Strategic Directions Analysis of the Nova Scotia Topographic Database

January 2010

THE Barrington Consulting Group INC.

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EXECUTIVE SUMMARY

The purpose of the Nova Scotia Topographic Database Program (NSTDB) is to be the source of base Geographic Information Systems (GIS) data for the Province of Nova Scotia. The Program's primary product is the 1:10,000 resource series dataset, available in digital and hardcopy formats. Secondary products include large scale vector mapping, 1:10,000 orthophoto maps and large scale orthophoto maps. Service Nova Scotia and Municipal Relations (SNSMR), the Department responsible for the NSTDB, has deemed it important to revisit the Program direction. This allows the NSTDB to stay abreast of clients' needs and to determine the most efficient use of Program resources. The objective of this strategic plan is two-fold; determine the Program's accomplishments and the value provided to clients, and develop a strategic plan which allows the Program to best meet its clients needs while remaining fiscally viable.

The strategic plan was developed using a client centric model. Emphasis was placed on the use of stakeholder consultations to determine clients' topographic data needs, and to formulate strategies which allowed the NSTDB to best meet those needs. These consultations were also used as an opportunity to review and analyze past strategic directions. The final component of the project approach was a jurisdictional analysis of New Brunswick's and Alberta's provincial topographic programs to gain a better understanding of where Nova Scotia stands among its peers and to gather information that may assist in creation of the NSTDB strategy.

Client input confirmed that the NSTDB is extensively integrated into the geomatics activities of a wide variety of organizations across the province, including all three levels of government, academia and the private sector. Through consultations, eleven provincial government departments and three additional provincial agencies were identified as clients of the Program, an important statistic when considering the Provincial Government is the primary client of the Program.

Several consistent messages came to the forefront during stakeholder workshops. Most importantly, users emphasized the high degree of value that the

NSTDB provides to its clients and the anticipated increased use of the Program in the future, as organizations and the general public become more spatially aware. Secondly, clients expressed the desire to revisit the layers, feature codes, and standards of the NSTDB. These items were developed in the late 1980s and users felt that changes in geospatial needs since that time have made certain layers and features more relevant in today's industry. NSTDB clients also expressed the importance of constant two way communications between users and the staff responsible for delivering and managing the Program. Finally, users identified data partnerships as a way of adding to the extensive catalogue of data collected and housed in the NSTDB.

This user input was a key building block in development of the five year strategic plan. The plan is designed to support the NSTDB's mission of being the sole source of base GIS data in the province. Stakeholders engaged throughout the project indicated that the Program is generally meeting this mandate, it is well positioned to meet clients' needs into the future, and there are opportunities for Program improvement.

After confirming the mission, seven project goals were developed using stakeholder input and previous NSTDB policies and directives. The goals support the NSTDB's mission and act as a set of Program guides. The seven Program goals are:

1. **Support Clients' Business Needs –** In order to support the geospatial activities of client organizations, SNSMR must proactively address the currency, accuracy and features of the NSTDB to ensure they meet evolving business needs.
2. **Ensure Efficient Use of Resources -** Efficient use of resources is a goal of any business or organization. In specific context to the NSTDB, efficient use of resources emphasizes assigning staff and Program budget to activities which are identified as providing maximum benefit to NSTDB clients.
3. **Increase Program Awareness and Support -** An opportunity exists to promote the NSTDB to the province, both within and beyond the geomatics community. This will build awareness and support among key stakeholders whose influence will ensure the continuity of the Program.

4. **Increase Communications with Clients and Stakeholders –** NSTDB communication should be a two way process, with proactive communications being disseminated to NSTDB clients. Proactive communications will inform NSTDB stakeholders of Program activities, data updates and new Program products. Proactive communication also entails ongoing engagement of clients to seek feedback and identification of the user community's needs.
5. **Collect Data Once and Reuse -** Opportunities exist to update the NSTDB using data collected at source by other organizations. By leveraging these opportunities the NSTDB can eliminate redundant data collection, maximize the use of its resources, and offer a more current product to clients.
6. **Monitor and Anticipate Trends in Technology -** In order to remain current with its technological practices, the NSTDB must continue to monitor and anticipate changes in technology within the geomatics industry. While remaining vigilant of industry best practices, the Program must also ensure that changes made to its technology align with the needs of its clients.
7. **Ensure Viability and Sustainability of the Program -** The NSTDB structure aligns with Gartner industry research, which supports centralized GIS solutions and common GIS data standards. Without NSTDB data, many organizations would not be able to undertake GIS related business activities because alternative sources of data do not exist and in house development of data is not financially feasible. Thus, it is vital to ensure the viability and sustainability of the Program moving forward.

A set of four objectives was then developed to support adherence to the goals over the next five years. Each objective has specific benefits with definable and tangible outcomes. The recommended objectives are:

1. **Create data development and maintenance processes focused on clients' business needs**
2. **Develop a proactive communications strategy**

3. **Develop a framework to identify, evaluate, prioritize, and build potential data partnerships**
4. **Determine the potential to collect data base on change**

To assist SNSMR in moving forward with the strategic plan, a high level implementation approach was developed, outlining possible implementation activities. Regardless of how SNSMR decides to pursue the strategic objectives, the guide recommends an initial step for implementation. An NSTDB Program Definition Document should be developed through a series of workshops attended by all SNSMR and Nova Scotia Geomatics Centre (NSGC) staff who contribute to the development, delivery and management of the NSTDB. Building the Document will create a common definition of what the NSTDB is and what it plans to accomplish. With this in hand, work can begin on fulfilling the strategic objectives by engaging NSTDB stakeholders and determining their present and future requirements for data, communications and technology as they relate to topographic data in Nova Scotia.

THE NOVA SCOTIA TOPOGRAPHIC DATABASE

From its inception, the purpose of the Nova Scotia Topographic Database Program has been to "serve as the geographic foundation on which to build the major provincial digital thematic mapping programs in Nova Scotia".[1] The program supports a broad user base including the Provincial Government, municipalities, the Government of Canada, the education sector, private industry, non-government organizations, and the public. The NSTDB serves as the foundation on which organizations apply their business specific Geographic Information Systems data, a primary dataset for analysis and planning, a resource to educate future geomatics practitioners, and provides hard copy products used by individuals and organizations to understand the physical landscape of Nova Scotia.

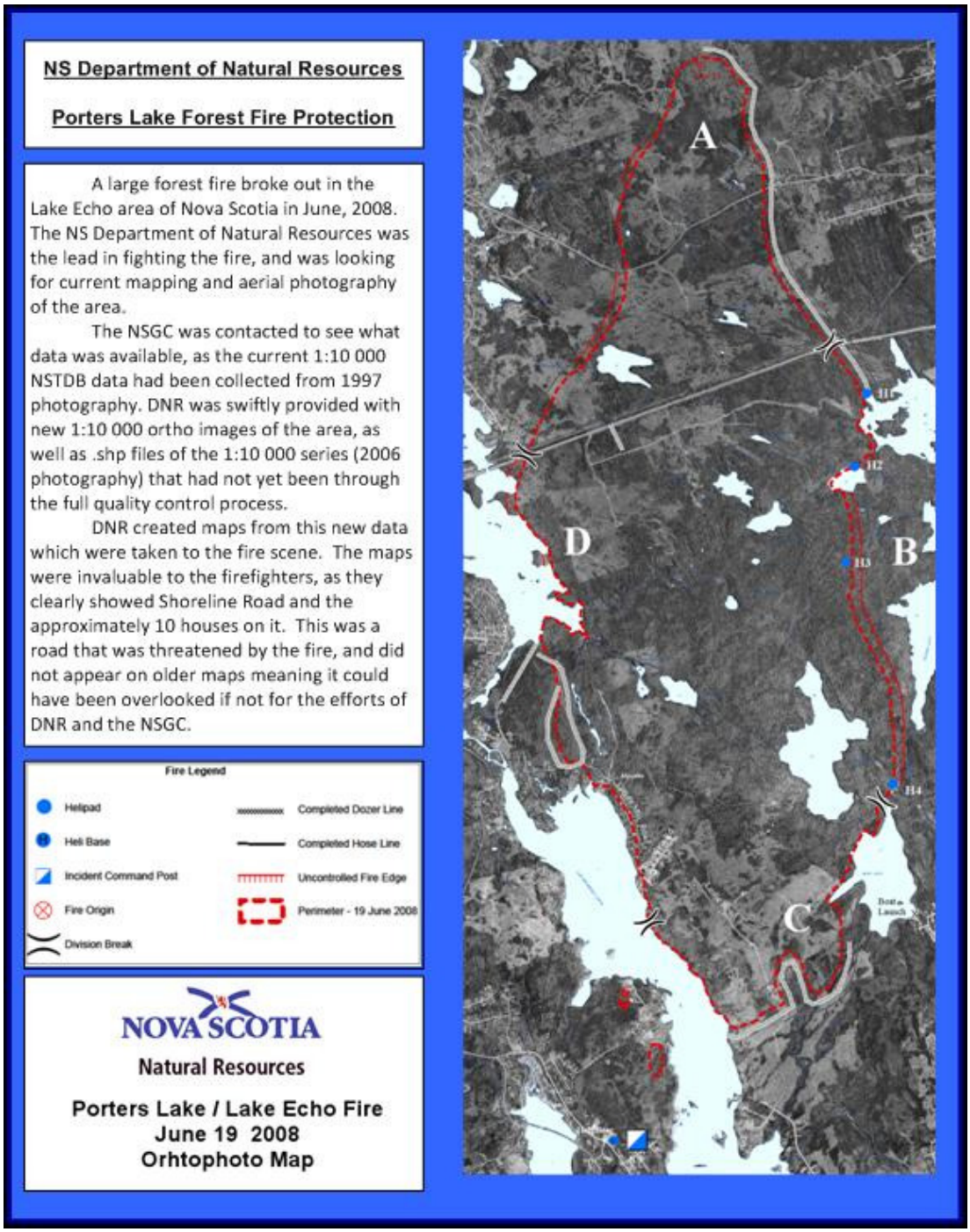
Developed, maintained and distributed by the Nova Scotia Geomatics Centre within Service Nova Scotia and Municipal Relations, the NSTDB Program provides vector, image and hardcopy products to its broad user base. The Program's primary product and thus primary scale is a 1:10,000 three-dimensional vector database consisting of nine themes of topographic features. Widely used as the base layers in provincial datasets, the themes (and the attributes within each theme) have not changed since the Program's creation. Complied from 1:40,000 or 1:35,000 black and white aerial photographs, the data is maintained on a ten-year revision cycle, with one tenth of the province flow each year, and providing coverage for the entire province. Two of the 1:10,000 themes, the Nova Scotia Road Network and

Nova Scotia Hydrographic Network, are also available as individual NSTDB products.

In addition to the 1:10,000 database, commonly referred to as the resource series, the NSTDB provides on request mapping product at a scale of 1:1,000[2], 1:2,000 and 1:5,000 (also known as the Large Scale Map Series) for urban areas and areas of special interest. Since 2003, the NSTDB has developed a 1:10,000 digital orthophoto

[1] Digital Base Mapping Policy for Nova Scotia, Nova Scotia Land Use Policy Committee, March 1988
[2] One time product for Halifax-Dartmouth Metro Area

product, with coverage to date of approximately two thirds of the province. A 1:2,000 large scale orthophoto product is also available on request for urban areas and areas of special interest. In 2004 the Program created a one time only 1:50,000 Coastal Map Series and Land Series.



Throughout this report examples are provided of NSTDB products used in business practice.

NSTDB STRATEGIC PLANNING OBJECTIVES

To ensure that the Government of Nova Scotia continues to provide high quality topographic information, SNSMR has deemed it important to revisit the direction of the NSTDB Program. The focus of the strategic analysis is to stay abreast of the needs of NSTDB stakeholders, to remain aware of advancements in technology, and to continue to manage the NSTDB in a cost effective and efficient manner. In the *Strategic Direction Analysis of the Nova Scotia Topographic Database Statement of Work* the project was mandated to meet the following two objectives:

Objective 1: Determine what the NSTDB Program has achieved. SNSMR seeks to gain an understanding of the accomplishments of the NSTDB Program and to measure performance against previous objectives and strategies.

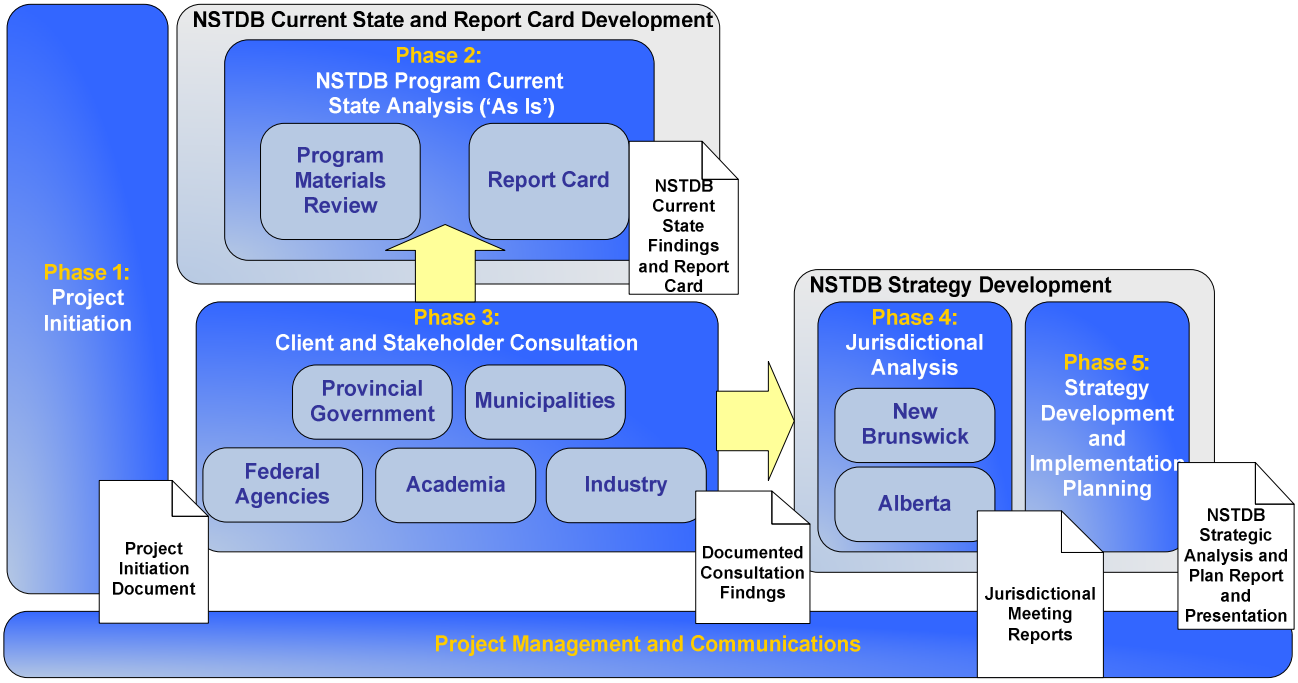
Objective 2: Develop a Strategic Plan/Direction for the NSTDB Program. SNSMR seeks to understand what the NSTDB Program must do in order to best meet the needs of NSTDB data consumers and to maintain the viability and sustainability of the NSTDB Program.

