards and their associated authoritative data sets related to the Idaho SDI.

6.5 APPENDIX E – RESEARCH OF OTHER STRATEGIC PLANS

Subcommittee 1 researched GIS Strategic Plans from other state and federal entities to propose areas of emphasis, for example, objectives, goals, and priorities, to consider in the rewrite of the Idaho GIS Strategic Plan. Subcommittee 1 compared and contrasted how other entities addressed statewide GIS strategies, how the plans were formatted and organized, how performance success was tracked or measured, and whether review and revision frequencies were defined.

This subcommittee consisted of seven members: Adrianna Gibson, a student from Idaho State University, Angela Vander Pas from the City of Lewiston, Bruce Godfrey from the University of Idaho, Gail Jorgenson from the Ada County Highway District, Kelly Green (Chair) from Blaine County, Linda Davis from the Idaho Department of Water Resources, and Spencer Seibel, a student from the University of Idaho.

Subcommittee 1's kickoff meeting was held on February 24, 2021, and each subcommittee member was to choose one or more entities and research their GIS Strategic Plans. A shared Google Docs document was created so each subcommittee member could document their findings and reference links to the plans of the entities researched.

On March 1, 2021, each subcommittee member presented their findings of the entities researched and the group concluded the top four GIS Strategic Plans were Alberta, Arizona, Nebraska, and New York. Additionally, the top five common core values and goals among the entities researched were identified as governance, data availability/coordination/sharing, training and education, data quality, and communication.

Other topics of discussion and considerations included 1) how are other entities addressing their GIS strategies 2) how are entities tracking their KPI's (key performance indicators 3) what are other entities' update and review frequencies 4) should we create a dashboard and/or story map to track the progress of the GIS Strategic Plan 5) should we include a two-page executive summary once the Strategic Plan is finalized

On March 16, 2021, Linda Davis noted that some GIS Strategic Plans written between 2006-2008 were likely with the aid of grant monies. Linda also noted the importance of knowing who your customers are and knowing how the Idaho GIS Strategic Plan will be utilized.

Gail Jorgenson presented a brief summary of Arizona's plan. Gail highlighted how the core principals were color coded throughout the plan, with funding being at the center, and recommended using similar graphics in the Idaho GIS Strategic Plan. Gail also placed emphasis on how training and staffing are key in Arizona's plan and technology and collaborations are the core principals. After further discussion, it was determined that funding is essential and should be included as one of the core values and goals in the Idaho GIS Strategic Plan.

Spencer Seibel developed the 'Plan Synthesis and Development' Google Docs document to be used as a guideline for building the outline for the core goals and values.

On March 23, 2021, further discussion regarding potential content included 1) ways to make the Strategic Plan a living document that can be utilized for a variety of purposes 2) streamlining processes for data sharing 3) legislative funding to help support the new Idaho GIS Strategic Plan 4) the plan should act as a guide for data sharing and participation in statewide efforts at the university level and beyond 5) statewide data standards would be beneficial, especially in the ‘trickle down’ approach 6) state contracts would be helpful as a guide for other agencies when making purchases 7) knowing the direction the State is going regarding cloud hosting technologies would benefit other agencies

The subcommittee decided to create a matrix of core values and goals for subcommittee members to input the common themes of the entities researched.

After the results were tallied, the top five core values and goals thought to be most pertinent for the Idaho GIS Strategic Plan were:

- Governance
- Data Quality and Access
- Training and Education
- Communications, Outreach, and Coordination
- Sustainable Funding and Funding Opportunities

The five core values and goals were divided among the subcommittee members to create a thorough outline for each, which would become the foundation of the Idaho GIS Strategic Plan.

On April 6, 2021, discussion persisted about finalizing the draft outline and a game plan for how it should be presented to the GIS Strategic Plan Committee was proposed. Each subcommittee member was to create a slide for the core value and goal they researched and present its summary to the GIS Strategic Plan Committee on April 14, 2021.

The proposed overall outline presented on April 14, 2021, was as follows:

- Executive Summary
- Introduction
 - Who are we?
 - Where are we now?
 - Where do we want to go (or not go) and why?
 - How do we get there?
 - How will we know when we get there?
 - Strengths & Weaknesses
 - Opportunities & Threats
- Core Values and Goals
 - Governance
 - data quality & access
 - training/education
 - communication & coordination
 - funding

- Core Values & Goals: Appendices
 - Glossary of Terms
 - TWGs
 - Goals
 - Layers
 - Schema from federal recommendations (Measurable KML)
 - Stakeholders, either a list or logos
- Other Recommendations
 - Dashboard
 - Graphics
 - Arizona example
 - Living Document
 - Business Plans
 - Oregon
 - Utah – Archival & Data
 - Examples of Maps
 - New York
 - Survey Results
 - Heat Map
 - Story Map

6.6 APPENDIX F – GIS MATURITY ASSESSMENT SURVEY RESULTS

The purpose of this assessment is to help better understand GIS maturity across Idaho. This GIS maturity assessment puts realistic context around Idaho's GIS Strategic Plan, so the state can effectively create strategies, objectives, goals, and action plans that best fit existing GIS maturity levels. This assessment is specifically designed utilizing architecture from the [URISA Capability Maturity Model](#).

This specific survey is divided into 2 components, Enabling Capability and Execution Ability. Each section is scored and answered utilizing a leveled answer approach. There is also an incorporation of other questions specific to individuals and their agency's level of maturity.



(Link to Survey: <https://arcg.is/0iXHnb>)

Overview of assessment responses to date:

Main questions:

- Where are we now?
- Where do we want to go?

6.6.1 Part 1: Education

What does the maturity assessment tell us?

6.6.1.1 *Where are we now?*

- 80% of participants had GIS staff at their agencies (20% did not)
- Of the 20% that were part of an agency without an active GIS program, 2 were interested in becoming GIS professionals and obtaining a GISP
- Most participants utilized the following platforms for training services:
 - Esri Academy
 - Webinars
 - Conferences
 - Tech Talks
 - Plural Sight
 - Agencies training
 - On the job training
 - YouTube
 - Local Colleges
 - Interagency Training
- 55% of the participants stated that their agency had the proper means to fund necessary training. Other agencies were working on getting support and funding for their program.

6.6.1.2 *Where do we want to go?*

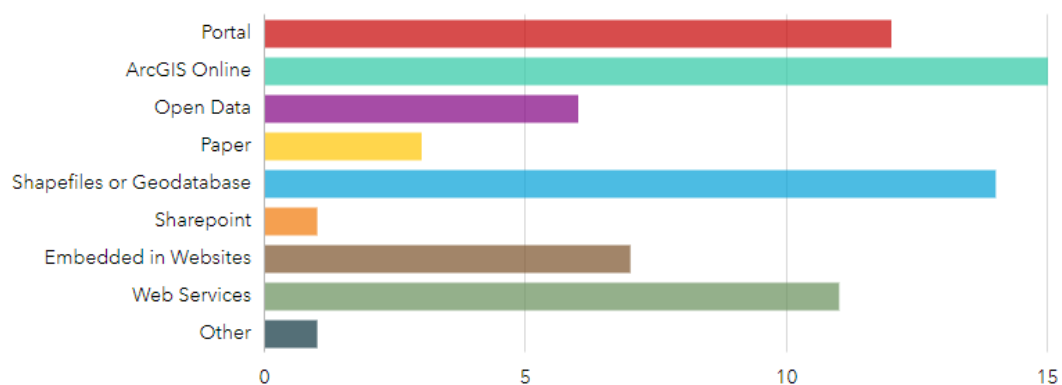
- More agencies utilizing GIS
- More opportunities for GIS professionals to obtain their GISP
- More events available to public for education and training ops
- More support and funding for GIS programs to assist in providing training and sending necessary staff to needed training

6.6.2 Part 2: Data, Infrastructure (Hardware and Software), and Governance

What does the maturity assessment tell us?

6.6.2.1 *Where are we now?*

- 65% of participants indicated their agencies or business utilized some sort of location aware GIS data
- Participants said that most of their business utilized SDE Feature classes and Services for data use and sharing, while others indicated shapefile were still utilized for sharing to external sources
- 55% Participants stated their agencies have selected data stewards to assisting maintaining and making data up to date
- A larger number of participants suggested no formal governance or schema was in place for their current GIS program
- 40% Participants suggested that they had metadata applied to most of their GIS datasets, while the other participants were either planning to apply metadata, or interested in help in the process
- 55% Participants said that their agency or business had a enterprise GIS infrastructure for production data
- Production data in these systems were updated primarily utilizing services
- Many participants stated that their agencies don't have a planned technical infrastructure (servers, technical diagrams, etc.) or future technical plans
- Of the participants that did have existing technical guides and diagram, they stated these plans helped with future investments and planning
- Most agencies seemed to utilize the Esri platform for software needs
- 55% of participants stated they had the necessary software to complete their tasks
- 42% of participants utilize an Esri Enterprise Licensing Agreement
- 65% of participants have some sort of backup system in place for data in case of an outage or error
- The following is an example of the response we received for data sharing:



- 65% of participants indicated that their agencies managed a GIS application portfolio and had some sort of application maintenance support (w/ documentation)
- Many participants stated they didn't have a defined process for development of custom GIS applications
- Very few participants utilized sharing methods that would allow a more regional plan of sharing and utilizing other agencies data
- Very few participants were aware of the states GIS data preservation program
- 60% of participants have a GIS manager or Coordinator
- Some of these participants stated that their current coordinator has some sort of GIS knowledge, while others stated there is adequate GIS knowledge
- Overall lack of participation and knowledge from agency's upper management

