State of North Dakota

GIS Program Strategic Plan – 2019-2021

NORTH
Dakota Be Legendary.™

Geographic Information Systems
INFORMATION TECHNOLOGY

Prepared By: Bob Nutsch
              GIS Coordinator
              Information Technology Department

Approved By: North Dakota GIS Technical Committee

Date of Publication: January 31, 2020

Contents

1. EXECUTIVE SUMMARY

1.1 Overview

The Geographic Information System (GIS) Program is driven by the North Dakota GIS Technical Committee (GISTC) with the focus of the work being the development and maintenance of the GIS Hub which is funded by the North Dakota Legislature and is the foundation of the GIS Program. The GIS Hub is a database of shared agency data and is a web infrastructure which supports state agency GIS and is used to disseminate geospatial data to other levels of government and to the public.

The GISTC also provides the coordination for state agency GIS activities, data development, and interaction with local and federal government.

1.2 Business Case

Key drivers include:

- Efficient delivery of geospatial data resulting in cost savings and protection of property and lives.
- Reduced agency program costs due to the existing infrastructure and data provided by the GIS Hub lowers the barriers to utilization of geospatial technologies.

1.3 Strategic Goals

The following strategic goals have been identified by the GISTC to implement its vision and achieve its mission:

Strategic Goal #1 – Enhance and develop GIS data
Improve existing datasets and develop plans to acquire new datasets needed for agency business processes.
Strategic Goal #2 – Improve Statewide GIS coordination
Streamline the flow of data, ideas, activities, standards, technology, training, and priorities within the state at all levels of government.
Strategic Goal #3 – Improve GIS systems
Continue to evolve and provide means of distributing data through the GIS Hub while improving reliability and access.

1.4 Key Recommendations

- Implement and maintain the statewide parcel dataset
- Enhanced coordination with all levels of government
- Sufficient staffing for the support and development of the GIS Hub

2. CURRENT SITUATION

2.1 Mission Statement

The State of North Dakota's GIS Hub will provide the essential infrastructure to share core geographic datasets through an accessible data warehouse among stakeholders with browsing ability to the public. The Hub will leverage the State's existing data, infrastructure and expertise to implement the core elements of this enterprise solution.

2.2 Business Case for the GIS Program

Geographic information is critical in emergency preparation and mitigation and is important in business processes. Two key drivers for the GIS Program at the State of North Dakota are:

1) Efficient delivery of geospatial data resulting in cost savings and protection of property and lives.
2) Reduced agency program costs due to the existing infrastructure and data provided by the GIS Hub lowers the barriers to utilization of geospatial technologies.

2.3 Who We Are

The North Dakota GIS Program is made up of two primary components, the coordination of state GIS efforts and the GIS Hub.

The GIS Program's coordination efforts include data development, support of state agencies' GIS, federal and local government collaboration, strategic planning, and oversight of the GIS Hub. These efforts are managed by the GISTC, as established by Executive Order 1995-05 and reaffirmed by Executive Order 2001-06.

The GIS Hub consists of applications, data, and services supporting state agency's GIS efforts and the dissemination of common interest data to other levels of government and the public.

2.4 Where Are We Now?

2.4.1 Coordination and Datasets

In 2019, the National States Geographic Information Council (NSGIC) released the results of a survey conducted in 2017. These results, termed the Geospatial Maturity Assessment, provide "NSGIC members, sponsors, and other partners with a summary of geospatial initiatives, capabilities, and issues within and across state governments." North Dakota received an overall grade of B- based on coordination and data status. More information is available at https://www.nsgic.org/NSGIC-GMA.

2.4.2 Strengths

Small group of dedicated individuals working well together
- The GIS Program is driven by the GIS Technical Committee (GISTC)
- The GISTC meets monthly, rotating the meeting locations between each of the agencies
- GIS expertise at the state agencies are shared at these meetings and is used to help develop and manage the GIS Hub and its data holdings

The GIS Hub utilizes existing infrastructure
- The Information Technology Department (ITD) manages the hosting of the GIS Hub infrastructure

Collaboration with non-state agencies
- Ties to industry, academia, other levels of government, and other states are maintained through the GISTC

Legislative Support
- General funding from the Legislature is used to maintain and develop the GIS Hub and is part of the ITD budget

2.4.3 Challenges

Hosting Fees
- Reductions in storage rates have occurred over the past few budget cycles but cost pressure remains with growth in the size of datasets and number of datasets
- Server hosting fees are an impediment to responding to vendor-recommended software deployment strategies and for implementing disaster recovery

Application Replacement and Updates
- Sufficient resources for application development, including replacement of aging tools and researching new tools and methods are required to remain in step with new technology and newer software versions
- Some agencies may be unable to fund timely replacement of their web and desktop applications which in turn creates the pressure to maintain older technology on the GIS Hub
- Some agency business functions rely on third-party extensions that can be upgraded by only the third-party provider. These schedules are beyond the control of the agency and the GISTC. However, since many of these types of third-party extensions are essential to agency business operations, they may delay the update of the GIS Hub software to the latest version.