To develop the strategic plan, SNSMR stated that previous strategic work will be analyzed to understand the Program's success in delivering against previous strategies and recommendations. Also, significant emphasis is to be placed upon engaging NSTDB clients and stakeholders, to understand their topographic mapping requirements and to gather their perspective on past, present, and future strategic directions.

An area of focus for the strategy was determining if clients, stakeholders and staff responsible for the NSTDB, continued to see the Program as "*the source of base GIS for the province"*. If through consultations it was found that the Program's Mission was no longer valid, the Project Sponsor and SNSMR Executive would be informed of stakeholders' impressions of the Program and the direction of the strategy initiative re-evaluated. Although important to the NSTDB's operations, program funding and cost recovery models were not in scope for the strategic analysis.

PROJECT APPROACH

The following five phase approach was used to meet project objectives. The approach was consultative in that it engaged a broad client and stakeholder group to both determine project accomplishments and to gather input on the Program's future direction.



Phase 1: Project Initiation

This phase ensured alignment with the Project Sponsor on the project objectives, scope, timelines, costs, reporting expectations, and deliverables, and confirmed the stakeholder groups engaged during the project and their level of involvement.

Phase 2: NSTDB Program Current State Analysis ('As-Is')

This phase focused on the development of a comprehensive understanding of the NSTDB Program, included assessing the current state and performing a historical review of available documentation. The 'Program Materials Review' involved the examination of documentation to capture key points relevant to this engagement, with emphasis placed upon *A Nova Scotia Topographic Database Management Policy* (1995) and *Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Data (*2001). Based on the documentation review, a NSTDB report card was developed. The report card asked stakeholders to evaluate the level of implementation of previous NSTDB policy statements, strategic recommendations and product oriented objectives; and to rate the benefits received from each statement, recommendation or objective.

A key input into the Current State Analysis was feedback provided by clients and stakeholders through the report card (described in more detail in the following section). A function of each stakeholder workshop was completion of the report card. Information collected during this phase was analyzed and consolidated and is included in the *Review and Analysis of Strategic Directives* section of this document.

Deliverables: NSTDB Program Current State Findings and Report Card

Phase 3: Client and Stakeholder Consultations

To develop the Program's Strategic Direction, SNSMR required consultations be held with a broad range of external clients and stakeholders, to gauge their perspectives on both Program accomplishments, and determining priorities for the NSTDB's future. This exercise was the most time intensive phase of the engagement and provided valuable insights from the users of topographic information on the Program's past and current state, and desired future direction. Project team members prepared session materials, facilitated workshops, and followed up with session participants to gather specific examples of business objectives supported by the NSTDB. In total, one hundred participants took part in eight sessions held during this phase. Client and stakeholder consultations were as follows:

- Two Nova Scotia Geomatics Centre workshops including SNSMR management team representation;
- Three Nova Scotia Municipalities workshops;
- One Provincial Government workshop; and
- Two Private Industry, Academic and Federal Government workshops.

Each NSTDB client session consisted of:

- An overview of the NSTDB Program, data and products;
- The NSTDB Report Card exercise to evaluate previous strategic directives and goals;
- Completion of an NSTDB profile to gather information on Program understanding and use; and,
- Round table discussions on:

- Current NSTDB Program communication processes, the value of Program interactions with stakeholders, and how the Program can more effectively communicate with its clients and stakeholders in the future;
- The benefits clients currently receive from the NSTDB, specific business processes supported by the NSTDB, and stakeholders' anticipated use of the NSTDB in the future;
- NSTDB data currently provided to clients, the use of 1:10,000 data layers and features, 1:10,000 data currency and precision, and the use of other NSTDB data and products;
- Can changes be made to provide NSTDB data that better meet users' needs;
- The effectiveness of current NSTDB technology for data collection, maintenance and distribution; and,
- Is there technology that the Program can use to improve data collection and maintenance and client data access?

Deliverables: Client and Stakeholder Workshop/ Meeting Minutes

For complete workshop documentation please refer to the addendum entitled *Nova Scotia Topographic Database Strategy Workshop Notes.*

Phase 4: Jurisdictional Analysis

To assist in the development of the NSTBD strategy, an environmental scan was conducted focusing on other jurisdictions' collection, management and distribution of topographic data. The Province of New Brunswick was chosen because of its proximity and its common mapping program history with Nova Scotia. The Province of Alberta was selected in order to gather information on their data collection model, which is focused on supporting natural resource based initiatives, and Alberta's approach to distributing topographic data to private industry through a third party partnership. In the jurisdictional analysis, meetings were held with both the administrators and clients of New Brunswick's and Alberta's topographic programs.

Deliverables: Jurisdictional Meeting Minutes

For complete documentation of jurisdictional workshops please refer to the addendums entitled *Nova Scotia Topographic Database Strategy – Alberta Workshop Notes* and *Nova Scotia Topographic Database Strategy – New Brunswick Workshop Notes.*

Phase 5: Strategy Development and Implementation Planning

Through the work completed in Phases 2 and 3, the current state of the NSTDB Program was determined, the original Program Mission, "the source of base GIS data for the Province of Nova Scotia" was confirmed, and stakeholders' desired future state of the NSTDB (their expectations and suggested direction for the Program), were documented.

This information was provided to the Project Sponsor, and SNSMR Senior Executive responsible for the Program, in a project interim findings presentation. This interim report also included discussion on the gaps between current and future states and activities required to achieve the stakeholders' desired state. If consultations had revealed that the Program's Mission was no longer valid, that stakeholders did not see the NSTDB as the source of base GIS for the Province of Nova Scotia, and if it was determined that the Program provided limited value, the interim findings presentation would have included discussion on reevaluating the focus of the NSTDB Program. Meeting participants agreed that stakeholder consultations strongly supported the NSTDB Mission and that project objectives should not be altered.

Project findings, senior executive input, and information gathered through the jurisdictional reviews, were then considered in developing the strategy for SNSMR to meet stakeholder expectations. In addition to the Program Mission; Program Goals, Objectives and Initiatives were identified and defined. Finally, a high level implementation plan was created outlining the order and potential timeframe required to conduct the identified initiatives.

Deliverable: NSTDB Strategic Analysis and Plan

Please refer to the Strategic Plan and Implementation Plan sections of this document for phase five deliverables.

USE AND VALUE OF THE NSTDB

This section discusses the various users who rely upon the Nova Scotia Topographic Database for geo-spatial data and specific businesses activities supported by NSTDB. Also, results from a user profile survey are presented summarizing the use of various NSTDB products.

NSTDB Users

Users of the Nova Scotia Topographic Database can be found in every sector of the Province; all levels of government, private industry, non-profit organizations, academia and individual citizens. This is illustrated on the following page in Figure 1. The broad variety of users can be attributed to the wide ranging applications of NSTDB data. Through project workshops, examples were provided of eleven Provincial Government departments and two agencies who use NSTDB data. This widespread application is very encouraging when considering Provincial Government users are the intended primary clients of the Program. It is particularly positive to see data being used in departments such as Community Services, Heath Protection and Promotion, Justice, and Tourism, Culture and Heritage which are not thought of as traditional users of geo-spatial data.

Many provincial departments require data sets with complete provincial coverage to support the wide ranging scope of their services. Localized or incomplete data would limit the government's ability to deliver services to all corners of the Province. Without the NSTDB, departments would be forced to develop their own provincial geographic data, an activity which would be inhibited by its significant cost.

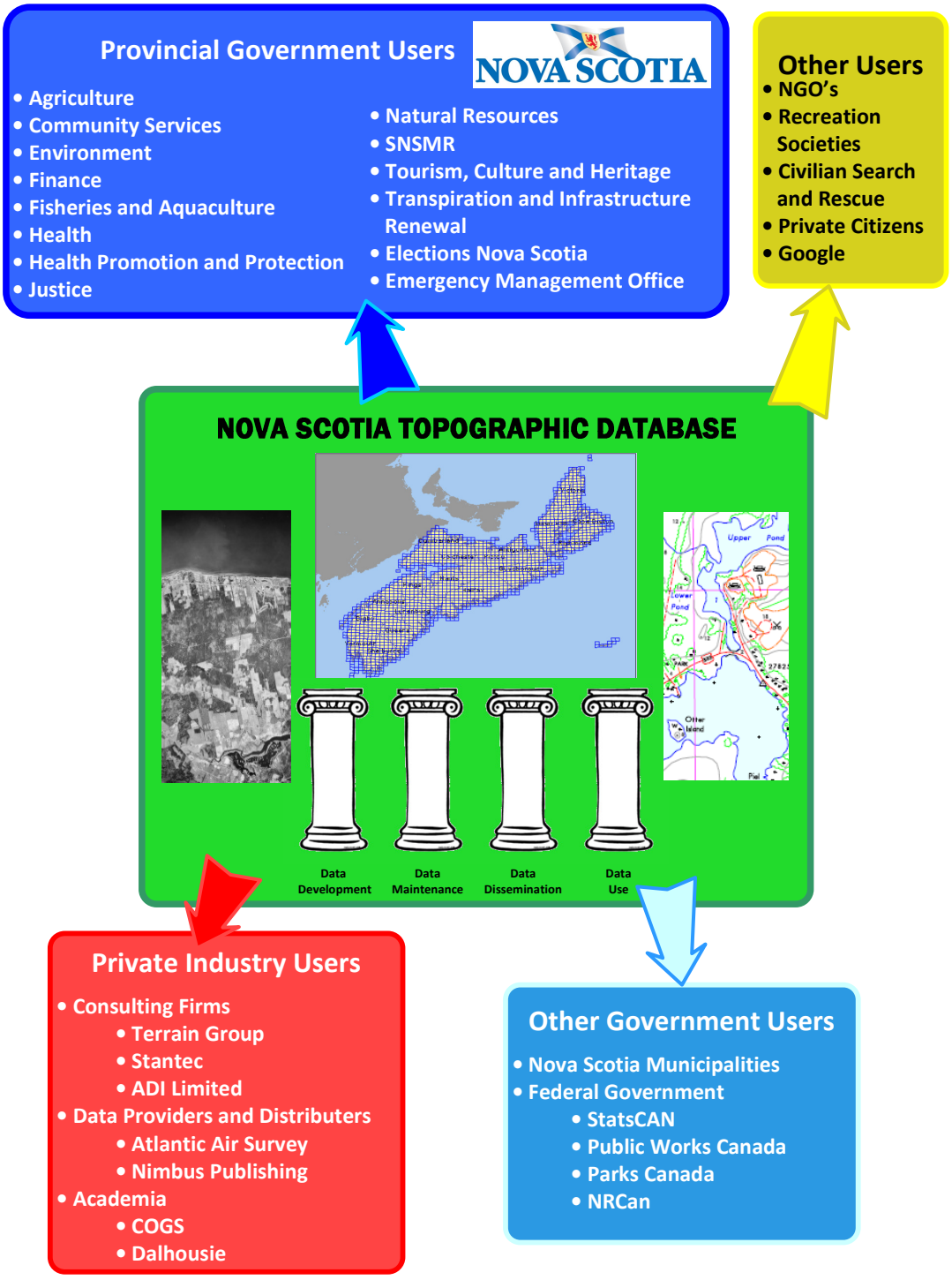


Figure 1 : Nova Scotia Topographic Database Users

The Nova Scotia Government is not alone in the public sector use of NSTDB data. Municipal Governments with GIS resources are active clients of the Program. As is the case for provincial government departments, the cost and technical expertise required to develop digital topographic data inhibits most municipalities from collecting their own base data. This is particularly true for geographically large municipalities which have fewer residents per square kilometer and thus fewer resources available to capture data. For municipalities engaged in the strategic planning process, the level of GIS sophistication and NSTDB use ranged from no GIS, and the recognition that planning is completed in a less than ideal fashion, to using the NSTDB as a base for municipal planning and management.

A message of increasing municipal use of NSTDB data was communicated during municipal workshops. Awareness of the potential applications of geo-spatial data continues to spread through efforts such as the GeoNOVA Municipal Geomatics Forums and ongoing communications and partnerships between municipal units in areas such as civic addressing business processes. Several participants indicated that they plan to (or know of other municipalities who plan to) expand their Geomatics capabilities in the future, in turn increasing use of the NSTDB.

Five municipalities develop some degree of localized topographic base data, those five being: Cape Breton Regional Municipality, Halifax Regional Municipality, Municipality of Kings County, Town of Bridgewater and Chester Municipality. The scale of these municipalities' data collection activities varied from complete topographic data sets to geo-referenced aerial photographs. Admittedly, these municipalities still utilize some portion of the NSTDB in their daily operations, emphasizing that self collection of data does not eliminate the need for NSTDB data within municipal units.

Users of the Nova Scotia Topographic Database can also be found within the Federal Government. During stakeholder consultations, several federal units were identified who leverage NSTDB data for federal initiatives and operations within Nova Scotia. These included

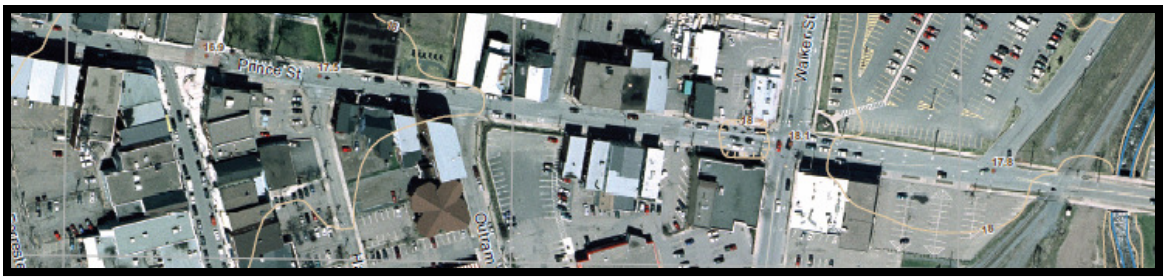
Natural Resources Canada, Public Works Canada and the Department of National Defense. Federal topographic resources with coverage of Nova Scotia are available to these departments. However, the NSTDB is preferred by federal organizations for working within Nova Scotia because of the availability of multiple scales, a wide variety of data layers, province wide coverage and the currency and accuracy of the data.

Use of the NSTDB is prevalent in the private sector. Engineering and construction firms are groups who particularly rely on data provided by the NSTDB. This use shows the commercial value of the NSTDB. Consulting firms use the data to develop solutions and deliverables for their clients. Private sector firms stated that the NSTDB allows for the delivery of costs effective services to clients, including the provincial government and municipalities, as the dataset is accepted as a standard by these organizations, clients have confidence in the data, and there is less of a requirement to collect information. The NSTDB stimulates economic activity for developers and distributers of topographic data. Local companies such as Atlantic Air Survey and Can-Am Photomap generate revenues by capturing and developing topographic data for the Program. Distributers such as Nimbus Publishing use NSTDB data and technology investments to develop supplementary products which are sold to other businesses and the public. These are examples of the businesses which use the NSTDB to generate economic activity.

The NSTDB is also used by academics. The Nova Scotia Community College Centre of Geographic Sciences (COGS) and Dalhousie represent the largest academic users of NSTDB data. The NSTDB is used extensively by both students and faculty members. COGS relies heavily on the NSTDB for classroom and project work and the dataset is seen as providing an educational foundation for graduates entering the Nova Scotia workforce. Both public and private employers stated that knowledge gained through the use of the NSTDB in the classroom benefits students, as it eliminates their need to become familiar with NSTDB data and increases their ability to immediately contribute to an organization.