6.6.2.2 *Where do we want to go?*

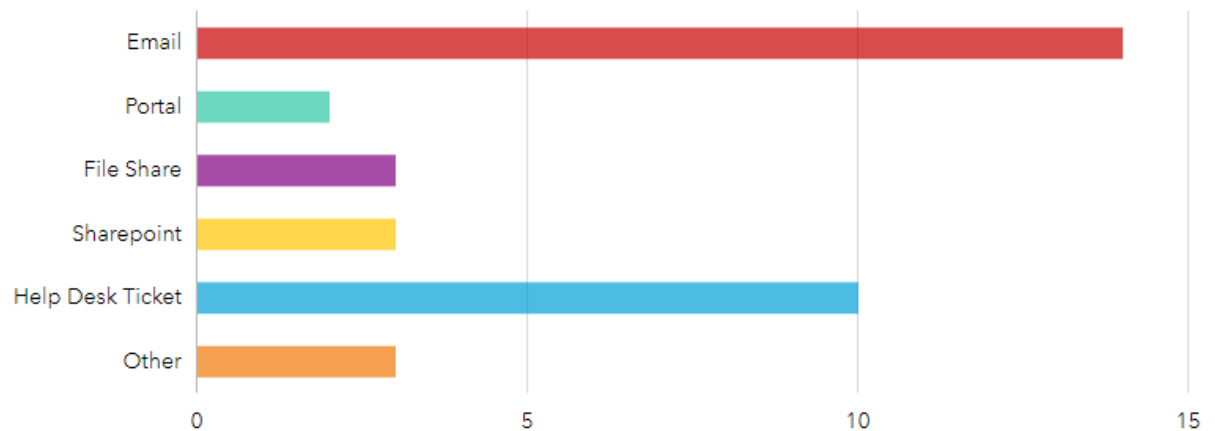
- As GIS professionals and end users in future state we'd like to see overall more use of GIS data to complete business tasks
- More allotted data stewards selected to help with maintenance plans and creation of better and more authoritative data
- We'd also like to see more mature infrastructure to provide a more enterprise solution for individual agencies and the state as a whole
- Existence of infrastructure diagrams, governance documents, and more solidified software agreements and maintenance
- Everyone has the necessary hardware and software to complete all their GIS tasks
- Formal governance in place for better support and better data for each agency and their provided authoritative data
- More centralized data that would allow for better external data sharing (Between agencies)
- GIS Architect positions that would assist in creating the best infrastructure to support the enterprise
- Everyone's adoption of a GIS data preservation program

6.6.3 Part 3: Support and Funding

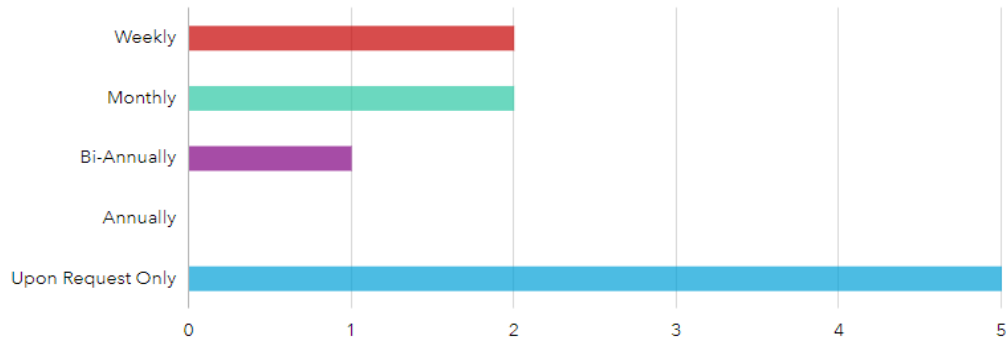
What does the maturity assessment tell us?

6.6.3.1 Where are we now?

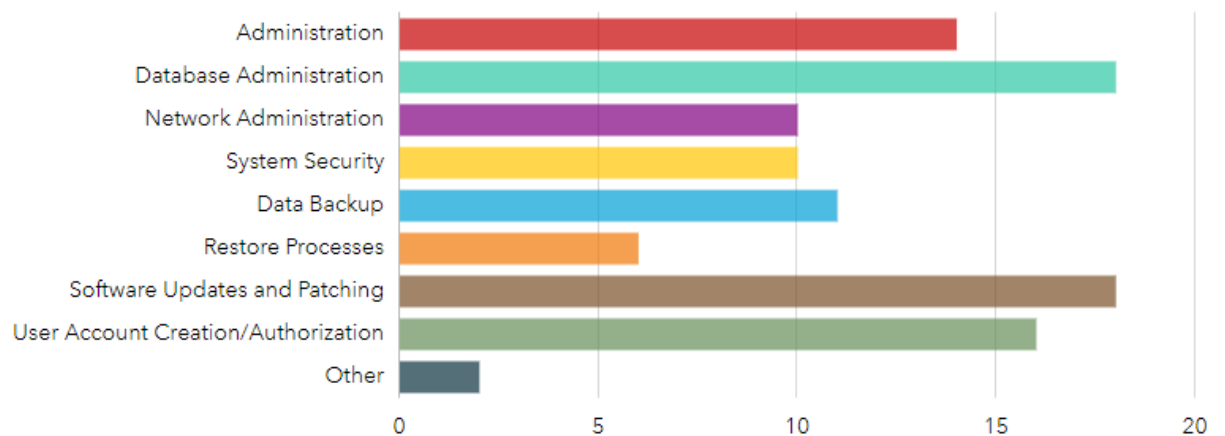
- Many participants indicated that their agency had a number of strategic goals, some participants stated that GIS planning was sometimes modelled to help assisting in obtaining their agency's goals
- Many participants indicated that outside vendor and contractor hiring is utilized to help accomplish necessary GIS functions
- Very few participants stated that their agencies manage support documentation for maintenance of their GIS portfolio and or a functional GIS service catalog
- 60% of participants stated that their agencies allot a supporting budget for GIS
- Only 20% of the 60% stated that their agency provided all the necessary budget, the others stated only “some” of the budget was met
- Only some of these participants stated that they have a well-documented funding model for their GIS program
- Very few participants have the necessary business analysts and project managers to provide needed support for GIS projects (internally)
- Few participants have structured ways of providing support to their customers
- This is how the participants support their customer base:



- Very few participants stated they have proper space to manage and monitor client deliverables
- Below are how often participants follow up on services provided to customers:



- They often utilize email and phone to follow up with their customers
- Limited number of participants stated that they had a standardized QA/QC process applied to maintenance and support for deliverables
- 65% of participants stated they did manage GIS systems for their agency with some sort of process
- Below are the responsibilities stated for managing GIS systems:



- 60% of participants said they were involved in purchasing and contracting processes for goods and services

6.6.3.2 *Where do we want to go?*

- Better overall knowledge of different agencies strategic goals, so better regional alignment can be met
- More work being complete internally to support the business needs, or more of a cooperative partnership between GIS staffs and vendors
- Better documentation of internal operational processes (maintenance, infrastructure, abstracts, etc)
- Creation of GIS annual plans for agencies with GIS staff
- Every agency getting the necessary GIS budget it needs to complete and fulfill their GIS annual plans
- GIS business analysts and project managers to help in completion of successful annual goals

- Better management and archiving of service requests, via ticketing system and or some sort of survey
- Creation of QA/QC processes necessary to obtaining annual goals
- GIS professionals involved in creation of GIS budgets

6.6.4 Part 4: Overall Assessment

What does the maturity assessment tell us?

6.6.4.1 *Where are we now?*

- Currently our overall maturity from our initial assessment (38 participants) is that we have an average to low maturity as a state
- There is inadequate budget in many agencies
- There is inadequate planning for annual goals or future planning in several agencies
- A major lack of tracking service requests
- Lack of documentation on provided services and future maintenance
- Lack of communication between agencies

6.6.4.2 *Where do we want to go?*

- Better communication between agencies to promote more collaborative GIS data use and accuracy
- Adoption and the use of nominated authoritative datasets
- Better documented processes
- Better tracking of service requests
- Better documented architecture diagrams
- Creation of QA/QC processes and annual goals
- Better use of metadata standards for all GIS data
- Help with getting buy in and support from different agency's upper management to progress planning for GIS programs

6.6.5 Initial Analysis

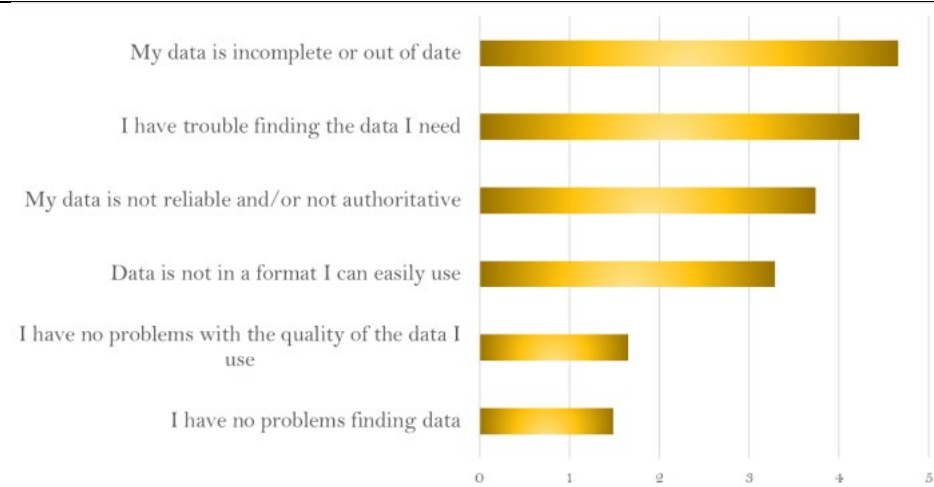
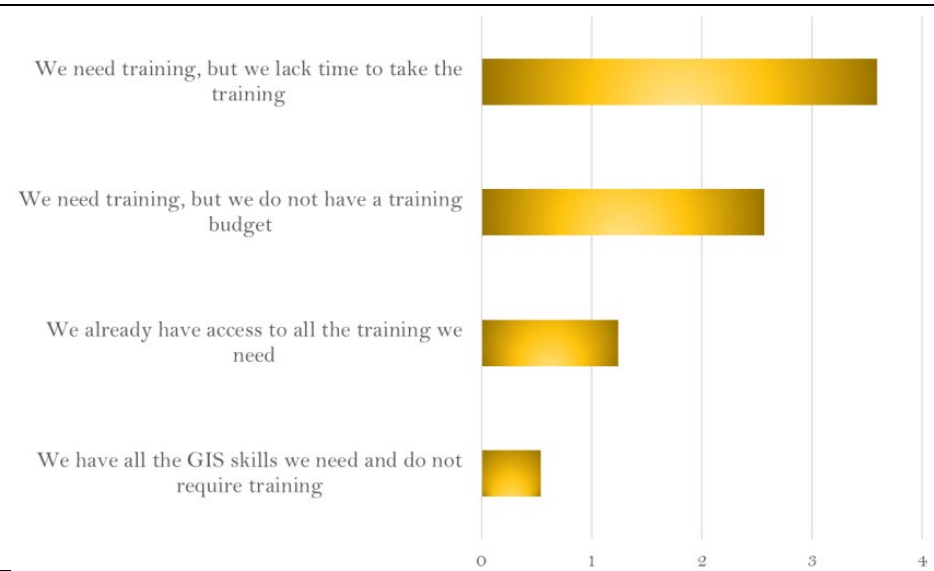
The initial review of the submissions indicates many of the participants currently have a relatively low GIS maturity level with respect to the integration and utilization of GIS within their organizations. They appear to lack the ability to obtain adequate funding, staffing, training, and/or visibility to the organization's leaders and decision makers.