People Resources
- Individuals from state agencies contribute their time and expertise in data and other activities associated with the GIS Program which can conflict with their primary agency-related work duties. As a result, GISTC schedules can be impacted.

- The timely development, research, and maintenance of GIS Hub systems are constrained by staff levels. States with the most successful GIS programs are those with sufficient staffing. North Dakota needs additional GIS staff in order to more fully utilize and respond to advanced capabilities in existing GIS software.

Awareness and Utilization
- State agencies have data that could be placed into a GIS to provide benefit to them and data consumers but they are not aware of that possibility and/or lack the resources to utilize GIS
- At all levels of government within North Dakota there are "haves" and "have nots" in terms of GIS knowledge and resources

Statewide Coordination
- The adoption and use of common standards and the development and maintenance of statewide projects is hindered by not having consistent and focused coordination with all levels of government including tribal

2.4.4 Opportunities

Geospatial Evangelization
- Abundant opportunities exist to assist state agencies that lack GIS resources to help them become aware of how GIS can be of assistance to their programs and business needs
- Assistance should be provided to state agencies to ensure their GIS data is referenced on the Hub Data Portal

Application of Technology
- Existing and new capabilities need to be leveraged wherever possible to further enhance the user experience in particular, mobile devices, to more fully integrate GIS into state agency business processes and decision-making, and to help make North Dakota government data more accessible and discoverable
- Unmanned Aircraft Systems (UAS) – The use of unmanned aircraft or "drones" by vendors and state agencies continues to grow. Leveraging its experience, the GISTC is available to aid in the development of data standards, data storage, processing, and access, equipment utilization, training, and governance
- Cloud-hosted data, applications, and services continue to increase in functionality and scope and need to be utilized as needed to assist in cost avoidance and disaster recovery

Data Development and Maintenance
- The 66th Legislative Assembly appropriated funds through House Bill 1021 to develop a statewide parcel dataset. When completed, this dataset will greatly benefit economic development and public safety. Local government is and will remain as the custodian of their parcel data and contribution of existing parcel data is voluntary. A state champion needs to be identified for this dataset.
- Municipal boundaries are an important dataset. Improving the update frequency and ensuring the accuracy of the boundaries is key for supporting Next Generation 9-1-1, accurate census count which is utilized by distribution of state sales tax, and for accurate

collection of sales tax. The GISTC will continue working with the Census Office of the Department of Commerce and the U.S. Census Bureau to further enhance the city boundary workflow.

- The state through the GISTC should work more closely with local and tribal government to define priority areas, update frequency, and funding mechanisms for high-resolution aerial imagery. Several cities and counties have been very generous working with the state to share their data; more of this sharing may be possible if the state through the GISTC were to take a more active role.

2.4.5 Threats

Hosting Costs
- Storage and server hosting fees charged to the GIS Program are the same as those charged to state agencies. The fee levels have flattened out over the past few budget cycles and in some cases, have even dropped. However, increased storage needs put pressure upon the GIS Program budget. For example, prior to 2016, individual statewide aerial photography datasets used about one terabyte of storage but beginning with the 2016 statewide photography, the higher-resolution statewide photography consumes almost 2.5 terabytes. The 2018 high-resolution statewide photography consumes nearly 10 terabytes.

Flat or Declining Budget
- A reduced or static budget will have impact the ability to store data that the GIS Program could otherwise acquire. Budget pressure will also negatively impact the number and/or sizing of servers needed to host future versions of GIS server software.

3. VISION AND GOALS

3.1 Vision Statement

It is the vision of the GISTC that the GIS Program will continue to grow in value to state agencies and other levels of government, resulting in increased cost effectiveness.

3.2 Strategic Goals and Objectives

The following strategic goals have been identified by the GISTC:

Strategic Goal #1 – Enhance and Develop GIS Data	
Improve existing datasets and develop plans to acquire new datasets needed for agency business processes.	
Programmatic Goals	**Objectives**
1. Establish key data development needs	a) Implement the statewide parcel dataset; ensure its completeness, maintenance and quality

	b)	Improve update frequency and accuracy of municipal city boundaries
	c)	Work with local and regional data stewards to acquire local and regional high-resolution aerial photography
2. Improve and enhance existing datasets	a)	Identify sources of non-government data sources that may be able to complement and/or replace existing data sources; consider ROI calculation

Strategic Goal #2 – Improve Statewide GIS Coordination

Streamline the flow of data, ideas, activities, standards, technology, training, and priorities within the state at all levels of government.

Programmatic Goals	Objectives	
1. Improve Communication	a)	Explore the benefits and details relating to state GIS coordination between all levels of government and the private sector via a ND Geospatial Coordination Council or similar
	b)	Increase awareness and use of the GIS Program communication channels: email list, Twitter, blog, website
2. Develop and Promote Standards and Guidelines	a)	As needed, develop and promote guidelines to assist in sharing of data
	b)	As needed, develop, establish, and promote data standards
3. Promote and Establish GIS Training	a)	Continue providing seminars, workshops, webinars, and on-site training
4. Provide Outreach	a)	Support and grow participation in the Geospatial Summit
	b)	Provide training and increase the awareness of the GIS Hub functionality and data access, including the use of the GIS Hub's geospatial data within other state systems.