Use of the NSTDB can be found at the citizen level. Non-Government Organizations (NGO's) such as search and rescue volunteers and recreation societies use the NSTDB as their primary source of geo-spatial information. Members of the public purchase hardcopy NSTDB products including the Nova Scotia Atlas through the Nova Scotia Geomatics Centre front desk and Provincial Land Registration Offices. Identifying and analyzing citizen use of the NSTDB is a difficult process due to a lack of defined communication channels. It is hoped that future NSTDB communications will create opportunities for more communication to and from individual civilian users.

A final, notable user of NSTDB products are web based GIS providers. Google is seen as a trail blazer in the distribution and promotion of geographic data through its Google Maps and Google Earth products. Recently Bing introduced Bing Maps providing similar data and coverage to Google Maps. Experienced GIS users identified the increasing relevancy of web based GIS in their operations. It should be noted that Program staff believe that portions of the NSTDB dataset may have been incorporated into web based GIS products.

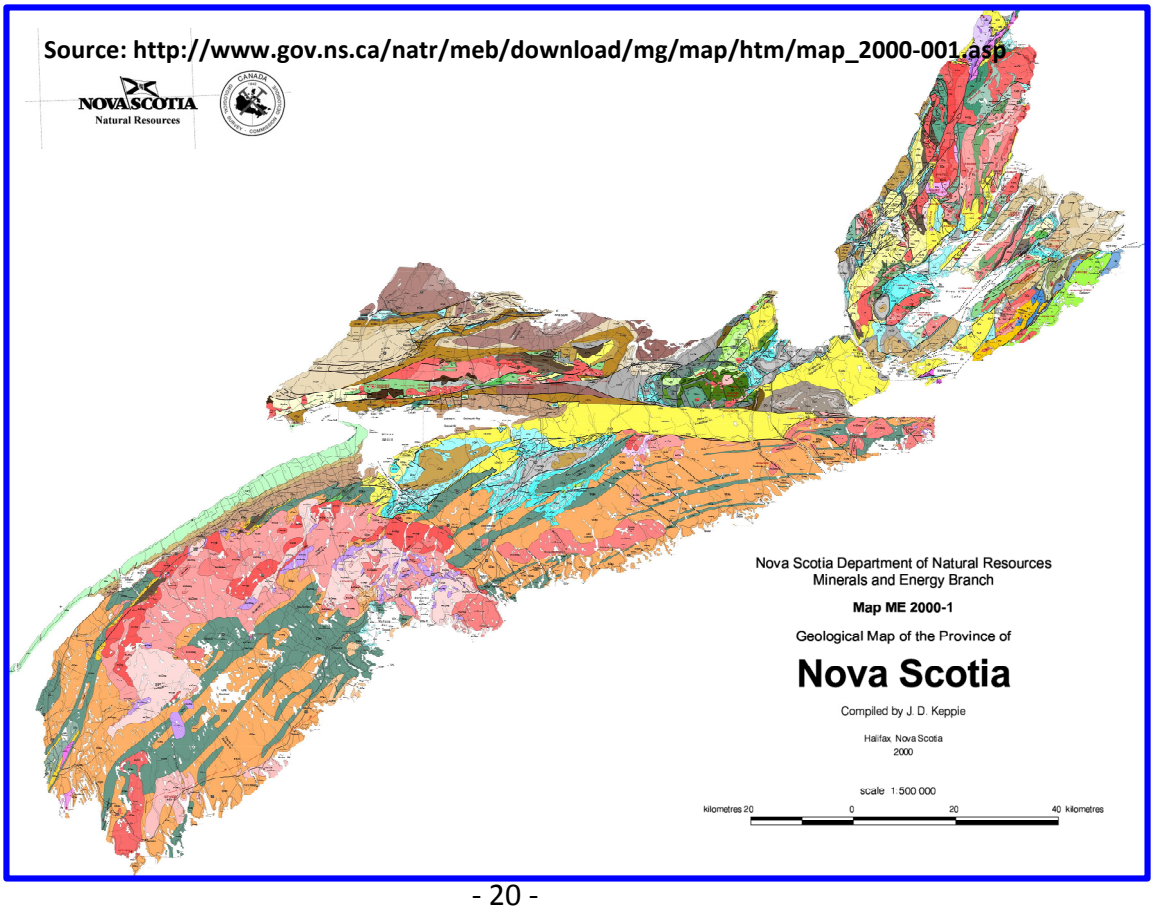


NSTDB Uses

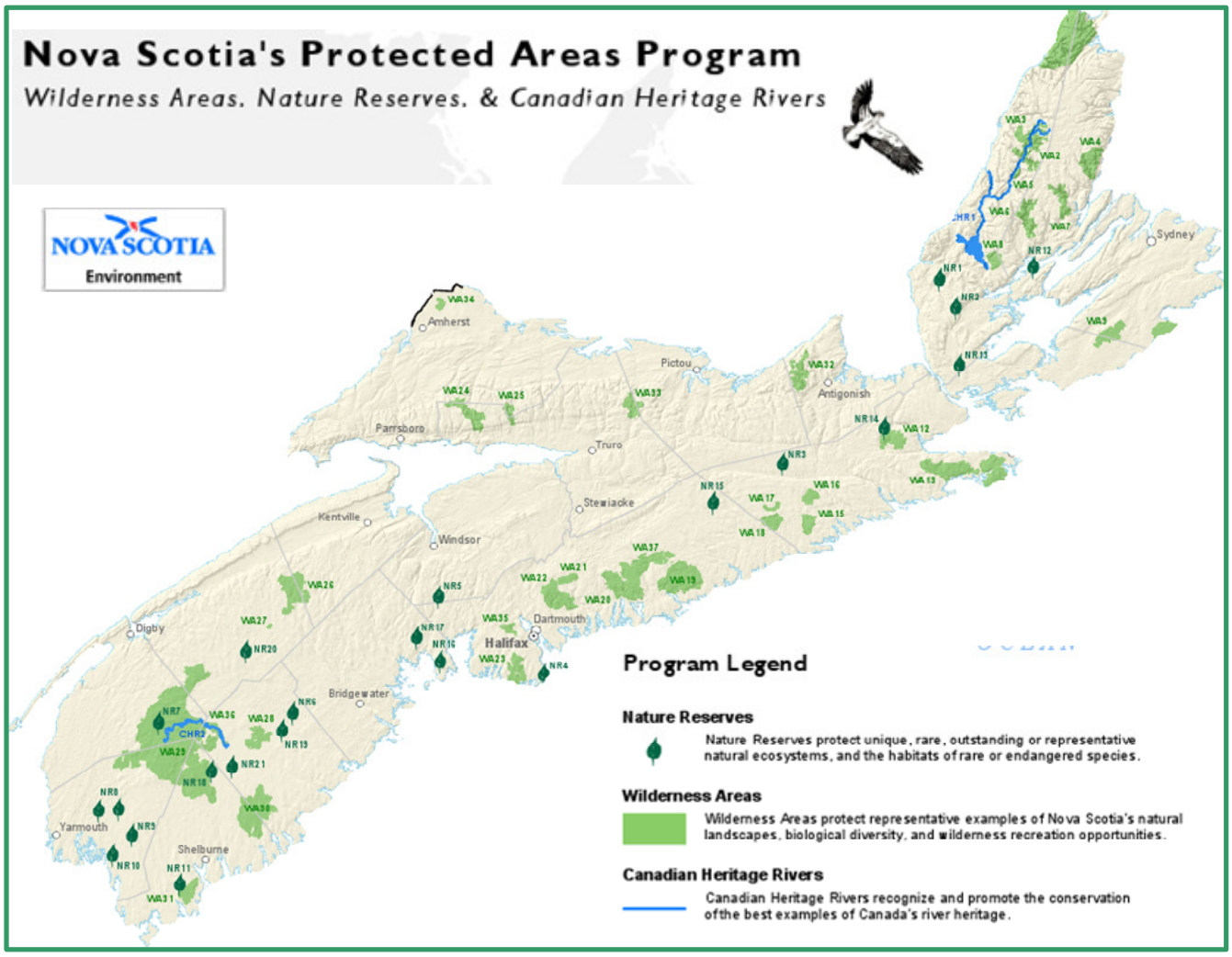
The wide variety of users identified in the previous section is a testament to the extensive applications of geo-spatial data which are supported by NSTDB data sets. During consultations, NSTDB users were encouraged to share their uses of topographic data to understand the value that it adds to organizations. Some of the key business activities supported by NSTDB data are outlined in this section and reflected in Figure 2.

Provincial Government

- ***Department of Natural Resources (DNR)***
  - Forest fire protection: All DNR forest fire towers use the Nova Scotia Atlas to geo-reference fires and points of interest. Helicopters used in firefighting also use the Nova Scotia Atlas to coordinate their water bombing efforts;
  - Geological mapping: As seen in the example below, DNR uses the NSTDB as a base to map the geological timelines, groups and formations in the province.



- Wilderness area identification: Wilderness Areas are provincially-significant protected areas which are designated under Nova Scotia's *Wilderness Areas Protection Act.* The map below was developed by Nova Scotia Environment with assistance from Natural Resources, using the NSTDB as a base;



Source: http://gov.ns.ca/nse/protectedareas/docs/ProtAreas_map_color.pdf

- Abandoned mine shaft location: DNR uses large scale orthophotos to identify abandoned mine shafts which have not been sealed, mitigating the risk to public safety;
- Environmental hazard mappings: Mapping high levels of environmental hazards such as arsenic and radon; and,

- GIS Base: Many of the cartographic deliverables developed from the Department's GIS use a 1:25,000 scale not offered by the NSTDB. However, this base is a re-scaling of the NSTDB 1:10,000 series and is totally dependent on the NSTDB for its creation and maintenance.

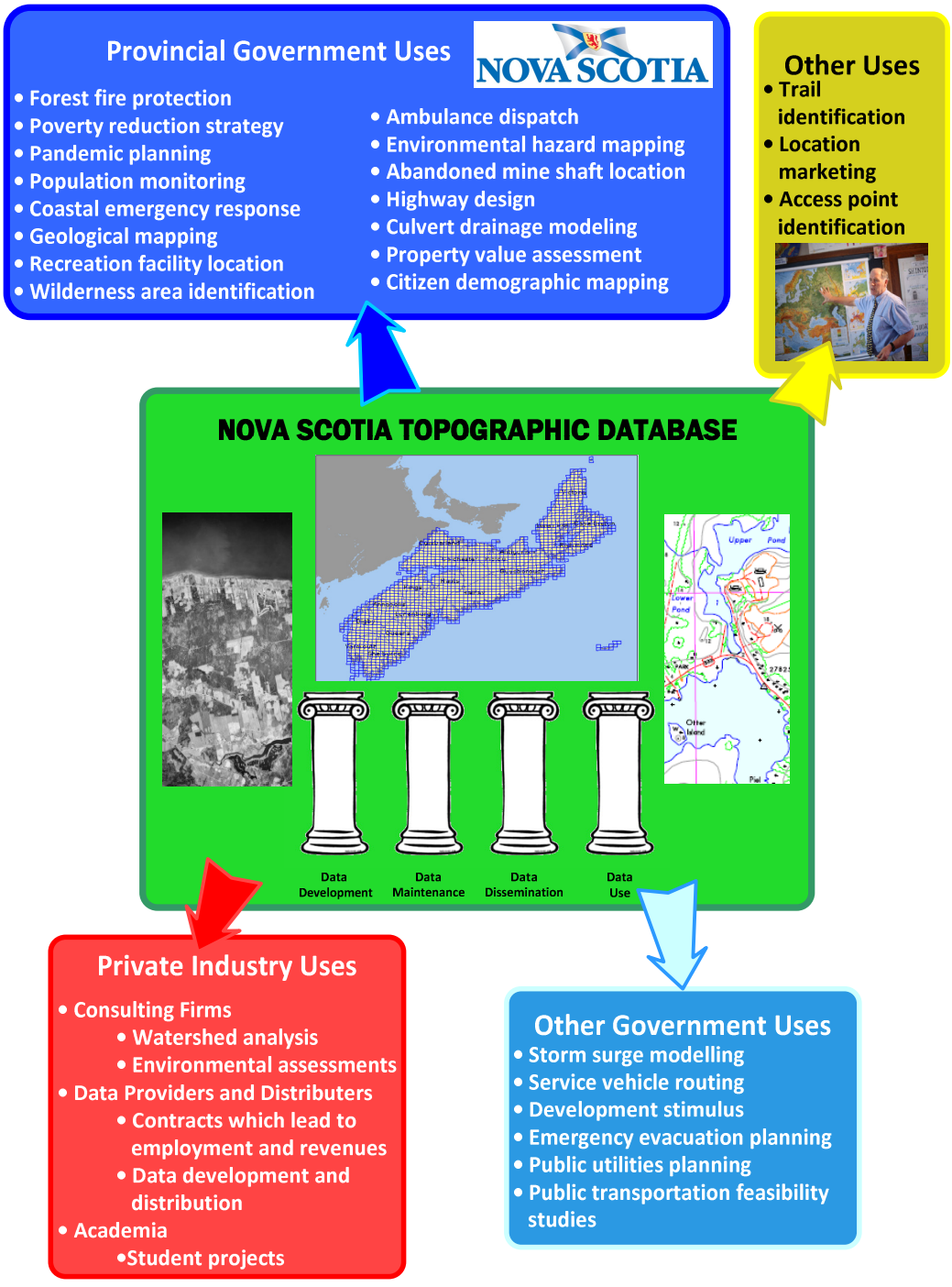
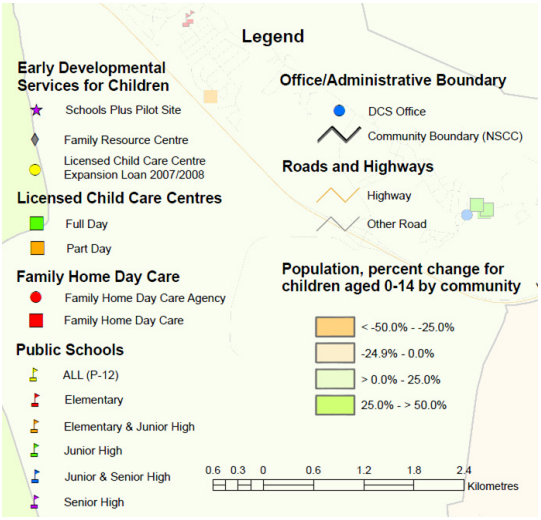
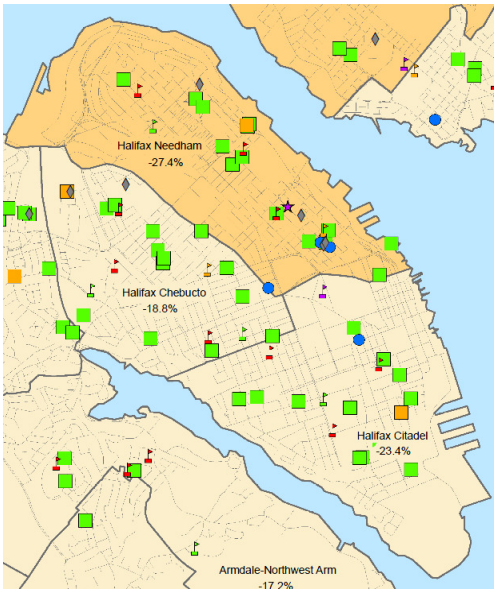


Figure 2 : Nova Scotia Topographic Database Uses

- ***Community Services***
    - Facility location: NSTDB data is used as the base for the identification of social support networks, particularly the location of schools, libraries, museums, and recreational resources;
    - Client service delivery planning: To help ensure clients are being served from the office nearest their home, a map was created showing the percentage of clients served by each office within the catchment area served by the office. This work may result in re-assignment of client files to offices closer to their home, or redistribution of workload; and,
    - Asset mapping: Community Services uses the Nova Scotia Road Network within the NSTDB to map the population densities for family resource centres.