There are very few organizations that have what would be considered a mid- to high-level of GIS maturity. Initial indications are that those organizations have a combination of highly experienced GIS professionals, mature processes for data acquisition and analytics, some level of consistent funding, strong integration within the organization's business processes, and have developed a high level of trust within their organizations through many years of dedicated and high-quality work.

6.7 APPENDIX G – SURVEY GROUPS RESULTS

Between June 21 and July 1, 2021, the Strategic Planning committee conducted 7 online regional focus groups. Each focus group was conducted using online polling software called MentiMeter where all attendees typed in and shared their answers and opinions about different GIS-related issues. The raw results were summarized and presented to the whole planning committee on July 21, 2021:

What are the top 3 GIS related issues going on your agency right now?	<p><u>Most popular issues:</u></p> <ul style="list-style-type: none"> ❖ More technical skills/training needed for staff ❖ Need for more staff and funding ❖ Data creation, data management, QA/QC <p><u>These issues were popular as well:</u></p> <ul style="list-style-type: none"> ❖ Lack of time/challenge to keep up with fast-paced GIS technology ❖ Lack of understanding & support from leadership ❖ Migrating from ArcMap to ArcPro ❖ ArcGIS Online vs enterprise (which to use and when)
Assuming GIS is not fully utilized, what is holding your back?	<ul style="list-style-type: none"> ❖ Training ❖ Staffing ❖ Funding ❖ Lack of time ❖ Department buy-in/support
How would you overcome those challenges if you were in charge?	<ul style="list-style-type: none"> ❖ Create more GIS positions ❖ Educate users & other departments/senior level staff about GIS and its capabilities ❖ Provide real life examples & showcase successes ❖ Fund a broad GIS training program for employees/more training ❖ More sustainable funding ❖ Enforce and prioritize data standards ❖ Collaborate and communicate to avoid data redundancy
What would you like to see in Idaho's GIS Strategic Plan that would help you and your organization?	<ul style="list-style-type: none"> ❖ Top priorities ❖ standards for core data ❖ marketing to decision makers ❖ collaboration that promotes standard practices ❖ cooperative groups that provide support for secondary priorities ❖ look for opportunities through licensing and shared resources ❖ plan to overcome silos and leverage opportunities ❖ transparency ❖ address GIS in school programs
One of the main issues in Idaho is lack of resources. Do you have any suggestions on how we can address	<p><u>Top priorities:</u></p> <ul style="list-style-type: none"> ❖ Show good work and the value of GIS / ROI / Metrics / Educate decision makers ❖ Breakdown silos and leverage expertise across organizations ❖ Explore unique funding opportunities for secondary priorities ❖ Leverage and support currently available training that is successful

that?	<ul style="list-style-type: none"> ❖ Centralize state efforts and leverage expertise / repurpose positions and create a GIS geek squad ❖ Assist with grant writing efforts 														
Rank the following statements regarding data (n=35)	 <table border="1"> <thead> <tr> <th>Statement</th> <th>Rank (approx.)</th> </tr> </thead> <tbody> <tr> <td>My data is incomplete or out of date</td> <td>4.5</td> </tr> <tr> <td>I have trouble finding the data I need</td> <td>4.2</td> </tr> <tr> <td>My data is not reliable and/or not authoritative</td> <td>3.8</td> </tr> <tr> <td>Data is not in a format I can easily use</td> <td>3.5</td> </tr> <tr> <td>I have no problems with the quality of the data I use</td> <td>1.5</td> </tr> <tr> <td>I have no problems finding data</td> <td>1.5</td> </tr> </tbody> </table>	Statement	Rank (approx.)	My data is incomplete or out of date	4.5	I have trouble finding the data I need	4.2	My data is not reliable and/or not authoritative	3.8	Data is not in a format I can easily use	3.5	I have no problems with the quality of the data I use	1.5	I have no problems finding data	1.5
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Data is not in a format I can easily use	3.5														
I have no problems with the quality of the data I use	1.5														
I have no problems finding data	1.5														
What could we put in the Strategic Plan that would help your data needs?	<ul style="list-style-type: none"> ❖ Determine authoritative data, set standards for framework layers ❖ Encourage free data sharing (parcels, address points) ❖ Hire people to standardize and consolidate data ❖ Coordinate purchases of high-resolution imagery, lidar, etc. ❖ Publish data as services ❖ Educate people on using authoritative data 														
Please rank the following statements about training (n=36)	 <table border="1"> <thead> <tr> <th>Statement</th> <th>Rank (approx.)</th> </tr> </thead> <tbody> <tr> <td>We need training, but we lack time to take the training</td> <td>3.5</td> </tr> <tr> <td>We need training, but we do not have a training budget</td> <td>2.5</td> </tr> <tr> <td>We already have access to all the training we need</td> <td>1.2</td> </tr> <tr> <td>We have all the GIS skills we need and do not require training</td> <td>0.5</td> </tr> </tbody> </table>	Statement	Rank (approx.)	We need training, but we lack time to take the training	3.5	We need training, but we do not have a training budget	2.5	We already have access to all the training we need	1.2	We have all the GIS skills we need and do not require training	0.5				
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We have all the GIS skills we need and do not require training	0.5														
What could we put in the Strategic Plan that would help your training needs?	<p><u>Content:</u></p> <ul style="list-style-type: none"> ❖ State standards, technical tools, ancillary training ❖ How to present GIS information – how to communicate to management need ❖ Focus on next generation of technology and specialized tools <p><u>How:</u></p> <ul style="list-style-type: none"> ❖ Classroom 														

	<ul style="list-style-type: none"> ❖ Regional training ❖ Include Esri ❖ Dedicated training ❖ State-sponsored, or ELA (Enterprise License Agreement) based <p><u>Communication:</u></p> <ul style="list-style-type: none"> ❖ Calendar ❖ LinkedIn ❖ Tips and tricks ❖ Sample projects, scripts <p><u>Reward and support:</u></p> <ul style="list-style-type: none"> ❖ Training regime with certificate ❖ Set goals and keep track <p><u>When:</u></p> <ul style="list-style-type: none"> ❖ Recorded, targeted, quarterly, in conjunction with conferences or other events <p><u>Who:</u></p> <ul style="list-style-type: none"> ❖ Regional squad ❖ dedicated trainer – training coordinator <p>Also - need licenses or funding to access training and the time to do training</p>										
<p>Please rank the following statements about support (n=40)</p>	<table border="1"> <caption>Ranking of GIS Support Statements</caption> <thead> <tr> <th>Statement</th> <th>Rank (approx.)</th> </tr> </thead> <tbody> <tr> <td>I turn to GIS Professionals in other agencies for support</td> <td>3.5</td> </tr> <tr> <td>I get all my GIS support from Esri or other vendor</td> <td>2.3</td> </tr> <tr> <td>I wish I could ask local or State level GIS Professionals</td> <td>1.7</td> </tr> <tr> <td>I do not need GIS support</td> <td>0.5</td> </tr> </tbody> </table>	Statement	Rank (approx.)	I turn to GIS Professionals in other agencies for support	3.5	I get all my GIS support from Esri or other vendor	2.3	I wish I could ask local or State level GIS Professionals	1.7	I do not need GIS support	0.5
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I wish I could ask local or State level GIS Professionals	1.7										
I do not need GIS support	0.5										
<p>What could we put in the Strategic Plan that would help you get the support you need?</p>	<p><u>Coordination:</u></p> <ul style="list-style-type: none"> ❖ GIS professionals to provide support ❖ GIS directory ❖ Regular meetings and training <p><u>Structure:</u></p> <ul style="list-style-type: none"> ❖ GIS wiki ❖ Call center, support line ❖ Centralization of licensing 										