Strategic Goal #3 – Improve GIS Systems

Continue to evolve and provide means of distributing data through the GIS Hub while improving reliability and access.

Programmatic Goals	Objectives	
1. Enhance State Agency Access to Data	a)	Identify and implement remaining processes and workflow that allow agency data stewards to directly manage their public data after the migration to SQL Server has been completed
	b)	Provide access via ArcGIS Enterprise to the GIS Hub data services to allow designated agency GIS coordinators to create, stop, start, and delete their own web services
2. Investigate use of alternative geospatial technologies	a)	Continue to monitor the development and applicability of open source and alternative commercial server and desktop tools and their applicability to state government
	b)	Monitor the development and application of artificial intelligence and related technologies
3. Improve GIS Hub Reliability and Access	a)	Complete the implementation of SQL Server geodatabase, including the use of Active Directory

	b) Continue to monitor the development and applicability of cloud-based servers, software, and data	
4. Enhance Disaster Recovery	a) Continue to enhance GIS Hub support redundancy so that in the event the GIS Coordinator is not available daily operations and support are minimally impacted b) Complete service level objectives for database and web services and supporting infrastructure. This includes disaster recovery.	

4. REQUIREMENTS

4.1 Executive Support

One of the key needs of the GIS Program is budgetary support at the highest levels of state government. Therefore, the GISTC members and the GIS Coordinator need to provide educational opportunities for agency executives and elected officials to help them learn what the GIS Program has done for the agencies and the state, and the value of GIS in general. The GISTC should provide a periodic "Executive GIS Update" for department heads and elected officials prior, especially prior to entering a legislative session.

4.2 Budget

The GIS Program budget supports the goals and activities as set forth by the GISTC. This budget supports both on-going operational expenses such as the fees paid to ITD for hosting services, for basic maintenance activities, and for annual licensing fees. The budget also supports one-time implementation costs such as the purchase of new software, development of new applications, and limited data development and maintenance.

The data development line item in the budget is restricted to purchasing or developing relatively inexpensive datasets that will have wide-spread use amongst the state agencies. As much as possible, data development funds are expended in association with other contributors to maximize state dollars.

2017-2019		2019-2021	
Requested[1]	Appropriated[2]	Requested[1,3]	Appropriated[2]
$1,074,082	$1,072,716	$982,669	$977,629

[1]Initial budget request prior to Legislative Session
[2]Appropriated by the legislature
[3]Includes mandated state budget reduction

4.3 Coordination

The GIS Coordinator, as a member and chair of the GISTC is responsible for balancing the needs of the GISTC and the individual GISTC member agencies. Statewide needs brought to the attention of the GISTC also need to be considered and included in the work done by the GISTC. It is important that the various needs are met while providing the autonomy needed by state agencies in order that they can accomplish their primary missions.

GIS users around the state have an opportunity to exchange ideas and share information via the biennial North Dakota Geospatial Summit. However, expanded coordination efforts would result in greater efficiencies in the utilization of geospatial technologies and in data development and maintenance.

4.4 Staffing

Sufficient staffing for the support and development is required for optimal growth of the GIS Program. An additional person would improve research and development on new or evolving GIS technologies, implement GIS Hub upgrades, and load new and updated data. As the budget allows, the State's Information Technology Professional Services Contract Pool is used to maintain the GIS Hub, particularly in the support of day-to-day operations such as support.

5. APPENDICES

5.1 Development of the Plan

The State GIS Coordinator developed this Strategic Plan in conjunction with the North Dakota GISTC.

5.2 History

In mid-January 2000, North Dakota's Chief Information Officer (CIO) was contacted by two representatives from the GISTC asking that ITD study the need for a centralized GIS hosting service for North Dakota state agencies and their partners. The GIS Hub would provide a means of sharing the GIS information being stored locally at each agency. The CIO agreed that GIS is an important technology for state government and that ITD should take a lead role in GIS. ITD retained a consulting firm to study how GIS was used in state government. The report's findings were presented to the GISTC, the Director of Office and Management and Budget, the Governor's Chief of Staff, and the Legislative IT Committee. At the request of the GISTC, the CIO agreed to request funding from the Legislature to fund the GIS Program. In April 2001, the Legislature provided funding to construct the GIS Hub, a database and web infrastructure hosted by ITD for hosting and sharing state agency GIS data.

5.3 Future Work

The items listed here are recognized by the GISTC as tasks to be worked on in the future, beyond 2019-2021:

- Review & prioritize framework datasets to be improved or developed including the strategy for maintenance and funding
- Identify GIS datasets and data stewards that reside in non-GISTC agencies
- Explore the development of Memorandums of Understanding with local and federal government entities regarding data sharing and development
- Explore the benefits and need for implementing a statewide GIS coordination model, e.g., a North Dakota Geospatial Coordination Council
- Conduct workshops on the use of GIS Hub services and resources
- Foster awareness of GIS being a critical information asset to state agency leadership
- Determine the feasibility and usefulness of the GISTC chair becoming a rotating position, including the use of incoming and outgoing positions to ensure continuity