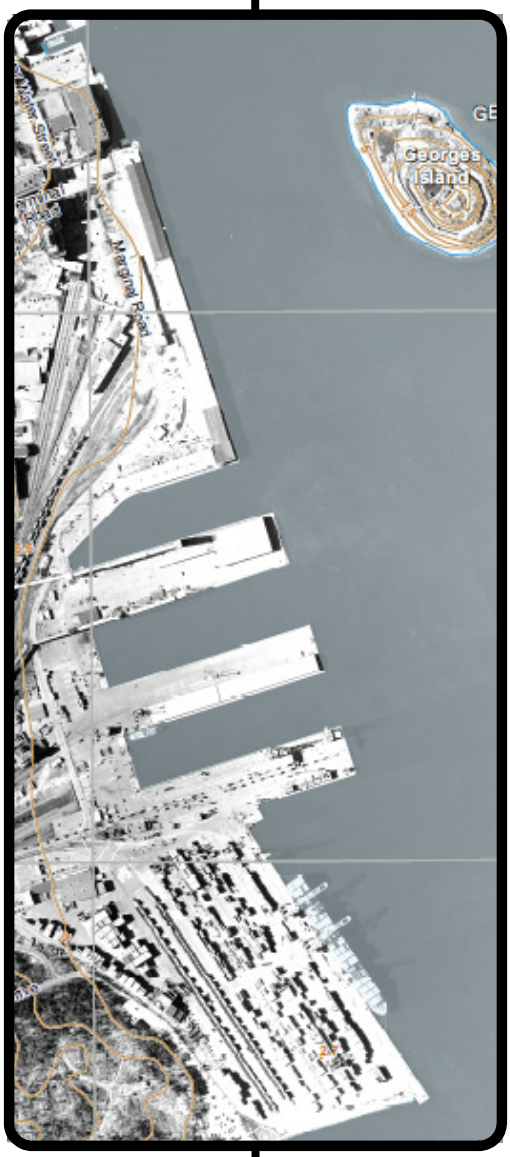
Long Term Planning



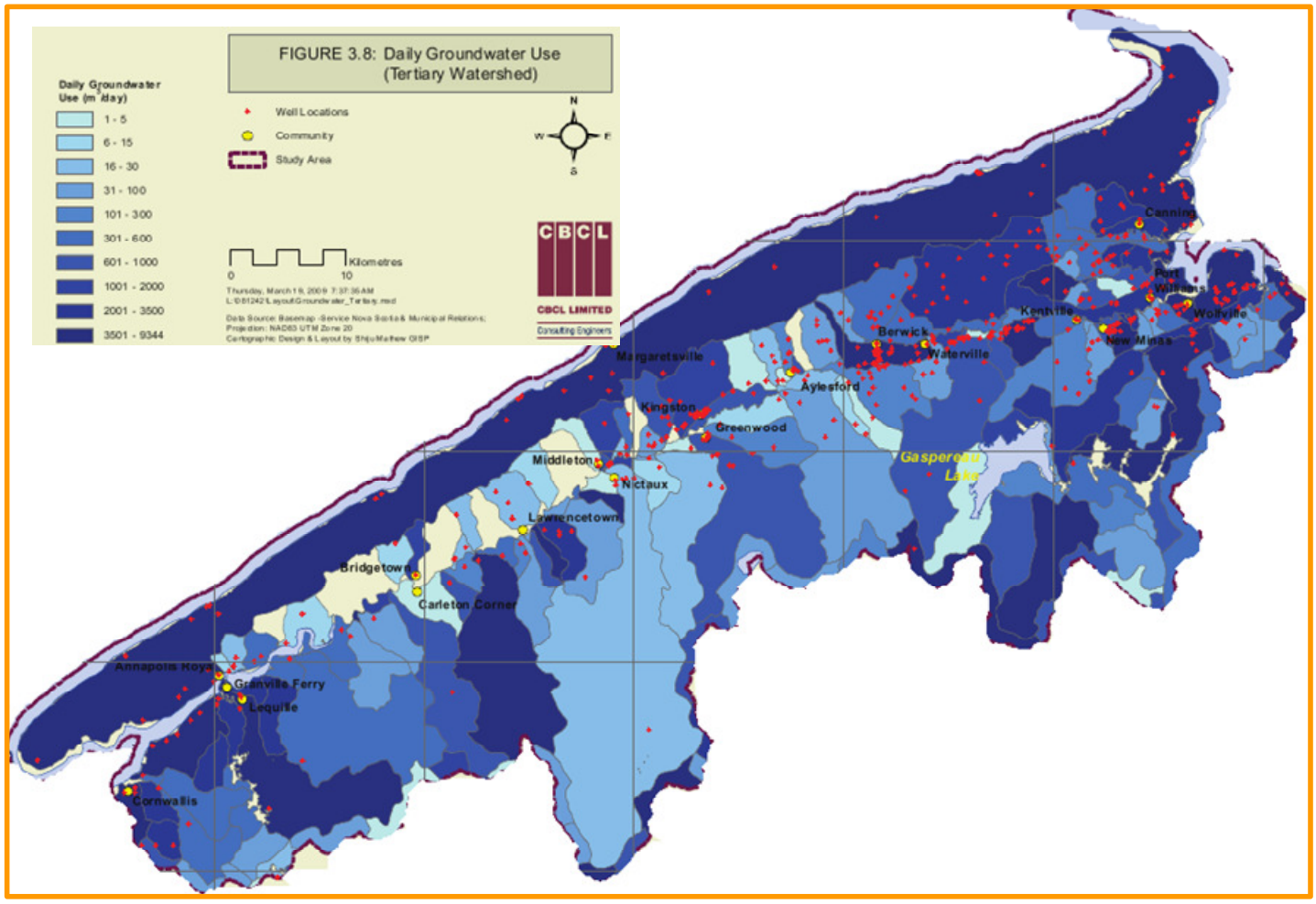


Community Services provides subsidized child care to eligible families and funding to licensed child care centres throughout the province. In order to understand long term needs, a series of maps were created showing the location of existing centres and overlaid with the existing population of children ages 12 and under, then overlaid with 10 year population projection data from Statistics Canada. This enabled staff to envision the long term changes to program demand and helped guide decisions with respect to future program development.

- ***Justice***
    - Crime prevention initiative mapping; and,
    - Child and youth strategy mapping: A series of maps were created to help decision-makers see where services existed, where there were gaps and to identify opportunities for coordination and integration of existing services as well potential areas to pilot new programs. Similar work was done by the Department of Community Services for the Department of Justice to support the development of the Crime Prevention Strategy.
- ***Health Promotion and Protection***
    - Pandemic planning;
    - Recreation facility location: When determining where to locate new recreation facilities, the Department of Health Promotion and Protection uses the NSTDB as a base to identify possible sites using factors including population density, access and existing facilities; and,
    - Hiking trail identification and guidance.
- ***Health***
    - Ambulance dispatch: All ambulances in Nova Scotia have onboard systems which use the Nova Scotia Road Network, a layer within the NSTDB.
- ***Environment***
    - Coastal emergency response.
    - Ground water use survey: The Department Environment engaged CBCL Limited to develop



systems to analyze and manage groundwater use in the Annapolis Valley. Maps produced for the study, such as the one below, used NSTDB data as the base.



Annapolis Valley Groundwater Use
Produced by CBCL Limited for Nova Scotia Environment
Source: http://www.gov.ns.ca/nse/groundwater/docs/Groundwater.Use.Survey-Annapolis.Valley-CBCL.2009.pdf

- ***Transportation and Infrastructure Renewal***
  - Initial highway planning and routing;
  - Maintenance of the road list; and,
  - Drainage modeling for culverts and subdivisions.
- ***Service Nova Scotia and Municipal Relations***
  - Identification of property boundaries by the Land Registration Office using water bodies,

roadways and buildings; and,

- Citizen demographic monitoring.

- ***Fisheries and Aquaculture***
  - Location of aquaculture leases; and,
  - Determination of land use adjacent to aquaculture operations.

Other Government Users

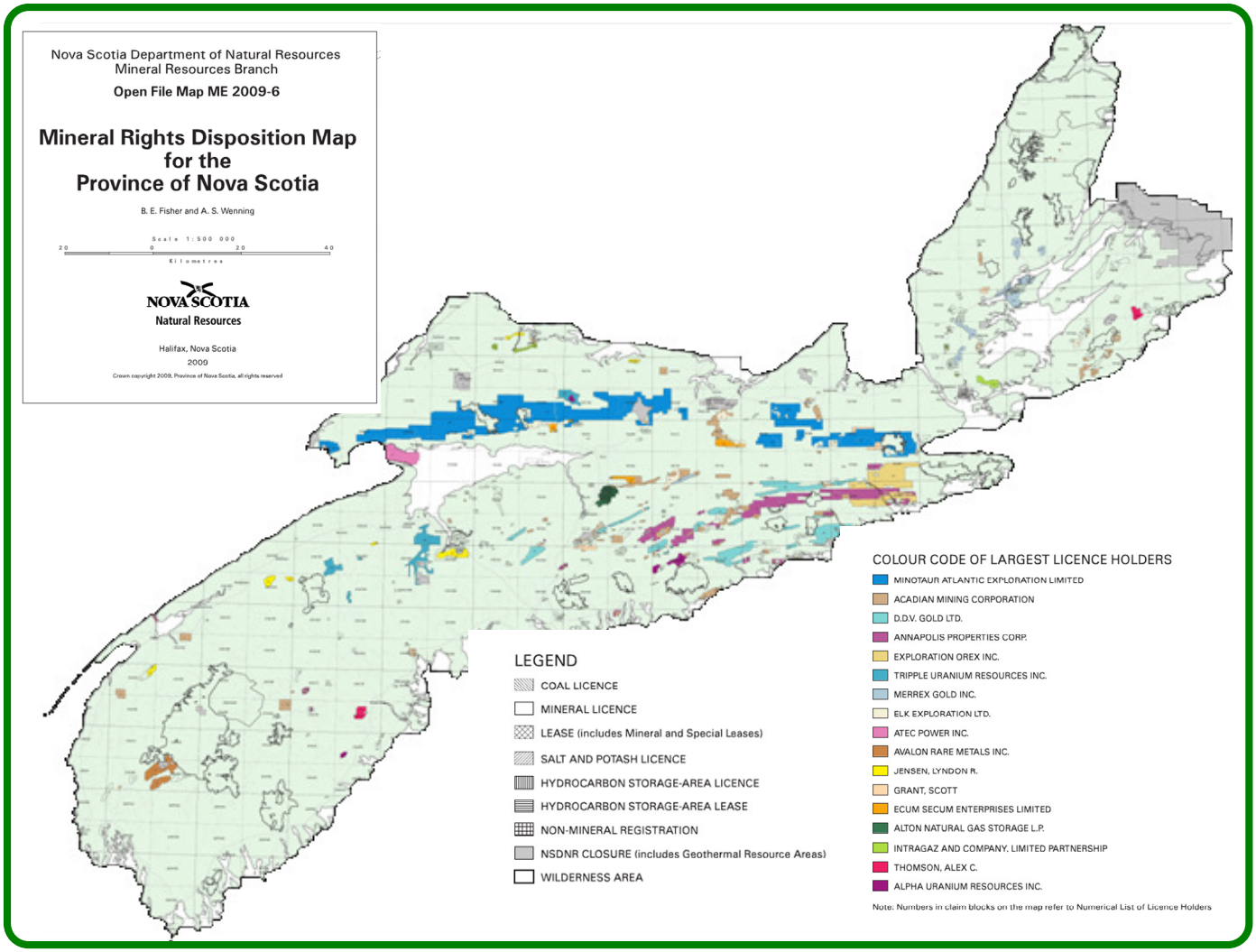
- ***Municipal Governments***
  - Coordination and routing for fire departments, garbage collection, search and rescue, RCMP, postal delivery, and water meter readers;
  - Watershed problem identification;
  - Public utilities mapping;
  - Emergency evacuation planning: Municipalities use the Nova Scotia Road Network, Digital Elevation Model and Nova Scotia Hydrographic Network to determine evacuation plans for emergencies and the effects that flooding and storm surges could have on possible routes;
  - Public transportation feasibility studies;
  - Maintenance of the Federal and Provincial Registries of Heritage Properties; and
  - Identification of possible locations for windmills and wind farms.
- ***Federal Government***
  - NSTDB data is overlaid with LandSAT images by Natural Resources Canada to do change detection;
  - Land cover data is used by Natural Resources Canada for harvest detection and to identify insect damage;
  - Emergency response for coastal emergencies such as oil spills;
  - Analyzing terrain for helicopter pad locations; and
  - Determining lines of communication affected by elevations.

Private Industry and Academia

- ***Consulting Firms***
    - Base mapping for projects: NSTDB data is used to create conceptual drawings which are used for approximately the first fifty percent of a project's life cycle. This saves consulting firms from having to conduct costly and time consuming field surveys;
    - Watershed analysis; and,
    - Environmental assessments: The NSTDB is particularly important for environmental assessments when large tracts of land are being analyzed and field surveys are unfeasible.
- ***Data Providers and Distributers***
    - A benefit of the NSTDB is the revenue it provides to the local geomatics industry. The NSTDB hires private data providers who capture and develop topographic data. The president of one such data provider indicated that his operations, which employ seven highly skilled professionals, is dependant on the NSTDB for sustainability; and,
    - Data distributers create secondary products such as maps and atlases using NSTDB data.
- ***Academia***
    - Used in university faculties including but not limited to geography, sociology, engineering, information management and marine affairs;
    - Used in most student projects at the Nova Scotia Community College Centre of Geographic Sciences, in particular the 1:10,000 resource scale; and,
    - Projects done at COGS include: Redevelopment of Cogswell Interchange land, surface geology analysis in Coldbrook, storm surge modeling in Annapolis Royal, and marine oil disposal site identification.

Other User Groups

- ***Recreation societies***
    - Trail identification;
    - Identification of steep inclines for climbers; and,
    - Creation of promotional materials.
- ***Search and Rescue Groups***
    - Access point identification; and,
    - Coordination of ground crews.



Department of Natural Resources Mineral Rights Disposition Map
Source: DNR Minerals Website – (http://www.gov.ns.ca/natr/meb/data/exe/dp046v026pd.exe)

User Profile

During strategic planning sessions a user profile survey was completed by attendees. The goal of the survey was to gauge the level of awareness users have of the NSTDB and to determine which specific data sets and products are being used most frequently.