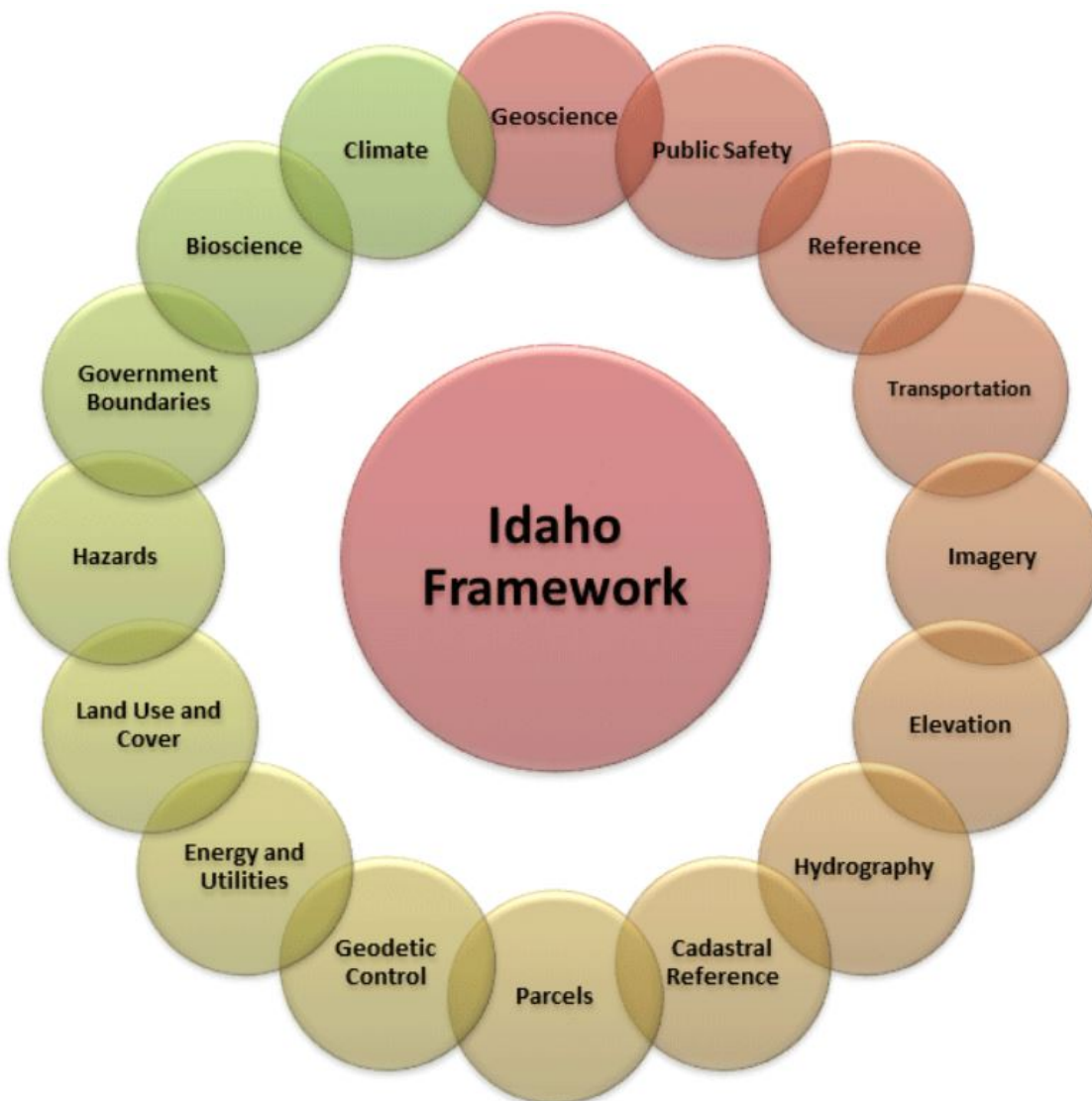
	<p><u>Education and outreach:</u></p> <ul style="list-style-type: none"> ❖ Awareness and celebrating successes to decision-makers and leaders outside GIS ❖ Social media <p><u>Database Coordination:</u></p> <ul style="list-style-type: none"> ❖ Projects such as NG 911
How do you sell your program, promote it or make others aware?	<ul style="list-style-type: none"> ❖ Communication/presentations ❖ Have a strong online presence/friendly apps ❖ Training/clinics ❖ Share data/reduce barriers to access data
Any other suggestions, wishes, items that should be addressed in Idaho's GIS Strategic Plan?	<ul style="list-style-type: none"> ❖ Tie goals to organization types (local, private, state, tribal)/tie plan to "our" business needs ❖ Communication – feedback loops; with leadership; make it easier for "non-GIS" people to understand

6.8 APPENDIX H – IDAHO SDI FRAMEWORK THEMES

The Idaho Framework diagram summarizes the core layers (and relevant data sets) of The Idaho Map (TIM). There is a technical working group (TWG) associated with each Framework theme.

The Idaho Map contains 16 Framework theme layers, which encompass the geospatial “framework data layers” identified by the federal government and additional layers defined by the Idaho GIS Community. At the time of this writing only eight of the TWGs are active and the framework data layers are in various stages of completion.

TWG leaders and members work collaboratively to collect, identify, aggregate, verify, and standardize data in the creation of TIM layers. Many of the state’s GIS professionals lead or participate on multiple working groups which enhances information flow and inter-TWG collaboration efforts.



6.9 APPENDIX I - GOVERNANCE

6.9.1 Governance Defined

In a broad sense, governance is associated with the organizational structure of an enterprise including the governing bodies that are in place to oversee strategic and operational activities, create and enforce policies, define priorities, represent the organization to higher authorities and to the public, and coordinate the various functional groups to address the needs and goals of the organization.

For organizations that utilize, and depend upon, data as critical to their operations, governance of data must be included in their governance model. The internationally recognized Data Management Book of Knowledge (DMBOK) discusses data governance as “...the exercise of authority and control (planning, monitoring, and enforcement) over the management of data assets”, and “The purpose of Data Governance is to ensure that data [are] managed properly, according to policies and best practices...to ensure an organization gets value out its data...[focusing] on how decisions are made about data and how people and processes are expected to behave in relation to data.”¹

The DMBOK also states that “Governance is the organizing framework for establishing the strategy, objective, and policy for effectively managing...data. It consists of the processes, policies, organization, and technologies required to manage and ensure the availability, usability, integrity, consistency, auditability, and security of data.”²

Citations

- 1) DAMA International. *Data Management Body of Knowledge*, 2nd Ed.. Basket Ridge, New Jersey, Technics Publications, 2017. Pages 67-68
- 2) DAMA International. *Data Management Body of Knowledge*, 2nd Ed.. Basket Ridge, New Jersey, Technics Publications, 2017. Page 565

6.9.2 Current GIS Governance Organization in Idaho

The current statewide organizational structure for GIS governance and operations, and their relationships to the ITS and the Idaho Technology Authority are shown in Figure 1.

Idaho GIS governance derives its authority from the Idaho Technology Authority (ITA) which was created by [Idaho statute I.C. § 67-832](#). Within the mission and vision plan the [Idaho Code I.C. § 67-833](#) grants ITA authority to set standards, policy, and guidelines. The ITA is composed of 18 members and six support staff members. One of the member seats is filled by the Chair of the Idaho Geospatial Council Executive Committee (IGC-EC). One of the ITA support staff members is the State Chief Data Officer/Geospatial Information Officer (CDO/GIO).

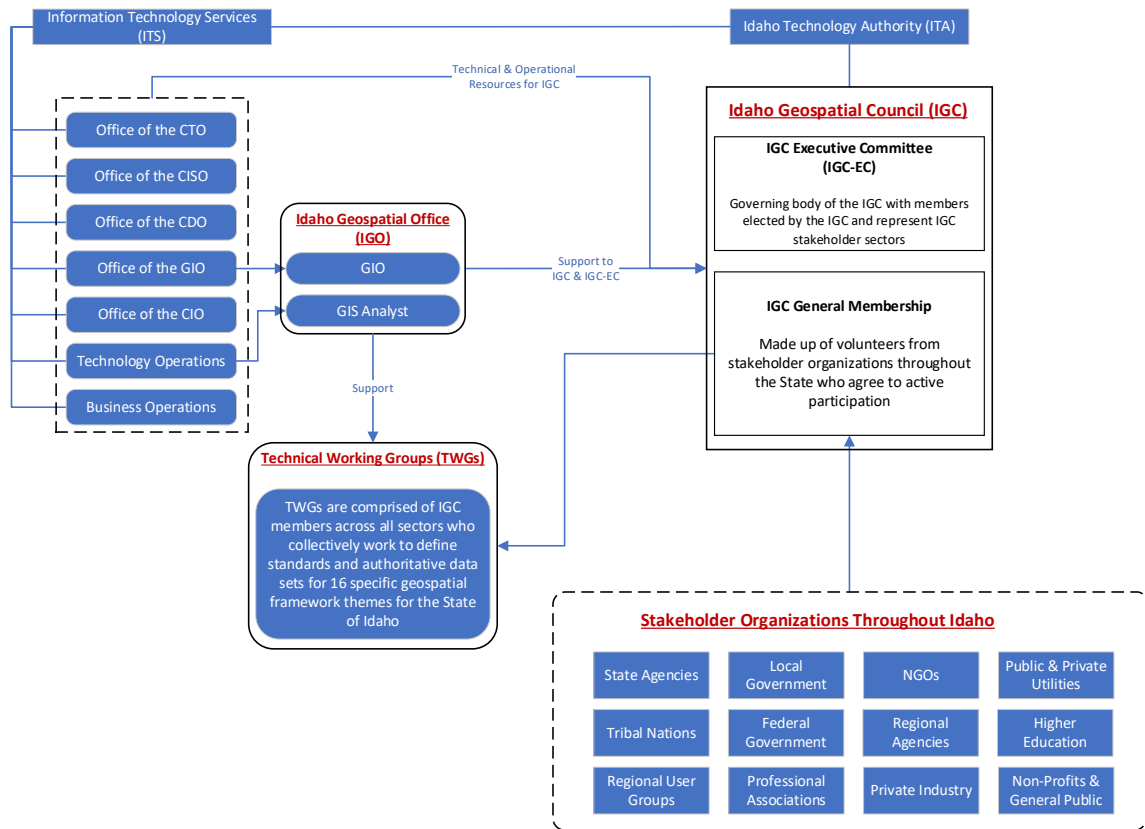


Figure 2: Current Idaho GIS Organization

The key role for governance of GIS at the state level is the position of Geospatial Information Officer (GIO). The GIO leads the Idaho Geospatial Office (IGO) whose mission is to “provide centralized leadership, support, technology & services resources, standards, training, and to coordinate GIS activities for the Idaho GIS community.” (<https://gis.idaho.gov>).

The Idaho Geospatial Council (IGC) is the state GIS coordinating council whose mission “...is to provide a forum for the Idaho Geospatial Community to facilitate the use, development, sharing and management of geospatial data; and to communicate the value of geospatial information to citizens and decision-makers” ([Idaho Geospatial Council Bylaws](#)).