Analysis of the user profile was done from a provincial and non-provincial perspective. This was done to gain specific insight into the data being used at the provincial level (keeping in mind that the Province is the intended primary client of the Program).

Thirty three provincial government users of NSTDB data completed the survey. Table 1 shows the level of awareness that these users had of the Program and its products. High awareness indicates that the user is very aware of the NSTDB and actively uses NSTDB resources. Medium indicates some knowledge and occasional use of NSTDB resources and low is indicative of very little knowledge of the NSTDB along with no use of NSTDB products. Almost all users indicated a high or medium level of awareness. Those with a medium level of awareness expressed that a lack of communications exists regarding revision cycles and new product availability.

Table 1 : Provincial Government User Awareness of the Nova Scotia Topographic Database

User Type		
Type	**Count**	**Percentage**
Provincial	33	100%
Awareness		
Level	**Count**	**Percentage**
High	15	45%
Medium	16	48%
Low	2	6%
No	0	0%

Table 2 shows the provincial use of digital data. For the purpose of the user profile, digital data was defined as base layers and vectors with no aerial photographs

included. Participants were asked to differentiate their use as either one time or refreshed. One time indicates that users downloaded data layers once to serve as a base and do not replace the files when new revisions become available, but continue to use the data in their operations. An example of this is the Property Mapping Program, within SNSMR. The system uses CARIS technology and resources are not available to incorporate NSTDB updates. The NSTDB still serves as the foundation on which the property layer resides and Property Mapping GIS resources conveyed the importance of having updated NSTDB data integrated into the system. The *Refreshed* column in Table 2 indicates that the user has downloaded an updated version of the file at least once.

Table 2 : Provincial Government Digital Data Use

Use of NSTDB						
Digital Data : Complete Files						
	One Time		Refreshed		Total	
Data	**Count**	**Percentage**	**Count**	**Percentage**	**Count**	**Percentage**
1:10,000	10	30%	17	52%	27	82%
1:5,000	6	18%	4	12%	10	30%
1:2,000	5	15%	6	18%	11	33%
1:1,000	5	15%	4	12%	9	27%
1:50,000	1	3%	0	0%	1	3%
Digital Data : Digital Layers						
	One Time		Refreshed		Total	
Data	**Count**	**Percentage**	**Count**	**Percentage**	**Count**	**Percentage**
Buildings	9	27%	12	36%	21	64%
Designated Areas	8	24%	12	36%	20	61%
Delimiters	7	21%	10	30%	17	52%
Land Cover	8	24%	11	33%	19	58%
Land Form	9	27%	9	27%	18	55%
Roads and Railroads	8	24%	14	42%	22	67%
Structures	9	27%	10	30%	19	58%
Utilities	6	18%	10	30%	16	49%
Water	6	18%	14	42%	20	61%

27 of the 33 participants indicated that they had used the 1:10,000 resource series at least once, with more than fifty percent downloading multiple versions of the

data. This high uptake is a strong indication of the importance of the resource series to provincial users. This scale is used by many as the base layer of the province because of its accuracy and completeness. The 1:50,000 product is no longer maintained and only available by special request, thus the low usage among participants.

Workshop participants were also asked to specify which individual layers in the 1:10,000 resource series they had acquired. All layers had usage of greater than fifty percent. Not surprisingly, roads and waterways showed the highest use with over sixty six percent of participants downloading the roads and railroads layer at least once.

Use of other NSTDB products by Provincial participants is shown in Table 3. A third of users have acquired orthophotos complete with digital vectors. Many stakeholders indicated they would prefer to use orthophotos in their business activities but were limited by the incomplete orthophoto coverage of the Province. Use of 1:10,000 orthophotos was more prevalent than the 1:2,000 scale because of the higher cost associated with capturing and developing the 1:2,000 product.

An interesting anomaly in the user profile results is the low use of the Nova Scotia Road Network (NSRN) and Nova Scotia Hydrographic Network (NSHN). These products are the same as the roads/railroads and water layers seen in Table 2. Any person using the road or water layer is actually using the NSRN or NSHN. However in Table 3 fewer participants indicated the use of these layers. These discrepancies are likely due to confusion over the names of NSTDB themes, data and products.

Users without access to GIS systems required to leverage digital data can obtain hard copies of NSTDB products from the Nova Scotia Geomatics Centre. Particularly popular among the hard copy products is the Nova Scotia Atlas. Users indicated that the atlas is very user friendly and is particularly popular with DNR fire crews.

Table 3 : Provincial Use of Other Nova Scotia Topographic Database Products

Use of NSTDB						
Digital Imagery						
	One Time		Refreshed		Total	
Data	Count	Percentage	Count	Percentage	Count	Percentage
Orthophotos	6	18%	5	15%	11	33%
1:10,000	8	24%	4	12%	12	36%
1:2,000	5	15%	2	6%	7	21%
Other Products						
	One Time		Refreshed		Total	
Data	Count	Percentage	Count	Percentage	Count	Percentage
Digital Atlas	8	24%	5	15%	13	39%
Digital Coastal Map Series	8	24%	2	6%	10	30%
NSRN	3	9%	15	46%	18	55%
NSHN	3	9%	7	21%	10	30%
NSCAF	5	15%	16	49%	21	64%
Digital Elevation Model	6	18%	6	18%	12	36%
Hardcopies						
	One Time					
Data	Count	Percentage				
Orthophoto Map	12	36%				
Nova Scotia Atlas	20	61%				
Coastal (1:50,000)	9	27%				
Land (1:50,000)	11	33%				

48 non-provincial NSTDB users completed the user profile survey. The user mix can be seen in Table 4. Fifty percent of this group worked for a municipal unit. Awareness of the NSTDB and its products for this group was similar to provincial users, with the majority of participants indicating a high or medium level of awareness. Three users had no awareness of the Program. These three individuals were municipal participants who attended workshops because of their use of the Nova Scotia Civic Address File (NSCAF), a product which is considered separate from the NSTDB and not specifically in scope for this work.

Table 4 : Non-Provincial User Type and Awareness of the Nova Scotia Topographic Database

User Type		
Type	**Count**	**Percentage**
Municipal	24	50%
Academia	5	10%
Federal	6	13%
Private	10	21%
NGO	3	6%
Awareness		
Level	**Count**	**Percentage**
High	19	40%
Medium	24	50%
Low	2	4%
None	3	6%

Table 5 shows the use of digital data among non-provincial users. Again, a high percentage of participants indicated use of the 1:10,000 resource series. Non-provincial users indicated a higher usage of the 1:2,000 large scale series. This is likely due to municipal needs for localized data as opposed to the province wide data sets required by provincial agencies.

Non-provincial organizations are frequent users of NSTDB digital layers, with all layers used by at least sixty seven percent of participants. Again, roads and water were the most downloaded layers. A greater percentage of users do not refresh their data layers when updates are available. This may indicate an opportunity to improve communications regarding updates or may suggest that having refreshed data is not a priority to some users. Six percent of respondents stated they have downloaded a refreshed version of the 1:50,000 product. The 1:50,000 data was created as a one time product. Users accessing the file multiple times may indicate a communications issue, as they belief the product is maintained on an on going basis. Overall, the data in Table 5 speaks to the wide spread use of NSTDB data beyond the Program's primary client and the importance of geospatial data to government, private and academic organizations.

Table 5 : Non-Provincial Digital Data Use

Use of NSTDB						
Digital Data : Complete Files						
	One Time		Refreshed		Total	
Data	Count	Percentage	Count	Percentage	Count	Percentage
1:10,000	21	44%	20	42%	41	86%
1:5,000	6	13%	7	15%	13	27%
1:2,000	18	38%	6	13%	24	50%
1:1,000	8	17%	1	2%	9	19%
1:50,000	2	4%	3	6%	5	11%
Digital Data : 1:10,000 Digital Layers						
	One Time		Refreshed		Total	
Data	Count	Percentage	Count	Percentage	Count	Percentage
Buildings	20	42%	16	33%	36	75%
Designated Areas	19	40%	15	31%	34	71%
Delimiters	19	40%	15	31%	34	71%
Land Cover	22	46%	13	27%	35	73%
Land Form	19	40%	14	29%	33	69%
Roads and Railroads	20	42%	17	35%	37	77%
Structures	18	38%	16	33%	34	71%
Utilities	19	40%	13	27%	32	67%
Water	21	44%	16	33%	37	77%

Fifty percent of participants indicated that they had at one point acquired digital orthophoto products from the NSTDB, as seen in Table 6. Similar to provincial responses, the 1:10,000 scale orthophotos were more popular than other digital NSTDB products, likely due to their lower cost. Finally, indicated use of the NSRN and NSHN were lower than that of the road and water layers, suggesting that confusion over naming conventions is common among all NSTDB users.

Table 6 : Non-Provincial Use of Other Nova Scotia Topographic Database Products

Use of NSTDB						
Digital Imagery						
One Time			Refreshed		Total	
Data	Count	Percentage	Count	Percentage	Count	Percentage
Orthophotos	15	31%	9	19%	24	50%
1:10,000	15	31%	9	19%	24	50%
1:2,000	8	17%	3	6%	11	23%
Other Products						
One Time			Refreshed		Total	
Data	Count	Percentage	Count	Percentage	Count	Percentage
Digital Atlas	7	15%	5	2%	12	17%
Digital Coastal Map Series	6	13%	6	2%	12	15%
NSRN	13	27%	14	6%	27	33%
NSHN	7	15%	10	4%	17	19%
NSCAF	5	10%	25	10%	30	21%
Digital Elevation Model	16	33%	6	2%	22	36%
Hardcopies						
One Time						
Data	Count	Percentage				
Orthophoto Map	18	37.50%				
Nova Scotia Atlas	19	39.60%				
Coastal (1:50,000)	9	18.80%				
Land (1:50,000)	21	43.80%				

CLIENT INPUT INTO FUTURE STATE OF NSTDB

During strategic planning workshops, NSTDB stakeholders provided input pertaining to NSTDB processes, communications, data, technology and the value provided by the Program. The workshops were structured in a manner that allowed clients to share their current experiences and perceptions of these items but emphasized developing solutions to improve the future state of the NSTDB.

Delivery of the Nova Scotia Topographic Database is supported by four basic pillars; data development, maintenance, dissemination and use. In this section client input is presented as common themes and concepts as they align with the four NSTDB pillars.

Data Development

Data Development and Data Maintenance are closely aligned pillars, and client input items listed in the Data Development section can also apply to the maintenance of NSTDB data.

Partnerships should be used to collect source data.

Clients persistently emphasized the opportunity to enhance the NSTDB by leveraging data partnerships. Possible benefits identified include a more complete product and improved precision of certain features. The increased use of partnerships is seen as an opportunity to support the NSTDB as the provincial source of all GIS information.

Regionalized and non-standard source data can be added to the NSTDB with supporting documentation.

Some data available from potential partners does not feature complete provincial coverage and may differ from current NSTDB standards. Clients do not want to loose

provincial coverage of the current data themes but would accept source data from partners with less than complete coverage and at a different standard if appropriate supporting documentation is included.

Emphasis should be placed on developing a more accurate Digital Elevation Model.

There is an increasing need for high accuracy digital elevation models (DEM) among clients. DEMs are used for activities such as storm surge modeling, flood plain analysis and watershed determination. Clients are seeking a more accurate DEM with smaller contour intervals. The current 2.5 metre interval is often insufficient because storm surges and flooding can affect areas of the coast with an elevation of 2 metres or less.

The current Large Scale Mapping Program cost sharing agreements could be improved to encourage municipal partnerships.

Many municipal clients communicated that the current large scale cost sharing agreements are not attractive due to high costs and lengthy development times. Several municipalities have circumvented the NSTDB Large Scale option and contracted large scale mapping services to private companies. This can result in the Province and other NSTDB clients missing out on the future use of such data. An approach is needed for the large scale program which reduces costs to municipalities by seeking partnerships with other organizations in need of large scale mapping, be it federal departments, Transportation and Infrastructure Renewal, the Department of Natural Resources or non government organizations.

Users would welcome the opportunity to redefine the requirements of the NSTDB.

The data layers and standards of the NSTDB were developed by a mapping committee in the late 1980s. The user community feels that it should now have the opportunity to revisit these items. Clients agreed that doing so would not be a one time activity but that regular sessions and user forums are required to gather requirements and ensure the NSTDB continues to develop data which meets clients' needs.

Data Maintenance

The ten year revision cycle is acceptable until a new data collection policy is implemented, if the ten year revision cycle is strictly adhered to.

There was general acceptance that the ten year refresh is a reasonable and realistic maintenance policy based on changes to natural features and acknowledging budgetary considerations. However, some regions reported that data in their areas had not been updated in the last fourteen years. Stricter adherence to the ten year revision cycle is needed until a new feature based or regional activity based change policy is implemented. The currency of roads and civic points received positive feedback due to updates flowing from the Nova Scotia Civic Address File.

Users would welcome proactive notification when updates are made to the NSTDB.

Users lack awareness of the refresh cycle and are unsure when updates are made to data. Some users download data each time they produce a deliverable to ensure they are working with the most current version. Implementing a notification system that alerted customers when updates are made would allow clients to be more efficient in their operations and increase the dissemination of data when updates are made.

Data Dissemination

The NSTDB should continue to offer multiple formats and emphasize the use of data download services such as DataLocator for acquiring data.

Positive feedback was received regarding the availability of multiple data formats and the improving usability of data download services such as DataLocator. Users expressed that the availability of multiple data projection formats creates a great degree of flexibility. In particular, the ability to download map sheets as .dxf files for use in AutoCad is very useful in engineering and design.

The NSTDB should be offered as a seamless database with the ability to download data by specifying a custom and irregular polygon.

Users indicated that downloading data by map sheet was a cumbersome and time consuming process. They recognized that while it may create efficiencies within the NSTDB Program such was not the case from a users' perspective. The ability to download the entire province in a seamless file or select custom polygons would eliminate the need to join map sheets and crop out unneeded areas.[3]

Clients would like access to the 1:10,000 ArcGIS Style Set.

Users of the 1:10,000 resource series spend a considerable amount of time developing a style set when first using the data. They would prefer a style set which is standardized among users and suggest that the Program make its style set(s) available for download.

Clients would like web services to improve access to NSTDB data.

Clients were unaware that the GeoNOVA portal provides web services for the NSTDB 1:10,000 dataset. Depending on their use of the NSTDB, many users expressed an interest in web services to provide direct access to NSTDB data. Users did not believe web services would eliminate the need to provide the ability to download data, rather it would serve as alternative access method.

[3] It should be noted that the NSTDB is working towards the delivery of a seamless database. No estimated completion data can be given due to resource constraints.

Data Use

The NSTDB is the base layer for most mapping in the Province of Nova Scotia. The Program provides significant value to all of its client organizations.

Clients emphasized the importance of having the NSTDB as a base layer of the province. Without this base, other geospatial information generated in the province would have no common context and much of the data would have limited value. Organizations using the NSTDB do not have the resources to develop provincial or regional base layers of their own. The ability to have standard layer such as the NSTDB allows GIS users around the province to easily manipulate and share data. Without this foundation the GIS capabilities of organizations would be limited and result in the creation of pockets of inefficient, siloed information.

Use of the NSTDB will continue to grow in the future.

Stakeholders agreed that use of NSTDB data will continue to grow as more potential users become aware of the power of geospatial data. Government departments and municipal units continue to become more digitally inclined and will seek to build their GIS capabilities as the public becomes more spatially aware due to products such as Google and Bing maps, and GPS units. A common theme in user workshops is the increase in citizen knowledge and expectations for geography because of web based GIS products, and that programs such as the NSTDB must have strong investment to meet these expectations.

NSTDB should clearly and concisely identify what data it makes available and where it can be accessed.

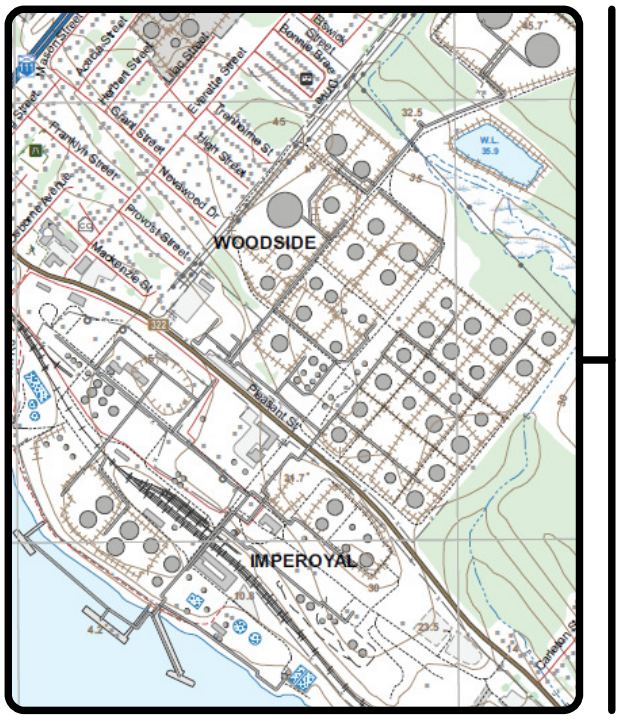
NSTDB users identified the opportunity to develop an *NSTDB Catalogue* which clearly defines the wide variety of data and products developed and delivered by the Program along with the specific location of these products in both digital and hard copy formats. In addition, some users indicated that use of the NSTDB is not intuitive for first time

customers. Some expressed difficulty in using the data dictionary to find and understand feature codes. A quick user guide explaining how to easily navigate and use the NSTDB would be of benefit.

REVIEW AND ANALYSIS OF STRATEGIC DIRECTIVES

When developing future strategic priorities, it is important to first look at past and current strategic directions to gain insight into why initiatives have been successful and glean lessons learned from objectives which have not been fulfilled. This section will briefly outline past policy statements, strategic recommendations and product oriented objectives. Justification of why these items were chosen for review will be provided. Finally, a strategic report card which was used to evaluate past strategic directions among stakeholders will be described and discussed.

Review of Past Strategic Directives



To gain a clear understanding of the current state of the Nova Scotia Topographic Database it is necessary to look back to the strategic directives which have governed the Program since its inception. Two documents were identified as significant contributors to the Program's strategic and operational directions, being: *A Nova Scotia Topographic Database Management Policy* prepared by the Base Mapping Policy Task Group, Land Information Systems Advisory Committee and Nova Scotia Land Use Committee in 1995, and *Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Data* prepared by Geoplan Consultants Inc. and GeoNet Technologies Inc. in 2001.

These documents were selected for review because of their direct provision of policy, strategic and tactical recommendations.

The *Nova Scotia Topographic Database Management Policy [1995]* was developed to "provide policy to guide the creation, distribution and maintenance of an integrated Nova Scotia Topographic Database System (NSTDB), to provincial standards, to meet the overall needs of geographic information users."[4] This goal is supported by eight policy statements which serve as the building blocks of the Program's operations. These high level statements outline directions for the development, revision, and dissemination of data using standardized specifications and technology. The statements also call for the creation of data partnerships and periodic engagements with data users to ensure that products align with evolving industry needs. The policy goals and statements presented in this document are relevant because they represent the most recent internally developed strategic directives related to the NSTDB.

The *Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Database* is the previous strategic report developed for the NSTDB. The strategic directives put forth by the 2001 strategic report aim to allow the Province to:

- "maintain and improve the NSTDB";
- "ensure that the NSTDB meets the evolving needs of its users";
- "reduce costs to maintain and distribute the NSTDB;" and,
- "maximize the private sector role, while retaining responsibility for policy, specifications, and ownership."[5]

To accomplish the above objectives, the report presented seven recommendations. Several recommendations were internally directed with aims of improving efficiencies and the use of resources. Others were externally focused with emphasis on developing partnerships and altering the ten year revision cycle of the resource series. Several recommendations counteracted one another, with the fulfillment of a given recommendation hindering the ability to fulfill another. The intricacies which led to this conflict were likely not evident at the time the recommendations were presented. The

[4] Nova Scotia Topographic Database Management Policy, 1995
[5] Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Database, 2001

individual recommendations will be discussed in more detail in **Analysis of Strategic Directives.**

The 1995 Management Policy contains Program wide policies which apply at a high level to all operations and products related to the NSTDB. The 2001 Strategic Report is more specific in its scope, stating "This document provides a framework for the future maintenance program for the NSTDB 1:10,000 (resource) scale data."[6] For this initiative, the project team felt it important to identify any strategic directives relating to products outside the 1:10,000 resource series. The products designated for review were the:

- large scale series (1:2,000);
- provincial orthophotos (1:10,000);
- large scale orthophotos (1:2,000);
- coastal series (1:50,000);
- Nova Scotia Road Network; and,
- Nova Scotia Hydrographic Network.

Documentation was available for some of these products which outlined a desired strategic direction. If no documentation was available, program staff with relevant context were consulted to develop an ad hoc goal for the product. The strategic directions for the above products are discussed in more detail in **Analysis of Strategic Directives.**

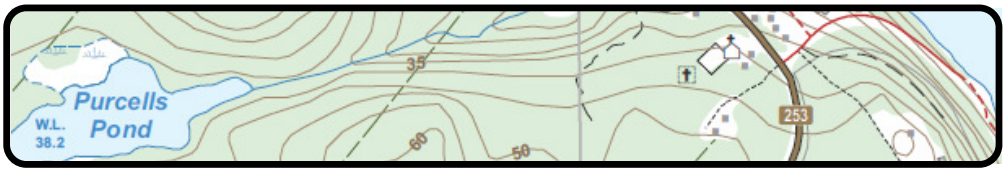
[6] Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Database, 2001

Analysis of Strategic Directives

Once pertinent strategic directives were identified, an analysis was done to measure the level of follow through and success associated with each directive. User consultation sessions provided an opportunity to gather quantitative and qualitative feedback on past strategies. Qualitative feedback was gathered through facilitated group discussions and follow up correspondence. Directives were evaluated quantitatively using a *Strategic Report Card*. Results of the analysis will be presented in this section, grouped together as management policies, strategic report card recommendations and other initiatives.

The strategic report card was completed by attendees of three municipal forums, three user workshops and a staff workshop at the Nova Scotia Geomatics Centre. Participants were asked to objectively evaluate past strategic directives by scoring individual policy statements, recommendations and product related objectives. Those in the municipal and user workshops were supplied with the report card seen in **Appendix A.** The staff at the NSGC were supplied with a slightly different form which allowed them to evaluate several internal initiatives in addition to the items evaluated by users. This form can be seen in **Appendix B.**

Participants were asked to assign a score of *high, medium, low, no* or *N/A* to each report card item. Differing guidelines for applying the scores were provided for each set of items. The scores were converted to numerical values (high = 3, medium = 2, low = 1, no = 0, N/A = null) to develop the averages and standard deviations seen in the tables to follow. Results of the report card exercise are not meant to serve as the ultimate determinant of an item's success. They are simply an attempt to add quantifiable, objective information to the input gathered during strategic planning sessions.



Analysis of Management Policies

The policy goal of the NSTDB and eight supporting policy statements can be found in the *Nova Scotia Topographic Database Management Policy* (1995). Participants were asked to assign a score to the nine items based upon the criteria described in Table 7. The items presented for evaluation are shown in Table 8.

Table 7 : Management Policy Scoring Criteria

Management Policy Scoring Criteria	
High (3):	The policy has been fully adhered to with successful results which contribute to the overall policy goal of the NSTDB.
Medium (2):	The policy has been mostly adhered to with results which do not undermine the overall policy goal of the NSTDB.
Low (1):	The policy has been partially adhered to with results which do not conform to the overall policy goal of the NSTDB.
No (0):	The policy has not been adhered to.

Table 8 : Management Goal and Policies

Policy Goals and Statements (1995)	
Policy Goal	**Provide vision and guidance for creation, distribution and maintenance of the NSTDB system.**
Policy Statements	**1. Create a single, seamless, topographic database.**
	2. Develop a standard suite of database and map products.
	3. Maintain and revise the NSTDB on a continuous basis.
	4. Establish and use province wide standards and technologies, and review them periodically.
	5. Facilitate product distribution and encourage the use of the NSTDB.
	6. Encourage partnerships for the creation, distribution and maintenance of the NSTDB and its products.
	7. Identify and respond to the needs of geographic information users for the NSTDB and its products.
	8. To establish and monitor production priorities for the NSTDB and its products.

The results of the report card exercise are shown in Table 9. The *Rate* column represents the percentage of participants who reported a score other than N/A, and *Average* scores are based on participants who indicated *high*, *medium, low* or *no*. The

Variance column represents the degree of agreement among respondents. Items with a larger variance indicate that there was less consensus within the group regarding the level of success of those items. Notable observations include:

- The second statement, *Develop a standard suite of database and map products*, received the highest score from all workshop participants. This reflects the success and relevance of the wide variety of products currently being offered though the NSTDB.
- The fourth policy statement, *Establish and use province wide standards and technologies, and review them periodically*, showed a high variance among provincial staff. Those giving a higher score felt that standards had been developed and implemented, however lower scores were given by those who felt that the Program did not periodically review the standards.
- Many provincial participants did not have enough context to rate the effectiveness of data partnerships (statement 6). However, a significant part of the workshop with provincial employees focused on the opportunities to develop such partnerships.
- Geomatics Centre employees exhibited a large variance for the same policy statement. Those who deal with the Nova Scotia Civic Address File had more positive experiences with data partnerships than those trying to foster data partnerships for the NSTDB.
- Only Geomatics Centre staff were asked to evaluate the eighth policy statement as it is internal in focus.

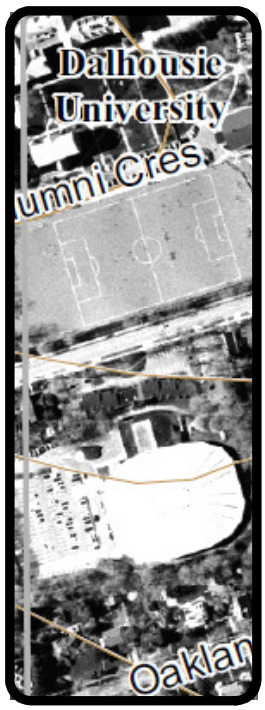


Table 9 : Management Goal and Policies Report Card Results

	Provincial			Non-Provincial			Geomatics Centre		
	Rate	Average	Variance	Rate	Average	Variance	Rate	Average	Variance
Policy Goal	65%	2.25	0.30	75%	2.10	0.45	82%	2.44	0.28
Statement 1	90%	2.18	0.37	87%	2.12	0.46	100%	2.64	0.25
Statement 2	94%	2.33	0.47	87%	2.40	0.28	100%	2.82	0.16
Statement 3	61%	1.84	0.47	83%	1.42	0.44	100%	2.36	0.45
Statement 4	61%	1.95	0.94	81%	2.12	0.39	91%	2.20	0.40
Statement 5	87%	1.98	0.55	98%	1.92	0.70	91%	2.10	0.54
Statement 6	55%	1.50	0.63	81%	2.02	0.77	91%	1.60	0.93
Statement 7	81%	1.56	0.59	89%	1.85	0.52	82%	1.89	0.36
Statement 8							91%	1.90	0.54

Analysis of Strategic Recommendations

Seven strategic recommendations for evaluation were taken from *Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Database* (2005), the previous NSTDB five year strategy. Several of the recommendations were evaluated using three criteria: implementation, operation, and quality. The use of the three criteria was to understand if the recommendation was acted on, if implemented how well the changes operated, and if the recommendation led to improvements in the quality of the NSTDB. Others were simply assigned a single score, similar to the management policy exercise. The report card completed by external users was slightly different than the one given to NSGC staff, because of the different perspectives gained by the groups.

The first recommendation states "*It is recommended that the province actively pursue the negotiation of data partnership agreements for the ongoing maintenance of the NSTDB.*"[7] Users of the NSTDB were asked to first evaluate all data partnerships using the criteria of implementation, operation and quality. They then evaluated partnerships in general for each of the nine NSTDB layers (buildings, designated areas, delimiters, land cover, land form, roads, structures, utilities, and hydrography).

The scoring criteria for data partnerships are shown in Table 10 and the criteria for the individual layers are in Table 11.

[7] Development of a Five Year Maintenance Strategy for the Nova Scotia Topographic Database, 2001

Table 10 : Data Partnerships Scoring Criteria

Data Partnerships Scoring Criteria	
Implementation Success	
High (3):	Partnerships were developed in a timely manner with clear communication processes.
Medium (2):	Partnerships were developed in a slightly prolonged timeframe with some communication processes.
Low (1):	Partnerships were developed in a prolonged manner with poor communication processes.
No (0):	Partnerships were not developed.
N\A:	Do not have context to rate the recommendation.
Operational Success	
High (3):	Partnerships operated with high efficiency and clear communication processes.
Medium (2):	Partnerships operated with moderate efficiency and acceptable communication processes.
Low (1):	Partnerships operated inefficiently with poor communication processes.
No (0):	Partnerships were not developed.
N\A:	Do not have context to rate the recommendation.
Quality of NSTDB	
High (3):	Partnerships led to the delivery of a high quality product.
Medium (2):	Partnerships led to the delivery of an acceptable quality product.
Low (1):	Partnerships led to the delivery of a poor quality product.
No (0):	Partnerships were not developed.
N\A:	Do not have context to rate the recommendation.

Table 11 : Data Partnership General Scoring Criteria

Data Partnership General Scoring Criteria	
High:	Partnership was created and is working well.
Medium:	Partnership was created but was not well maintained.
Low:	Partnership was created but never maintained.
No:	Partnership was not developed
N/A:	Do not have context to rate the recommendation.

The evaluation of data partnerships by external stakeholders is shown on the following page in Table 12. Important observations gleaned from the results include:

- For a workshop based audience, overall, the response rates for this recommendation were low. Many participants felt they did not have context to rate the success of past data partnerships.
- Implementation and operational success of data partnerships were scored low by both provincial and non-provincial participants. During workshops it was indicated that this may be due to the sizeable resource commitments required to determine partnership structures and data cleansing issues.
- Higher response rates and average scores for the buildings and road layers can be attributed to increased user awareness of partnerships for these data sets through NSCAF.
- It cannot be explained why some users evaluated a partnership in areas where none exist. For example, the hydrography layer is developed without data from any partner yet it was rated by 19% of provincial and 28% on non-provincial users.