The governing body of the IGC is the Idaho Geospatial Council Executive Committee (IGC-EC). The IGC-EC is composed of sixteen members: four standing members and twelve elected members. Elected members serve a two-year term and are chosen from the IGC membership and represent specific groups of GIS professionals: 2 seats are allotted to State Government Representatives, 2 seats are for Federal representatives, and 2 seats are for Local Government Representatives. Additionally, there is 1 seat each for a Tribal Nations, Utilities, and Private Industry. The final two seats are Open Seats and can be held by any IGC member. Members of the IGC-EC serve as the leadership for the IGC, are elected from the IGC general body, and membership requires approval by the ITA. Members of the IGC-EC provide policy level

direction to the ITA which includes creating, managing, and enforcing policies, standards, and guidelines. A roster of IGC members is maintained by the IGC-EC.

Technical Working Groups (TWGs) are designated by the IGC-EC and are comprised of IGC members across all sectors who collectively work to provide expertise and focused effort in specific areas of interest to further the work of the Idaho SDI. Defining data standards, identifying authoritative data sets, and recommending SDI Framework layers to TIM are key responsibilities that TWGs have in relation to data governance. TWGs are where the groundwork is laid to further the Idaho SDI structure, data quality, and availability.

Currently there are 16 TWGs which focus on the approved Idaho SDI Framework themes ([Appendix H](#)). Of the 16 TWGs, only eight are active with champions that vigorously participate in regular meetings, developing standards, submitting authoritative data sets for approval and inclusion in TIM, and maintaining those standards and approved data sets. Members of TWGs are volunteers from the IGC rosters. TWG chairs and membership report directly to the IGC-EC.

Other responsibilities of a TWG may include setting up a communication system to promote collaboration, identify risks and bring those to the attention of the IGC-EC, and support the GIS community in mitigating those risks. TWG leaders work to engage with GIS professionals and stakeholders to grow the membership of the TWG, assess new data and information about their Framework theme, encourage compliance with data standards, educate and train leaders and the public about GIS resources that are available and how they can be used, and identify opportunities where they can assist and support GIS teams and organizations in their analytics and decision-making projects.

Creating and implementing a successful GIS ecosystem in Idaho relies on the collaboration with, and support of all stakeholders. Stakeholders are participants, sponsors, contributors, and investors in GIS in the state including local, state, and federal government, tribal nations, regional agencies, educational institutions to include elementary, secondary, and higher educational institutions, public and private utilities, regional user groups, professional associations, private industry as well as non-profits and the public.

Communication is a crucial component of effective GIS governance. Passive communication platforms to the wider body of Idaho GIS stakeholders include the official government website for the Idaho Geospatial Office (<https://gis.idaho.gov>), the State of Idaho GIS Hub (<https://Idaho.maps.arcgis.com>), the Idaho Lidar Consortium (<https://www.idaholidar.org>), and the state GIS data web portal INSIDE Idaho (<https://insideidaho.org>). Data layers available from these sites may not be approved by the IGC-EC in which case they would not be included in the Idaho SDI or The Idaho Map (TIM).

Active communication occurs by means of emails that are distributed to the GIS community via the GeoTech ListServ as well as Listservs set up specifically for IGC members, and through local GIS user group meetings, GIS Tech Talk training webinars, as well as GIS conferences and other training opportunities. The GIS community has indicated some frustration with the ListServ communications being unidirectional. They have identified an opportunity to provide communication forums to facilitate bidirectional interaction and discussion.

6.9.3 Assessment of Current GIS Governance Gaps and Needs

Several challenges and opportunities came to light with respect to GIS organization and governance during the research done for this Strategic Plan. The goals and objectives that relate to the core principle of governance are aimed at addressing these challenges and opportunities.

6.9.3.1 Formalize Duties, Memberships, and Missions

6.9.3.1.1 The Idaho Geospatial Council

Currently the IGC Bylaws state...

“The Idaho Geospatial Council is open to all persons interested in geospatial information and applications. The Idaho Geospatial Council should include representatives from all stakeholder groups, including federal government, state government, regional government, county government, municipal government, tribal government, higher education institutions, public utilities, private companies, and the public at large. Membership is open and may also include elected officials, executives, surveyors and others whose business needs or interests intersect with or depend on Geographic Information and services.”

They further state that individuals can become a member just by adding their name to the membership registry. Currently that registry is a listserv email server through which email messages are sent to the entire membership of the IGC. With IGC membership comes one vote or proxy vote if, or when, there are action items that require the vote of the IGC general membership. There are no other rights, responsibilities, requirements, or expectations to membership in the IGC except that the purpose of the IGC “...is to broaden and deepen participation in statewide geospatial efforts and decisions.”

Active participation by IGC members is a critical success factor in achieving the visibility, acceptance, and viability of GIS envisioned by the GIS community. To that end, applying for membership and being accepted as an IGC member needs to have more formality than signing up for inclusion on a mailing list. Recognition in the form of a certificate of membership, membership card (or eCard), and special access to members-only resources and information, access to CE credits or GISP contribution points, and other GIS related activities should be used to promote membership as a desirable recognition to have for GIS professionals in the state. In addition, membership should define the expectation of active participation and the responsibilities involved. A membership and engagement committee (potentially a standing committee) could be tasked to fully define what it means to be a member of the IGC but should include, at a minimum, one of the following:

1. Being a chair and/or active member of an active TWG
2. Be an active member on one of the standing committees
3. Become a member of the IGC-EC by standing for election when the opportunities arise
4. Volunteer for ad hoc committee opportunities as they arise

6.9.3.1.2 The IGC-EC

In the same spirit of engagement, membership in the IGC-EC needs additional structure and formalization of rights, responsibilities, and expectations. The current Bylaws identify the purpose of the IGC-EC “...is to act as the decision-making and steering body for the Idaho Geospatial Council”, where each member has one vote or proxy vote. The remaining verbiage about the IGC-EC lists the composition of the Committee, limitations on standing members, the process of election for elected members, election of the chair, terms of services, etc.

Experience indicates that a percentage of the IGC-EC members’ engagement is limited to attendance at bi-monthly meetings. Additional levels of engagement by IGC-EC members are needed for the committee to function appropriately as the “decision-making and steering body” for the IGC. This is also needed for the IGC-EC to guide GIS professionals and their organizations efficiently and effectively in achieving the goals and objectives of the Strategic Plan.

Updates that should be considered for the Bylaws for IGC-EC members’ responsibilities could include, but are not limited to:

1. Actively function as the Chair of a standing committee
2. Actively function as the Chair of a TWG
3. Be a member of the Strategic Plan Committee to assess progress, propose updates/changes, communicate and educate about the Strategic Plan to state and local agencies and other organizations, executive leaders, decision-makers, etc.
4. Other duties as proposed/requested

Visible engagement and taking on leadership roles will support and enable stronger and more engaged GIS leadership at the governance level and to the general IGC membership.

6.9.3.1.3 Technical Working Groups

The TWGs are the heart of developing the Idaho SDI Framework theme data and authoritative TIM layers. Traditionally, TWGs have been a loose association of like-minded analysts, data stewards, stakeholders, researchers, and GIS professionals. They have, in a somewhat ad hoc manner, come together to discuss their specific needs and interests with respect to a specific Framework theme and to formulate standards for proposal to the IGC-EC. Based on approved standards, the members of the TWG collaborate and coordinate to identify/create the appropriate authoritative data sets for inclusion in TIM. Currently, there is no formal organizational structure beyond having a designated chair for the TWG. Also, there are no formal operational procedures, standardized meeting formats, assignment tracking, or TWG charters to provide guidance, direction, or accountability for the work being done.

To better support and improve TWG outcomes and deliverables, there is a need to formalize TWG organization, management, and functions. This can best be done with a TWG charter that outlines the requirements and work plan for the TWG and its Framework theme, details about expected deliverables and products, etc.

In addition to specifics for each TWG through its charter, the IGC-EC should put standards and procedures that apply to all TWGs to include such things as the organizational structure with a chair, vice-chair, and secretary, required documentation (meeting minutes, data standards, data nomination proposals, etc.), membership and assignment tracking, reporting requirements to the IGC-EC, etc. This will remove the frequent uncertainty around what TWGs do and assist new TWG chairs to move ahead quickly and efficiently.

6.9.3.1.4 Standing Committees

Adding standing committees dedicated to furthering critical areas of focus for the IGC-EC is needed for improved GIS governance and to provide directed focus for carrying out the goals and objectives in the Strategic Plan. Standing committees would have targeted areas of responsibility with a written charter to define duties and prevent overlaps. Standing committees would be chaired by a member of the IGC-EC as part of that person's responsibilities as a member of the IGC-EC. Some of the identified areas that need attention of a standing committee include, but are not limited to:

1. Collaboration and Advisory Committee
2. Data Interoperability Committee
3. Membership and Engagement Committee
4. GIS Education, Marketing, & Outreach Committee
5. Enterprise Communications and Unified Messaging Committee
6. Sustainable Funding and Grant Opportunities Committee
7. Disaster Preparedness & Public Safety Coordination Committee
8. Data Acquisition – Shared Purchases Coordination Committee
9. Others as determined by the IGC-EC to assist in carrying out the IGC mission

Under the current IGC bylaws the IGC-EC can designate TWGs and ad hoc committees only. Organizing and staffing standing committees will require updates and/or modifications to the IGC Bylaws.

In addition to the need for standing committees, there are other areas in the GIS governance organizational structure that require more formalized definitions, qualifications, and expectations to be prepared to achieve the ends of the Strategic Plan. These will also require updates or modifications to the IGC Bylaws. The changes can be applied, with minor modifications, to the GIS governance structures within state and local agencies and other organizations where GIS professionals are employed.

6.10 APPENDIX J – DATA QUALITY AND DATA ACCESS

6.10.1 Quality Data Are Trusted Data

The quality of all data can be measured by assessing “dimensions of data quality”. These are characteristics that are measurable and that are important to the business’s processes. They are characteristics that are worth measuring and can validate the quality of data that are in question.

Data quality dimensions address characteristics that can be measured objectively and others that are context dependent or interpreted subjectively. Completeness, validity, and conformity can be measured objectively, while usability, reliability, and reputation are context dependent.