The Geomatics Centre was asked to evaluate the Implementation Success (I), Operational Success (O) and Quality (Q) of partnerships for each data layer because of the greater context they can provide. Table 10 was also used as the scoring criteria for this portion of the evaluation.

Table 12 : Data Partnerships Report Card Results (External)

Data Partnerships Recommendations (2001 Strategic Plan)		Provincial			Non-Provincial		
		Rate	Average	Variance	Rate	Average	Variance
General Data Partnerships	Implementation	39%	1.25	0.93	32%	1.44	1.37
	Operation	39%	1.17	0.88	26%	1.14	1.05
	Quality	42%	1.50	1.08	28%	1.57	1.25
Layers	Buildings	32%	1.65	1.89	49%	1.42	1.13
	Designated Areas	23%	1.14	2.14	28%	1.27	1.35
	Delimiters	16%	0.80	1.70	30%	1.13	1.32
	Land Cover	26%	1.00	1.71	26%	1.21	1.26
	Land Form	16%	1.00	1.50	26%	1.21	1.41
	Roads	29%	1.56	1.78	51%	1.78	1.33
	Structures	23%	1.14	1.48	34%	1.56	1.32
	Utilities	16%	0.90	0.55	32%	0.94	1.18
	Hydro	19%	0.67	0.67	28%	1.40	1.69

Table 13 : Data Partnerships Report Card Results (Internal)

Data Partnerships Recommendations (2001 Strategic Plan)		Geomatics Centre		
		Rate	Average	Variance
Layers	Bulidings:I	55%	1.5	0.7
	Bulidings:O	36%	1.8	0.3
	Bulidings:Q	36%	2.3	0.9
	Designated Areas:I	45%	0.8	0.7
	Designated Areas:O	36%	1.3	0.9
	Designated Areas:Q	45%	1.8	1.2
	Delimeters:I	36%	0.3	0.3
	Delimeters:O	9%	1.0	
	Delimeters:Q	18%	1.5	0.5
	Land Cover:I	45%	0.4	0.8
	Land Cover:O	18%	1.0	2.0
	Land Cover:Q	27%	1.7	2.3
	Land Form:I	45%	0.0	0.0
	Land Form:O	18%	0.0	0.0
	Land Form:Q	27%	1.0	3.0
	Roads:I	45%	2.0	0.0
	Roads:O	45%	2.0	0.0
	Roads:Q	55%	2.3	0.3
	Structures:I	45%	0.8	1.2
	Structures:O	27%	1.3	1.3
	Structures:Q	36%	2.0	2.0
	Utilities:I	45%	0.0	0.0
	Utilities:O	18%	0.0	0.0
	Utilities:Q	27%	0.7	1.3
	Hydro:I	45%	0.2	0.2
	Hydro:O	18%	0.5	0.5
	Hydro:Q	18%	1.5	4.5

Results of the NSGC evaluation are shown in Table 13. Notable observations include:

- For all features implementation success scored the lowest among the three criteria. This could be attributed to the lengthy and resource intensive process which is required to initiate a data partnership, which represents a challenge when considering potential partnerships.
- Similar to results identified in the external report card above, the roads and buildings layer were viewed as having the most successful partnerships. Again, this

is likely due to the ongoing success of municipalities partnering with the NSGC to maintain the NSCAF.

- The utilities and land form layers exhibited the lowest scores. This is likely due to the fact that opportunities to partner with private companies and municipalities exist within these layers but have yet to be initiated.

The remaining six recommendations from the 2001 report (see Table 15 below) were evaluated using a single criterion, shown in Table 14.

Table 14 : Strategic Recommendations Scoring Criteria

Strategic Recommendations Scoring Criteria	
High:	The recommendation led to the delivery of a high quality product. Positive customer feedback and increased usage of products resulted from the implementation of the recommendation.
Medium:	The recommendation led to the delivery of an acceptable quality product. Mostly positive customer feedback and constant usage of products resulted from the implementation of the recommendation.
Low:	The recommendation led to the delivery of a substandard quality product. Mostly poor customer feedback and decreased usage of products resulted from the implementation of the recommendation.
No:	The recommendation was not implemented.

As can be seen in Table 15, only three of the six recommendations were evaluated by provincial and non-provincial external stakeholders. The remaining three were deemed internal and thus operational in nature, meaning only NSGC staff could have the context to conduct an informed evaluation.

Of the six recommendations, implementation of a flexible data model received the highest evaluation from non-provincial users and Geomatics Centre staff. In 2003 the NSGC migrated from a CARIS data structure to ArcGIS. This was done to enable the use of new Softcopy technology. When the new system was put in place specifications for collecting points, lines and features had to be re-written. This was a relatively straight forward process, however, challenges arose when developing new annotations. All symbols, texts and associated attributes from the CARIS system were not compatible with ArcGIS. A large undertaking was required to upgrade annotations on the provincial map series, with new annotation specifications being supplied to contractors in 2007. As of this reporting period,

748 of the 1597 1:10,000 series map sheets remain to be converted to the ArcGIS annotation style. Once this is completed, province wide coverage of the 1:10,000 series will be available with improved accuracy and currency. Stakeholders were generally very positive about the transition to ArcGIS, due to its compatibilities with their GIS systems.

Table 15 : Strategic Recommendations Report Card Results

Strategic Recommendations (2001)		Provincial			Non-Provincial			Geomatics Centre		
		Rate	Average	Variance	Rate	Average	Variance	Rate	Average	Variance
Recommendations	Use alternate accuracy specifications for ongoing maintenance.	32%	1.60	0.93	40%	1.86	0.83	64%	0.29	0.57
	Implement a more flexible data model for storage and retrieval of attributes.	45%	1.57	0.73	42%	1.91	0.85	73%	1.00	1.14
	Vary update cycles by feature, based upon data availability and feature importance.	52%	1.75	0.87	36%	1.39	1.02	82%	0.78	1.44
	Separate the data detection process from the data inclusion process to make maximum use of information gathered by other entities.							64%	0.00	0.00
	Logical consistency relationships should not be maintained between features of different accuracies.							55%	0.83	1.77
	Cartographic issues should be separated from the maintenance process.							73%	0.88	1.55

Moving from CARIS to ArcGIS will also enable the eventual transition to a seamless database (one of the policy statement mandated in the 1995 Management Policy). At present, data is downloadable by an area covered by one or more map sheet. However, in a seamless database, users have the ability to select a customized area for download, independent of map sheets. The transition to seamless is currently ongoing but due to the complexity of converting files to the required Oracle database a truly seamless product will not be available for approximately three to four years. Workshop discussions indicate that NSTDB users are frustrated in having to download data by map sheet and unaware of the effort to develop the seamless database.

The three recommendations receiving the lowest evaluation from the Geomatics Centre were the use of alternate accuracy specifications, varying update cycles by feature and separation of the data detection and inclusion process. The low scores are justified as

these recommendations were not pursued. These initiatives were not pursued because the transition from CARIS to Arc prohibited them from being feasible. A by-product of re-tooling to Arc was the availability of black and white orthophoto maps due to the Softcopy technology. A business decision was made to provide these maps province wide, creating the need to fly photography for each mapping block in the province. Hence the data detection and inclusion process became one in the same, both being done when new photography was captured.

With the photogrammetric approach to capturing data the ability to vary update cycles by feature was also negated. All features are captured in the photography and updated as areas are flown. Finally, all features are captured at the same accuracy since they are derived from the same photograph, eliminating the possibility of using alternate accuracy specifications for various features.

The final set of items evaluated using the strategic report card consisted of other initiatives and products delivered under the Nova Scotia Topographic Database. The products selected and their respective goals were:

- **Large Scale Mapping (1:2,000) -** Provide a large scale map product of the province.
- **Provincial Orthophotos -** Provide a 1:10,000 scale aerial photograph series for the province that has been rectified to remove distortions and geo-referenced.

- **Large Scale Orthophotos -** Provide a 1:2,000 scale aerial photograph or photographs for a specific area that has been rectified to remove distortions and geo-referenced.
- **Coastal Map Series -** Provide 1:50,000 scale maps depicting land and marine features around Nova Scotia's coastline out to the 12 mile limit which supports mapping applications involving coastal resource inventories, aquaculture, community economic development, and environmental planning.
- **Nova Scotia Road Network –** One geometric representation of roads for the entire Province.
- **Nova Scotia Hydrographic Network –** One geometric representation of roads for the entire Province.

Internal and external workshop participants were asked to evaluate the success of these products using the criteria shown in Table 16. Results are shown in Table 17.

Table 16 : Other Initiatives and Products Scoring Guide

Other Initiatives and Products Scoring Guide	
High:	The recommendation led to the delivery of a high quality product.
Medium:	The recommendation led to the delivery of an acceptable quality product.
Low:	The recommendation led to the delivery of a poor quality product.
No:	The recommendation was not developed.
N/A:	Do not have context to rate the recommendation.

Table 17 : Other Initiatives and Products Report Card Results

Other Recommendations		Provincial			Non-Provincial			Geomatics Centre		
		Rate	Average	Variance	Rate	Average	Variance	Rate	Average	Variance
Other Initiatives	Large Scale (1:2000)	74%	1.72	1.2	79%	1.90	1.02	91%	2.20	0.40
	Provincial Orthophotos	58%	1.56	1.4	70%	1.89	0.77	100%	2.73	0.22
	Large Scale Orthophotos	42%	1.54	1.6	60%	1.69	1.25	100%	2.55	0.47
	Coastal Series	61%	1.74	0.6	36%	2.26	0.20	73%	2.75	0.21
	NSRN	81%	2.38	0.4	85%	2.24	0.46	91%	2.60	0.27
	NSHN	52%	2.13	0.5	57%	2.13	0.33	73%	2.50	0.29

In general, participants evaluated these other products favorably, with no average scores below 1.54. The lowest score was assigned to large scale orthophotos by provincial government users. This is due to the incomplete provincial coverage of 1:2,000 orthophotos. However, note the large variance for the item. This is due to the high scores provided by participants with coverage in their areas and a smaller group with no coverage who assigned *No.* The same can also be said for provincial orthophotos (1:10,000), which are popular among users, but not available for all parts of the province.

The product receiving the highest rating was the Nova Scotia Road Network. This item also had the highest response rate, attributed to its high uptake. Almost every NSTDB user accesses the NSRN. The high rating can be attributed to the currency of the layer. New roads are added between revision cycles through updates shared via municipalities through the NSCAF program. The Department of Transportation and Infrastructure Renewal also notifies the NSTDB when a new road is created allowing the NSGC to capture it and add it to the NSRN.

The response rate for the coastal series was among the lowest. However, those who did rate the product gave a favorable evaluation. Due to the fact that this is a less current data series which is not refreshed, many participants were unaware that the product could still be obtained from the Geomatics Centre. Those who did have knowledge of the product, felt that it provided data for an important section of the province, particularly coast lines and inter-tidal zones. During workshops, many participants voiced an increasing need for current and accurate coastal data as planning and modeling for sea level rise, storm surges and coastal evacuations become more prevalent issues.

JURISDICTIONAL REVIEWS

As input into the development of the NSTDB Strategy, jurisdictional reviews were conducted with the provinces of New Brunswick and Alberta. The objectives of these sessions were to gain an understanding of how other provinces collect, manage and distribute their topographic data, and the benefits received by Provincial and external clients. In both provinces meetings were held with the government employees who administer the topographic programs and users of the topographic data. Through the jurisdictional reviews lessons were learned on engaging clients and stakeholders, program communications, and the value of Nova Scotia's Topographic Program that supports a broad range of Provincial Government and external stakeholders. In all sessions, participants shared openly what worked well within their programs and opportunities for improvement. Program administrators encouraged clients to discuss the strengths and the weaknesses in their programs' datasets, communication processes and use of technology. Specific items of note from the jurisdictional sessions include:

1. **After reducing its emphasis on topographic data New Brunswick is now working to establish a topographic dataset to be used by all Provincial Departments.**

New Brunswick and Nova Scotia have a similar history in the creation and initial operation of their topographic programs. In the late 1990's New Brunswick changed program priorities and stopped maintenance of all topographic data. Recently, Service New Brunswick created GeoNB. This organization is focused on the development of a base set of topographic data to be used by provincial departments, with an initial emphasis on a provincial road network and hyrdrography.

2. If priorities are applied in the collection of topographic data, consideration must be given to the impact on all topographic data users.

In stakeholder consultations a reoccurring theme was to consider collecting data based on topographic changes, rather than continuing a ten year flying cycle, in order to more efficiently apply data collection resources. In Alberta topographic data collection is based on The Ministry of Sustainable Resource Development's (SRD) priorities. SRD is the ministry responsible for Alberta's lands, forests, fish, and wildlife. As a result, resource based Departments benefit from the topographic dataset, but socio-economic Departments do not use SRD data. In Nova Scotia, by way of comparison Community Services and Health Protection and Promotion use NSTDB data, and in project workshops stated an expectation for increasing use of topographic data. Any changes to Nova Scotia's approach in collecting topographic data must ensure the information continues to provide benefits to all Provincial stakeholders.

3. Value of Senior Executive Support for Topographic Programs

A concern raised in Nova Scotia stakeholder consultations was the level of understanding within government of the uses and value of the NSTDB. In both Alberta and New Brunswick, Senior Executive Committees exist which provide direction and support for the provincial topographic programs. When asked the bases for support, SRD stated that Senior Executives from resource focused ministries recognize the value of GIS and topographic data in managing provincial resources. Service New Brunswick stated that a Deputy Ministers Committee was fundamental to the creation of GeoNB. Committee support is based on an understanding of GIS and its benefits, and the need to reduce duplication that is now occurring as departments maintain independent topographic datasets.

4. Benefits of Proactively Connecting with Clients and Stakeholders

In Nova Scotia stakeholder workshops suggestions were made on how the NSTDB program could engage clients and to better understand users' needs. Alberta and New Brunswick have formal structures to gather stakeholder input. New Brunswick has created Business and Technical Committees to provide direction to GeoNB. Committee participants, representing departmental GIS stakeholders, stated that they felt GeoNB understands their needs and is focused on supporting their requirements. The Business and Technical Committees have created a positive environment necessary for the work to be successful. In Alberta, SRD formally collects topographic requirements for their organization. Participants in the process feel this allows the Ministry to make the best use of topographic resources. As well, SRD has engaged a third party not-for-profit organization, AltaLIS, to distribute topographic and other GIS data to organizations out side of the provincial government. AltaLIS has focused efforts on understanding clients' data requirements, how clients wish to access data, and the type and level of communications clients wish to receive. Using this information, AltaLIS has created a website that allows efficient access to data (96% of all data downloads occur directly from the website), web communications focused on topics of interest to clients, and periodic mass email announcements. Alberta's clients spoke positively of AltaLIS communications and, through their focus on clients' needs, AltaLIS has increased the use of SRD GIS data.

5. Value of Nova Scotia's Provincial Topographic Data Approach

In New Brunswick an "informal GIS network" exists. GIS specialists contact other GIS resources, who may have data in an area where they are planning to complete an analysis, to understand the data available and to share information where possible. Alberta Ministries that do not use SRD's topographic data will attempt to access data from other government ministries or the Federal Government, as a starting point for many of their GIS activities. In Nova Scotia stakeholders do not need to informally gather base information or contact other departments to create a starting point for

topographic data. In contrast to the jurisdictional review discussions, Nova Scotia topographic data users stated the value of having a complete provincial data set to use either directly in their analysis or as the base on which to place their themes of information.