Regardless of the names they are called, data users are ultimately concerned with very specific questions about the data they use. These focused questions map to data quality dimensions that can be used to evaluate the quality of data and are illustrated in figure 3.

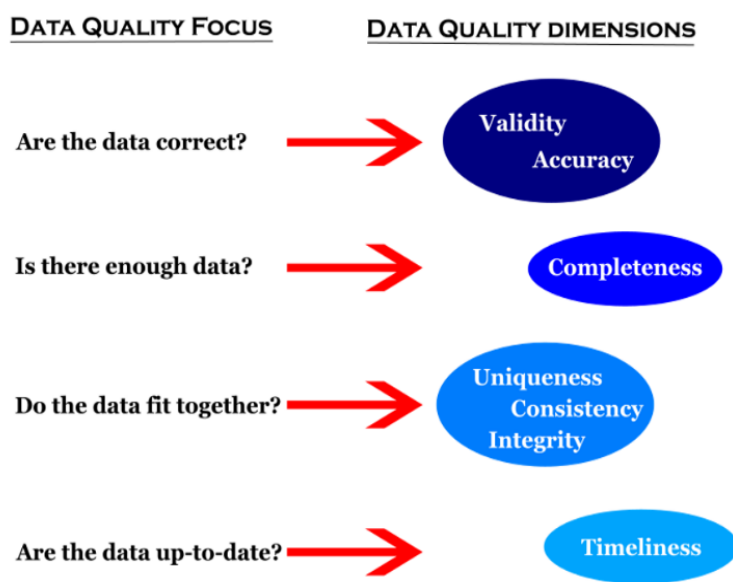


Figure 3: The answers to data quality question are found in data quality dimensions.

Data quality and, by extension, data trustworthiness, are highly dependent upon the idea of data stewardship, which includes the ongoing maintenance of data. Stewarding, maintaining, and sharing commonly needed spatial information about geographic features are vital to the strength of the State of Idaho. The focus areas, goals, and objectives listed below aim to attain and maintain this strength. GIS data and analytics are integral parts of the State’s enterprise information technology (IT) architecture. Compatible data and metadata are necessary for interoperability among agencies ([P1070 – Geographic Information Systems \(GIS\)](#)) and for effective data sharing.

6.10.2 Current State of GIS Data Quality and Access in Idaho

Idaho has a mature GIS Data web portal called INSIDE Idaho (<https://insideidaho.org>) that is hosted and maintained by the University of Idaho (U of I). INSIDE Idaho contains a significant amount of data content and is actively being promoted in higher education courses and by the IGC-EC. INSIDE Idaho continues to operate on part-time staffing from the University of Idaho Library. Those that maintain the site have done a good job staying current with technology and linking INSIDE Idaho to Open Data Portals of various agencies in Idaho.

Most public entities with dedicated GIS staff maintain Open Data sites where users can find and access publicly available spatial and other data. ITS maintains a GIS Open Data Portal linked to Open Data Portals at other State Agencies, while INSIDE Idaho is a single point of access with a much broader distribution of connectivity to GIS data from a large number of state, local, and federal organizations.

Most non-public data sharing in the state happens ad hoc through point-to-point memorandums of understanding (MOUs) that define which specific data can be shared and what they can be used for. Based on stakeholder and other feedback in ad hoc interviews, broad non-public data sharing to enable true simultaneous data interoperability between multiple organizations is very rare. Several government agencies actively participate in federal initiatives and provide data to federal databases and conversely are permitted access to those databases that contain data from other states as well. In some cases, federal funding is available to those agencies who support these federally mandated data initiatives.

The participants in focus groups conducted during July 2021 indicated there is a pervasive problem where GIS professionals find it difficult to locate authoritative data that are complete and/or current. Also, many casual GIS users have trouble differentiating between new/old and good/bad data from multiple similar, or same, datasets. Responses have indicated that it is often not clear whether GIS data assets are authoritative, are associated with set schemas, adhere to accepted standards, or are managed by data stewards with clearly defined workflows. There is a significant amount of duplication of GIS data when siloed acquisition and consumption demands result in acquiring and processing the same data multiple times. For example, many state and local agencies contact all counties in Idaho to collect parcel data, aggregate them, and then publish them for internal use which duplicates work already done by other entities. This practice has the potential to introduce discrepancies and errors during data cleansing, processing, and validation. This practice also results in duplication of efforts, often multiple times, burning work hours that could have been used more productively instead of redundantly.

The issue of data quality has traditionally been left up to individual organizations and (sometimes) the GIS staff at those organizations. While a number of Idaho state and local entities have mature data management practices, most data are not managed as enterprise assets and lack formalized data governance and data quality processes that address the data quality dimensions discussed above. Additionally, the data are often processed to internally defined data standards instead of to industry accepted, or IGC-EC approved, data standards. This brings data products and their related analytics into question when the data do not have strict management processes to

ensure that the data are of high quality, are authoritative, and their provenance are documented in the metadata or are in other ways assured.

Non-standard data are more difficult to share when the shared set is based on an internal, proprietary data standard or are biased in some way. This is especially true when the end user (or the use case the data are used for) requires a more rigorous data standard with much broader applicability. Data processing to reformat, cleanse, or fix data while converting to an approved data standard increases the demands on staff resources, and increases the risk of errors in the data set that could negatively impact data quality.

Processing and storing data to comply with a recognized and accepted data standard at the time of creation or acquisition reduces the number of potential errors in the data initially assuring the quality is high from the outset and supports increased usability by a broader community. Using well developed and accepted processes ensure that similar data are all processed the same way resulting in consistency across data sets regardless of the organization that creates or acquires/authors them. This only works if data standards are known and used at the time of data creation, acquisition, or initial processing instead of being applied later in the data lifecycle.

6.10.3 Assessment of Current GIS Data Quality and Data Access Gaps and Needs

Prior Strategic Plans have focused heavily on data specific to the Idaho SDI Framework themes and TIM. While these data are extremely important as publicly accessible, standard, authoritative data sets for Idaho and its citizens, the SPC recognizes that these are not the only strategically important GIS data for the state. This recognition stresses that the GIS Strategic Plan should provide goals and objectives that are valid for the quality and accessibility for all GIS data and not just those data related to TIM and the Idaho SDI Framework themes.

The more important focus of strategic goals and objectives is to ensure that the quality of all GIS data supports data democratization and being “fit for use” while reducing or removing risks associated with analytics and decision making based on “bad” data. Simply put, users must be able to trust published data and those data must have evidence of being trustworthy. Strategically this requires that goals for data quality and data access address the need for proactive data stewardship, data management best practices, and the processes related to the concept of “create once, use many” for authoritative GIS data.

The lack of a comprehensive, statewide GIS data catalog that supports full metadata management, data dictionaries, schemata documentation, and other required data stewardship functionality is a critical deficiency for the Idaho SDI and for GIS analysts and managers. It represents a crucial opportunity for the IGO to enable and support data interoperability across all domains in the state. It would also provide a dramatic shift in the work efforts of business and other analysts who depend on data and analytics products to positively impact the missions of their organizations. A complete and managed GIS data catalog would enable a major shift in the hours that analysts spend at finding and preparing data and the hours they use to do the valuable work of analyzing those data. Recent surveys have indicated the data analysts spend 66% of their time finding, cleansing, and visualizing data before they can put it to use for analytics (Anaconda, *The State of Data Science 2020*, <https://www.anaconda.com/state-of-data-science-2020>). Discussions with data analysts across organizations in the past year have indicated that number may be closer to

80% of their time finding and preparing data to be usable for their analytics needs, and only 20% of their time actually doing valuable analytics. Identifying authoritative data sets and enabling those data to be easily found and accessed will essentially save tens of thousands of hours searching for the correct data and giving those hours back for improved analytics and analytics products.

Part of data quality and access is the management process of archiving and storing old data and data that has been replaced with newer and/or more accurate data. This creates a need for specific guidelines and policies about data retention and access to archived data. Data retention defines which data need to be preserved and retained and which data can be removed and destroyed. Data are valuable enterprise assets and must be managed as such.

Some data have legal requirements for data retention periods and other data do not. Currently the GIS community has indicated that nearly all GIS data sets are subject to permanent retention because of uninformed and poorly conceived generalized documentation that lack detailed guidelines and policies for data retention based on data type or data purpose. Costs for unending data retention can get quite high. In 2016, Veritas estimated the annual cost to store 1 petabyte of data is over \$750K (<https://www.veritas.com/news-releases/2016-03-15-veritas-global-databerg-report-finds-85-percent-of-stored-data>).

In prior years there was a project started to work with the Idaho Historical Society in an effort to define the retention periods for GIS data. Unfortunately, that project went dormant and was never completed, and has recently been reinitiated. Attention to policies on data retention will be crucial to ensure that the most timely and correct data are those that are being found and used, and inaccurate or out-of-date data are not available. This will also have the positive impact of reducing the cost associated with data storage and access, as well as the confusion of tracking and managing large numbers of data sets that have little or no operational value.

Discovery surveys and meetings have led to identification of the following focus areas that identify gaps and needs for Idaho's GIS data regardless of where they physically reside or the data domains in which they reside.

- Focus Area – Stewardship
 - Stewardship addresses the individual(s) who are responsible for the data at the operational level. A data steward is responsible for data quality, format(s), updates, acquisition, maintenance, storage, and other activities related to hands-on management and processing of raw data and, where appropriate, aggregated data. Data stewards are the key individuals responsible for their data and metadata.
- Focus Area – Uniformity
 - Data uniformity ensures that data comply with the correct formats, range values, types, and ensures that like data in disparate systems are uniform. For example, if a data set stores an address that requires a street number, street name, street designator (street, road, circle, lane, etc.), secondary address data (apt #, suite, PO Box, etc.), city, state, and postal code, then all address data in other data sets follow the same format and use the same data types for each data element. Other uniformity requirements relate to data complying with accepted standards or using a commonly accepted/required coordinate

system. Data uniformity ensures that data similar data are uniformly implemented and makes data, and metadata, more shareable and interoperable across the enterprise.

- Focus Area – Findability, Accessibility, and Sharing
 - Data cannot be effectively and efficiently used for their purposes unless they can be found and understood in context. Making data findable requires appropriate metadata, cataloging, and accessibility. Standards for metadata help ensure that there is uniformity and consistency in the critical metadata for each dataset. Data stewards are critical to ensuring that metadata are complete, and that data are cataloged correctly. Public data that are not cataloged on a publicly accessible data catalog cannot be found. Similarly public data that are not stored on publicly available storage locations are similarly lost. Non-public data that can be shared between organizations should also meet metadata standards, be cataloged on internally accessible catalogs, and available in controlled access data storage systems for easy discovery and use.
 - Public GIS data should be cataloged and stored on the Statewide Geospatial Clearinghouse (INSIDEIdaho.com) to be available for public discovery and accessibility. Non-public data should be cataloged and stored on controlled access portals. Dated, aged, and other data that no longer has current or historical relevance should be archived or destroyed according to data retention policies and regulations. This will ensure that relevant data are findable, accessible, and shared.
- Focus Area: Collaboration
 - The value of data increase when they are used. Collaboration is crucial to both acquisition and ongoing use of data. Collaboration on all levels is needed to acquire data from third parties such as purchasing LiDAR and aerial imagery data. Often, the costs for these purchases require participation by multiple entities. These data can then be shared across multiple organizations without having to purchase the same data multiple times. Collaboration also relates to sharing data across organizations to find answers to complex, multi-organization questions, or to use data from multiple organizations for the public good. Sometimes this requires legal agreements for non-public data to be accessed and used.

6.11 APPENDIX K – COMMUNICATION, OUTREACH, AND COORDINATION

6.11.1 Needs and Focus Areas

Coordination of outreach and communication efforts are most effective when consistent, targeted messaging is developed that is specific to an individual's or an organization's needs and interests. A well-developed web presence will impact a percentage of identified stakeholders and GIS professionals through word-of-mouth or targeted notifications within the community. However, web-based information only becomes effective when curiosity and interest drive investigation by a much larger stakeholder and user population. This occurs when individuals make specific efforts to search and find web-published or other online information and data. Building curiosity and interest requires a "marketing strategy" to find and engage specific people and their organizations to inform and to propose solutions that will help solve their current and long-term challenges. A well-crafted plan for utilizing online resources, operational meetings, trainings and seminars, targeted legislation, and personal face-to-face conversations will be the key to success for this core principle.

To communicate efficiently, GIS contacts and stakeholders need to be identified. There are a significant number of tools at the GIS community's disposal that can help engage the public, including, but not limited to: Story Maps, ESRI's HUB, Survey123, Dashboards, and a variety of web applications. Establishing a strong presence on the web will be critical in spreading the word to users, decision makers, and the public. Showcasing successes that have used GIS can open doors for other agencies/organizations and be used as example cases. These successes can be communicated most efficiently when there is a strong web presence established and stakeholders have been identified. Tactically, having a standard structure to communication and establishing branding will help communicate GIS capabilities and vision in a consistent and unified way. Identifying available tools and developing new tools for outreach will also aid in communication and outreach efforts.

Coordinating and planning effective outreach efforts must take into account the concept of visibility. For organizations and agencies that have GIS staff and resources already in place this most frequently requires directing a stakeholder or decision-maker where to look for those things that will increase their interest in GIS solutions and that have the potential to provide locational intelligence and applied analytics. Success is also achieved by actively reporting the role that GIS played in a successful project or solution in their own organizations.

Gathering the needed intelligence to create targeted messaging is vital to the quality and effectiveness of communications that are used to promote, encourage, inform, and educate about the value of GIS solutions and services. Once gathered, the knowledge and information must be stored and used effectively in planned communication and collaboration activities to gain the maximum value from each targeted communication effort. Targeted messaging done right has a common theme and is unified with similar communications. It has the power to stimulate curiosity that often leads to initiating constructive conversations and/or opportunities to direct stakeholders to crucial information sources or to storyboards that demonstrate the power of GIS to contribute to mission-critical solutions.

The best sources of this type of intelligence are GIS staff who work in each organization. As they work internally and create their own effective internal communication and coordination processes for their own organizations, there needs to be a way that the knowledge and information can be shared with the wider community, and to ensure that internal messaging is consistent with statewide messaging and enables uniformity at all levels.

To accomplish this there is a need for a communications and messaging coordination function that works at a statewide level and coordinates online communications solutions and unified messaging content, develops targeted messaging, and is a resource for uniformity and consistency used for outreach and communication engagement opportunities. A central contacts database should be developed and used by both intra- and inter-organization GIS professionals to identify stakeholders, contacts, and decision-makers within agencies and organizations, in legislative offices, and in the offices of elected officials.

These two resources provide significant guidance of “what to say” and “who to say it to”. The final act is then one of “when to say it”. That “when” is related to if the communication process involves a “push” (active) or a “pull” (passive) methodology. “Push” or “active” communications and methodologies involve targeted outreach messages using traditional methods of email, texts, instant messaging (IM), and in-person meetings. The content for targeted communications is created each time they are sent and are tailored to be unique for the intended reader(s). Passive communications methods are effective when engagement with an identified contact generates has enough curiosity and interest to search out (pull) web-based resources, blogs, storyboards, attend seminars/webinars, enroll in RSS feeds or newsletter mailing lists, or any other process of requesting, searching, or accessing relevant information on-demand. These communications platforms are created once and updated periodically and are scripted for the consumption of a much broader audience.

The challenge for GIS professionals and leaders is to create and maintain these various processes and resources in the long-term.

6.11.1.1 State and Federal GIS Legislation

Other states, counties, cities, municipalities, tribal nations, and other government entities that have a strong and vibrant GIS ecosystem are linked by one commonality – statutory authority and funding.

There exists an opportunity for the GIS professionals and stakeholders across all state domains to collectively work to positively influence the future of GIS through the legislative process. This requires a combined, coordinated, and concerted effort that may take years to accomplish. However, it must start at some point, so the question is “why not now?” With statewide GIS support, the GIO and the IGO can coordinate efforts with all stakeholders to start the process of drafting relevant legislation proposals to move forward. This will also require a unified message and a common vision that all parties can get behind and support.

At the national level, in 2018 the federal government passed the [Geospatial Data Act](#) (GDA) that legitimizes and supports building the National Spatial Data Infrastructure (NSDI) to support federal and state governments. The law states (in four places) that federal agencies are supposed to be working in partnership with state and local governments, tribal nations, higher education,

and the private sector to build the NSDI. It has been communicated that, with few exceptions, federal agencies do not really know what that means or how to go about developing a true partnership where all parties benefit and both states and federal agencies jointly achieve the objective of a complete NSDI.

There is a high likelihood that a GDA amendment will be introduced in the current Congress early in 2022 but may not have full support and will need to be re-introduced in a future Congress. State GIS communities are being asked to advocate, individually and collectively for true partnership programs that meet the letter and the spirit of the law, but with sustainable funding, not grant funding.

Having a Strategic Plan that allows for the development and maintenance of a full Idaho SDI (which is Idaho's portion of the NSDI) developing authoritative geospatial Framework data in standardized formats in collaboration with stakeholder and making those data publicly available and comprehensive across the state, will be very helpful to the cause for GIS. It will provide a means to advocate with Idaho's congressional delegation for the NSDI, and for the collaborative governance and sustainable funding, which are the two main pillars of the proposed GDA amendment. Ultimately, coordinated communications and outreach to support advocacy by NSGIC and others to leverage GIS collective influence in support for an amendment to the GDA, as well as direct advocacy with Idaho's Delegation, will be very important.

6.12 APPENDIX L – SUSTAINABLE FUNDING AND FUNDING OPPORTUNITIES

6.12.1 Introduction

Nearly all respondents in the focus groups held in July 2021 mentioned lack of funding resources as the primary challenge preventing them realizing the full value of GIS on behalf of their organizations. Identifying sustainable funding streams and other funding opportunities are paramount for the full value of GIS to be achieved in individual agencies/organizations and collectively for the benefit of the citizens of the state.

There are three primary areas where funding, especially sustainable funding, can have a significant positive impact on the creation and sustainability of greater GIS value. These are staffing, technology, and training. The assessment of current status and current needs for each of these areas will be discussed in the following section. Secondly, funding is needed for the acquisition of mission-critical data sets, usually purchased from third parties and that can be used by multiple agencies and organizations, which are needed to complete incomplete data sets, update aging data, and to be used to generate locational intelligence on a broader scale with greater accuracy.

The return on investment (ROI) for funding additional GIS professional staff can be significant by increasing the quality, value, and “speed to market” of GIS products and analytics, and by reducing staff turnover. Sustainable funding is required as technology costs continue to escalate and the demands for advanced technical solutions, systems, and services proliferate.

Unfortunately, as organizations depend more and more on technology to drive business success, and as existing technologies become more complex and more powerful, they also become more valuable to the organization...and more costly. With increased complexity and usefulness, technology comes with a higher price tag. The increased costs are not only related to hardware and software but include the need for ongoing training to keep staff skills up to date, to build new skills required to support/use updated technologies, and to provide greater value to business functions and the technologies that support them. In addition, there is a general business need for a more data literate workforce at all levels and in all roles to better understand and utilize analytics and the data that power them.

Other than the GIO position, there are no dedicated funding streams designated to support statewide GIS coordination, data collection and aggregation, data sharing and other collaborative efforts in Idaho. Indeed, Idaho lacks the resources and the political will to implement things like the required GIS component of crucial public safety initiatives like Next Generation 9-1-1 (NG9-1-1) on a statewide level.

6.12.2 Current Funding Status and Needs Assessment

As mentioned in Section 5.5.1, the three areas that represent primary GIS-related funding needs are staffing, technology, and training. Because of the way that state and local governments handle budgeting and manage their individual funding requirements, the discussion related to funding in the context of this core principle refers mainly to funding available to individual agencies and organizations. However, future funding needs include dedicated and sustainable funding for statewide services and support, coordination for statewide initiatives and their implementations, and to support the technology and infrastructure required to democratize GIS

data and resources making them interoperable and shareable based on accountability to accepted data standards and supporting the concept of “create once, use many.” Additionally, there are growing needs for centralized infrastructure and systems to support statewide initiatives such as NG9-1-1, Broadband services, disaster response, and to sustain and improve existing centralized GIS data portals like insideidaho.org.

6.12.2.1 Staffing

Respondents to survey and focus group questions have indicated a nearly universal lack of adequate GIS staffing exists within agencies and organizations in all state domains. This is also true at the State IGO level to support coordination, data sharing, legislation, policy development, GIS services and support, and other GIS oversight and coordination activities. Respondents indicate that most GIS staff and leaders are struggling to stay current with the daily demands of their work, let alone taking on additional projects and work requests that provide greater value to the organization and that can take advantage of expanding data availability and access. Most respondents wear multiple “hats” and are spread thinly across multiple projects and are filling different technology support and business roles. They also identified a lack of time to stay current on upgraded systems and changes to technology solutions, or to get involved in training for these newer technologies. This is detrimental to organizations in two ways. First, GIS solutions and systems are providing only basic value for cost and not achieving the full scope of their potential worth. This often results in products and analytics solutions being delivered late. Second, fewer GIS professionals who are being tasked with additional responsibilities increases both job dissatisfaction and staff burn out.

Having adequate staff to reasonably meet increasing work output expectations requires significant investment. However, the return value to the organization has the potential to be substantial. Access to more complete and in-depth solutions delivered on time, that provide focused actionable intelligence in context, and that support evidence-based decision making will ensure that organizations, agencies, and other entities more effectively use precious time and limited funds to benefit the citizens of the state with less waste on programs and services that were traditionally designed based on anecdotal evidence. Notably, with the real costs associated with staff turnover being reduced, funding for additional staff will pay for itself in the long term. In addition to staffing in individual agencies and organizations, adequate staffing for the IGO is vital to provide centralized coordination of statewide initiatives, improve shared services and local support for underrepresented entities, create greater access to training and education resources, centralize infrastructure resources for statewide initiatives, improve data sharing and data lifecycle management, lead interaction with other state and federal GIS entities, monitor Strategic Plan progress, develop standards, policies, and best practices, and a host of other important strategic and tactical activities to bring added value, visibility, and maturity to GIS in the state.

Currently there is only limited funding for central IGO staff in the form of a GIO, who also functions as the state Chief Data Officer (CDO). There is also one full-time GIS Analyst at ITS who provides GIS support to agencies and whose position is sustainably funded through technology billings to supported agencies. Unlike many other states, no funds are specifically designated from the General Fund for coordinating, streamlining, developing, managing, and promoting the full value of GIS products and services from a central geospatial office. The

majority of GIS funding in Idaho exists within the individual agencies and organizations that have GIS staff and use GIS for their own business needs. There appears to be a correlation between the value an organization gets from integration of GIS into their business processes and the number of GIS professional staff that are funded.

6.12.2.2 Technology

The current reality is that business operations and the success of agency/organization missions are increasingly dependent on technology solutions and on the analytics available from vast amounts of data assets. However, the fact is that the cost related to the technologies that business functions rely on continues to increase. Technology related costs are primarily focused in three areas: Technology purchases (hard dollars), GIS staff headcount, and GIS staff hours.

The costs of technology platforms, infrastructure, managed services, system licensing, and commercial off-the-shelf (COTS) software solutions, continue to rise faster than the annual inflation rate. Concurrently, the tangible value that can be realized by effectively and efficiently applying technology solutions to mission-critical business use cases also continues to increase. The challenge is...and continues to be...that the up-front, out of pocket costs are significant and the realization of value for those initial investments of money, staff, and time, comes later.

Unfortunately, technology solutions also continue to grow in complexity which requires a longer implementation and configuration timeline to bring systems “online”. This complexity requires additional training for users, more aggressive maintenance schedules, increased technical staff support, and (nearly always) more complex billing models. Since most large, mature technology solutions providers are publicly traded or are for-profit, the annual costs for licensing and maintenance continue to increase in order to increase profitability and market share, effectively making operational budgets moving targets. GIS technology expenses related just to licensing and maintenance costs nearly always require additional annual budget requests and justifications. With the majority of Idaho being invested in a single GIS software solution, agencies and organizations have no ability to competitively negotiate pricing so are disadvantaged by their own commitment to a single solution provider.

Currently, Idaho State government has an ad hoc licensing structure with several state agencies having their own Enterprise License Agreement (ELA) or participating in a shared pool of licenses administered by ITS. Other agencies purchase all their own licenses outside an ELA. There would be value in researching the viability of a comprehensive ELA that would centralize all GIS licensing across the state, improve license costs based on economies of scale, leverage the discounts available for large volume purchases, and reduce the amount of time that multiple agencies and organizations spend negotiating and managing enterprise contracts and their managing the related licenses.

Infrastructure costs related to GIS implementations and solutions are also a challenge. This is especially true when cloud-based infrastructure platforms are put into place. Cloud platforms are priced based on a usage model with each compute function, storage volume, and processing services being charged a fee, usually on some type of sliding scale based on volume. This means that it is nearly impossible to predict the real cost of infrastructure in the cloud since it is based on the amount of use. For cloud solutions that support multiple entities, the challenge can be to

break out how much use each entity had during a specific period and do some type of charge back costing. Changes in cloud services have started to surface with “managed services” and “fully managed solutions” being promoted by COTS and other solutions providers that manage all the background cloud storage and compute functions for a single price structure or a standard “usage credits” cost.

Conversations with local government GIS professionals have highlighted that the lack of sufficient funds for GIS in smaller cities and counties impacts their ability to implement infrastructure solutions to support and enhance desired GIS capabilities. They also lack the technical support functions that traditionally exist in an IT department to be able to implement and manage local infrastructure. In those conversations, suggested solutions have included creating a regional GIS infrastructure by pooling funds from multiple local entities to acquire hardware and sharing a regional data center along with the staff for that data center that have the skillsets to manage the physical infrastructure for regional users.

6.12.2.3 Training

Closely aligned with funding for staffing and technology is the need for funding for training. As stated in Section 5.3, increased complexity related to modern technology solutions requires staff to keep skills up to date through regular and ongoing training. New or upgraded technologies also require new skills to manage and support them. Organizations have three options for implementing new technologies and maintaining existing systems. They can invest in training existing staff, they can hire new staff who already have the required skills, or they can outsource the required service to contractors who have the required skills. For each option there is a cost involved and a requirement for an ongoing funding stream to effectively utilize new technological functionalities and to maintain existing technologies that are upgraded.

One of the universal responses by respondents in the focus meetings held this year was that the current GIS technology solutions platform releases too many new products and services too quickly for GIS professionals to keep up with, let alone utilize them. They cited lack of time to stay current with so many updates and changes, which equates to an artificially created training deficiency.

6.13 APPENDIX M – GLOSSARY OF TERMS

Several GIS-related terms and acronyms are used in this Strategic Plan. Many are defined in the State approved technology guideline document “ITS G105 – ITA Glossary of Terms”

(<https://ita.idaho.gov/psg/g105.pdf>). The most relevant terms for this Strategic Plan are defined below.

Authoritative Data	Recognized geospatial data that are certified and provided by an Authoritative Source
Data Customer	Anyone who uses Geospatial Framework Data. This includes public citizens, private businesses, educational institutions, non-profit organizations, and government agencies at all levels.
Data Steward	The organization or individuals within or contracted by an Authoritative Source charged with creating, collecting and maintaining Authoritative Data
Enterprise Model for GIS	The means by which GIS is integrated into and among the business processes of an organization
Framework	A framework dataset along with the technology, policies, standards, human resources, and related activities necessary to acquire, process, distribute, use, maintain, and preserve this spatial data. The Idaho Map (TIM) consists of a collection of frameworks
Framework Data Theme	Spatial data that are commonly needed by a wide spectrum of GIS users with a goal toward developing and maintaining coverage statewide. Themes include Cadastral, Geodetic Control, Land Use/Land Cover, Hydrography, Transportation, Government Boundaries, Elevation, Orthoimage, Bioscience, Geoscience, Climate, Public Safety, Reference, Parcels, Energy, Utilities and Hazards
Framework Dataset	The GIS dataset representing all or a portion of a Framework Data Theme. It is common for a Framework Data Theme to consist of several Framework Datasets
Geographic Information Systems (GIS)	Any system in which a geographic coordinate system is used to reference the location of features represented by the data. In general, typical components of a GIS are the tools to capture, store, transform, analyze, model, simulate, and display spatial and tabular data related to positions on the Earth's surface
Spatial Data	Digital information that identifies the geographic location of features and boundaries that are usually stored as coordinates and topology that can be mapped or used for comparative spatial analysis
Spatial Data Infrastructure	Spatial Data Infrastructure
Technical Working	Long-term groups formed by the Information Technology Leadership

Group (TWG)	Council (ITLC) or Idaho Geospatial Council Executive Committee (IGC-EC) to provide expertise and focused effort in specific areas of interest.
The Idaho Map (TIM)	The full collection of Framework Data Theme GIS datasets

6.14 APPENDIX N – PRIOR STRATEGIC PLANS

For reference, see attached documents:

1. [Strategic Plan for Development and Deployment of Idaho's Spatial Data Infrastructure](#) (March 2009)
2. [Business Plan for Development and Deployment of Idaho's Spatial Data Infrastructure](#) (March 2009)
3. [State GIS Strategic Plan](#) (December 2016)

6.15 APPENDIX O – REFERENCES AND IMPORTANT LINKS

Important Links:

1. Idaho GIS Hub Site: <https://gis-idaho.hub.arcgis.com/>
2. Idaho Geospatial Office: <https://gis.idaho.gov/>
3. Idaho GIS Maturity Assessment: <https://arcg.is/0iXHnb>

References

Babinski, Greg, “URISA GIS Maturity Assessment,” URISA GIS Management Institute, September 2013 ([URISA GIS Maturity Assessment](#))