Annually Nova Scotia commits in the area of one and a half million dollars to NSTDB maintenance[8]. In comparing Nova Scotia's Topographic Program to New Brunswick and Alberta, the province dedicates more formal effort to data maintenance than New Brunswick, and appears to dedicate as much or more relative effort than the province of Alberta. Through this effort Nova Scotia provides the greatest benefit to all topographic stakeholders. Although not possible to quantify within the scope of this project, it is clear that New Brunswick and Alberta expend significantly greater informal effort than Nova Scotia to create partial topographic datasets, limiting the value of their respective information.

For complete documentation of jurisdictional workshops please refer to project supplements entitled *Nova Scotia Topographic Database Strategy – Alberta Workshop Notes* and *Nova Scotia Topographic Database Strategy – New Brunswick Workshop Notes.*

[8] Average NSTDB contract costs of $1,000,000 from 2003-2004 to 2008-2009 – source 2009 SNSMR budget
Annual maintenance staff costs of $500,000 – source NSTDB Maintenance Cost and Digital Data Revenues FY1998- FY2006

STRATEGIC PLAN

This strategic plan has been developed to guide the Nova Scotia Topographic Database Program through its next five years of operations. The strategic plan is developed in a hierarchal structure as outline in Figure 3. The Program mission states why the Program exists. The Program goals state what must be achieved for the Program to be successful in achieving its mission. Program objectives are designed to allow the Program to achieve its goals and mission. Each objective supports one or more goal, with each goal supported by at least one objective. Program initiatives are planned actions to achieve Program objectives.

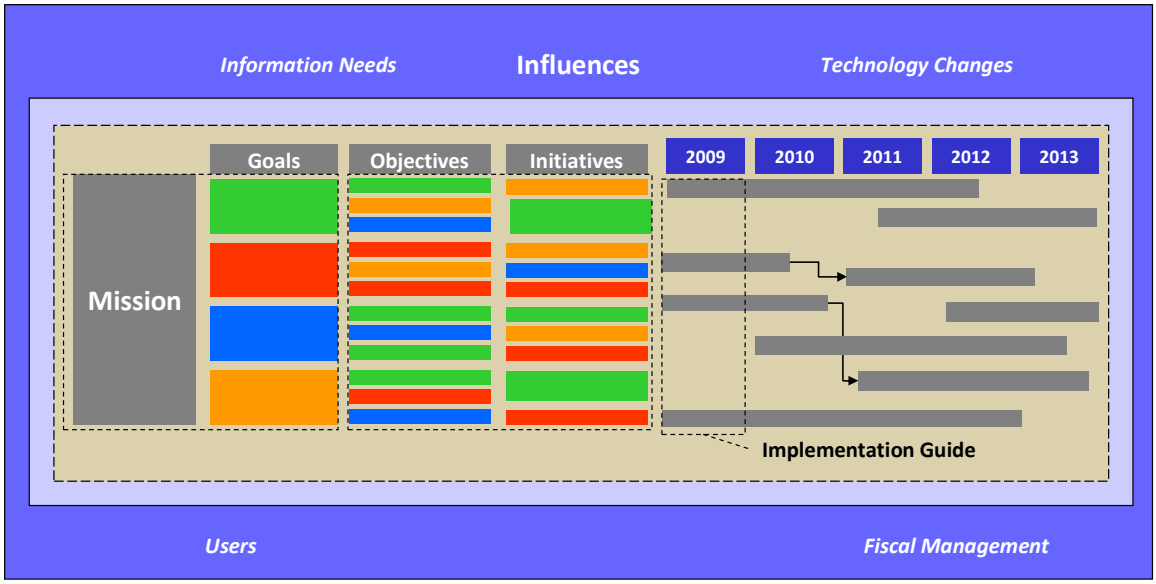


Figure 3 : Strategic Plan Structure

Mission

The mission of the NSTDB Program is to be the source of base GIS data for the Province of Nova Scotia. This mission has been in place since the inception of the NSTDB and its applicability was reinforced during every strategic planning workshop. NSTDB users agree that the Program should be the source of base data for GIS user mapping within

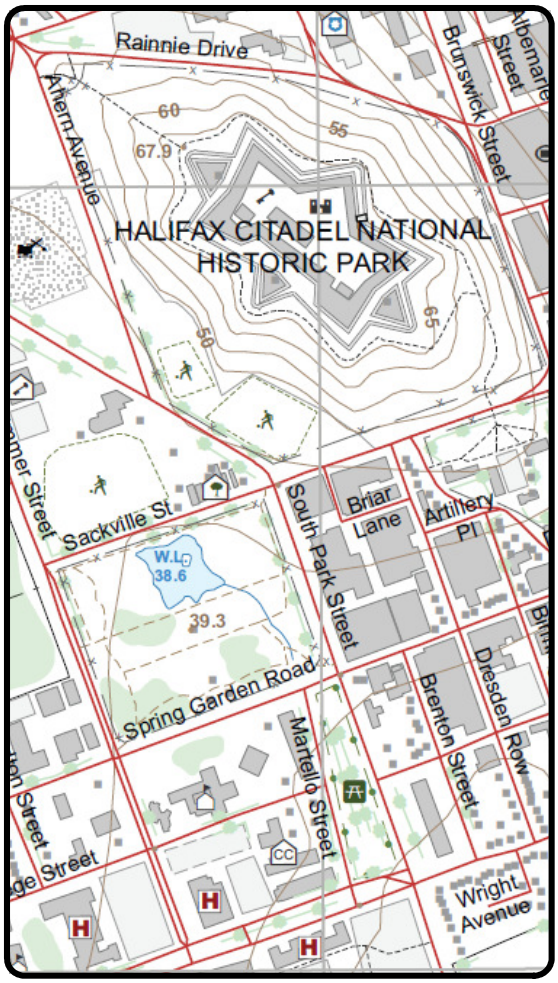
Nova Scotia. This mission allows NSTDB management to set direction and provides a framework for the formulation of strategic goals, objectives and initiatives.

Program Goals

The goals of the Nova Scotia Topographic Database are a set of guiding principles which allow the Program to fulfill its mission of being the source of GIS base data for the province. The goals set direction for the Program and should be taken into consideration when key decisions are made. Program goals come from one of two sources:

- Feedback from user and stakeholder workshops; or,
- Prior NSTDB documentation containing Program goals.

Some goals were not an NSTDB focus in the past, and have come to the forefront during user workshops as items which can help transform the NSTDB to a more client centric and responsive program. Others were previously stated goals or objectives which have been confirmed and reemphasized during workshops.



1. Support Clients' Business Needs

Description

In order to support clients' business needs it is critical to understand the Nova Scotia GIS user community. During strategic planning sessions it was confirmed that NSTDB products are being used in provincial and federal government departments and agencies, municipalities, academia, non-government organizations, private industry and by the general public. In order to support the topographic needs of these organizations, SNSMR must proactively address the currency, accuracy and features of the NSTDB to ensure they meet evolving client business needs. This requires ongoing dialogue with stakeholders to determine which portions of the Program should be emphasized in terms of maintenance, resources, partnerships, communications, and promotion.

Alignment with Mission

In order to use the NSTDB as their sole base of topographic data, users need the Program to meet their business needs. By ensuring that it develops and maintains relevant and valuable data, the Program will sustain its status as the preeminent topographic base map of Nova Scotia.

2. Ensure Efficient Use of Resources

Description

The majority of the human resources which manage and support the NSTDB are located within the Nova Scotia Geomatics Centre. The NSTDB is one of many programs supported by the NSGC and demand for resources is ever growing. As well, a significant portion of NSTDB budget is dedicated to hiring private firms to collect Program data. Thus, it is vital that all available resources are used efficiently to maximize their benefit to the Program. Efficient use of resources is a goal of any business or organization.

However, in specific context to the NSTDB, efficient use of resources emphasizes collecting data that provides the greatest value and assigning staff to projects and assignments which are of maximum benefit to NSTDB clients. Where necessary and possible, traditional workflow boundaries and responsibilities should be blurred to create a flexible working group, capable of multi-tasking and quickly shifting responsibilities. Efficient use must also be made of monetary resources allotted to the maintenance. Opportunities for leveraging new technologies, reconfiguring refresh cycles and partnering with other agencies for data capture will ensure that maximum utility is derived from budgeted resources.

Alignment with Mission

It is likely that the Program will continue to face tight resource constraints in the future. Thus, to ensure that the NSTDB remains the base topographic layer of the province, SNSMR must efficiently allocate resources to initiatives that stakeholders have identified as priorities. This customer focused view will ensure that GIS users in the province continue to use the NSTDB as their base layer.

3. Increase Program Awareness and Support

Description

As seen in the ***Use and Value of the NSTDB*** section, there are a wide variety of very important applications of NSTDB data. Business activities enabled by the data are vital to key decisions being made in all manners of organizations. However, many people using the NSTDB data in support of business functions are unaware of its origin. Concerns were raised by NSTDB users and Program staff that the Program's value is not understood and support of its operation will diminish. An opportunity exists to promote the NSTDB to the province, both within and especially beyond the geomatics community. Several forums and target audiences were suggested for this promotion including regional councilors and executive level Provincial government employees. At

one time, responsibility for promoting the NSTDB was with an NSGC operations manager. That position has since been reassigned, leaving questions to who should be responsible for NSTDB promotion. Regardless of this, it is critical that downstream users of NSTDB data be educated on the Program's value and importance.

Alignment with Mission

Promotion of the NSTDB will entrench its standing as the sole source of base GIS data in the province.

4. Increase Communications with Clients and Stakeholders

Description

During planning sessions, NSTDB users indicated that they were very satisfied with inbound communications to the NSGC regarding the NSTDB. It was emphasized that NSGC staff are very knowledgeable and accommodating when fielding inquiries regarding NSTDB products. However, it was also indicated that communication should be a two way process, with proactive communications being disseminated to NSTDB clients. Proactive communications keep NSTDB stakeholders informed of the most current direction, updates and products of the Program. The Nova Scotia Topographic Database is constantly evolving with a considerable amount of change to data sets and the business activities of many organizations require the most current data available. Proactively communicating such updates will ensure that users have timely access to updated map sheets. These positive customer relationship measures will prove useful when soliciting user feedback or developing new data partnerships.

Alignment with Mission

To help ensure the NSTDB achieves its mission, is to be the source of base GIS data for the province, the Program must inform clients of the data available, how to access information, the initiatives underway intended to improve Program products and

access, and market the availability of new data. Proactive communications will also enable feedback which can be used to create a more client centric NSTDB product, thus increasing uptake of the Program and use as the sole base layer.

5. Collect Data Once and Reuse

Description

Since its creation, a primary objective of the NSTDB has been to develop, maintain and disseminate the topographic foundation for the Province of Nova Scotia. Collecting and developing data that is used across government ensures the efficient use of provincial resources and allows departments to focus on thematic data primary to their operations. As seen in the jurisdictional reviews, an absence of this approach results in duplicated effort, inefficiencies for departments in creating base data, rather than their thematic data, and organizations working with incomplete, non-standard datasets. During strategic planning workshops, NSTDB clients discussed opportunities that exist to update the NSTDB using data collected at source by other agencies. Municipal units, private industry and provincial departments collect source data, some in a localized area and some province wide. By reusing this data the NSTDB can eliminate redundant data collection, create more flexibility for its resources and offer a more current product to customers.

Alignment with Mission

Development, maintenance and dissemination of the topographic foundation for the Province of Nova Scotia are fundamental to being the source of base GIS data for the province. Integrating data collected by other organizations will consolidate geospatial data from several sources and supports the Program's mission of being the sole source of base GIS data for the Province. Reusing data from other organizations will allow GIS users to access the NSTDB as a *one stop shop* source of topographic content.

6. Monitor and Anticipate Trends in Technology

Description

Like any sector which relies heavily on technology, the geomatics industry is constantly evolving and pushing the technological frontier forward. The NSTDB is at the forefront of GIS technology in Nova Scotia. In recent years the Program has evolved to better address client needs and has included soft copy photogrammetric capabilities and multiple data formats (.shp, .mif, .dxf, .gml), and is currently working towards providing a seamless database of the entire province. In order to remain current with client needs and its technological practices, the NSTSB must continue to monitor and anticipate changes in technology within the geomatics industry. While remaining vigilant of industry best practices, the Program must also ensure that changes made to its technology align with the capabilities of its clients. This means that resources responsible for monitoring trends in technology should do so by looking at the Geomatics industry on a broad scale and the provincial user base on a smaller scale.

Alignment with Mission

In order to be the sole source of base GIS data, the NSTDB must ensure that its technology aligns with industry best practices and customer GIS systems and evolving business practices. By providing multiple formats and leveraging the most recent data collection methods the Program will ensure it remains at the forefront of GIS technology in the province.

7. Ensure Viability and Sustainability of the Program

Description

A recurring message during strategic planning sessions was the importance placed on the NSTDB and the reliance that many organizations have on the data. Without NSTDB data, many organizations would not be able to undertake GIS related business activities because alternative sources of data do not exist and in house development of data is not financially feasible. As seen in other jurisdictions, in absence of a centralized source of topographic data, Departments and organizations attempt to gather base data through informal processes. This results in a large amount of effort attempting to create a foundation that may not meet the organizations needs, and individual groups creating silos of GIS data. Thus, it is vital to ensure the viability and sustainability of the Program moving forward. Doing this requires the fulfillment of other goals mentioned in this section, but the value of sustaining the Program is important enough in itself that it merits a separate goal. Ensuring viability requires delivering a product which is relevant in terms of currency, content and technology.

To confirm the appropriateness of this goal, industry research was completed focused on the use of a common GIS dataset with government environments. Gartner Inc. is a leading information technology research and advisory company. In an article titled *Hype Cycle for Government Transformation, 2009*, Gartner highlights technologies that they believe have the broadest and deepest ability to help public sector organizations achieve their transformation objectives. Within this article Gartner analysts rated Geographic Information Systems as having a *High* benefit, which is defined as "*Enables new ways of performing horizontal or vertical processes that will result in significantly increased revenue or cost savings for an enterprise*".

As part of their review, Gartner Analysts make several statements focused on GIS data that support the NSTDB Program structure, as a corporate resource for use as the base data for all Provincial GIS. In the GIS Business Impact section, the article states that "*Governments have realized that managing accurate data in hundreds of stand-alone*

legacy applications is an impossible task". Also, "*inconsistent data definitions and accuracy, poor maintenance, and dissimilar architectures*" are referenced as the common barriers to the successful use of GIS. The NSTDB limits these barriers in Nova Scotia, as it manages a large portion of the provincial GIS dataset using consistent data definitions and accuracy, and using standard maintenance processes in a common architecture. Gartner feels that the use of GIS in supporting government transformation is on the increase as the technology is two to five years from mainstream adoption.

Alignment with Mission

Sustaining the relevance of the NSTDB is tantamount to it remaining the sole source of GIS data in the province. If clients perceive the NSTDB as an unsustainable program they will begin to adjust their business activities to accommodate the use of other GIS data, preventing the NSTDB from being the sole source. Having a viable and stable program will foster trust in GIS users and sustain use of the NSTDB as the GIS base of the province.

Program Objectives

Program objectives form the next hierarchy of the strategic plan and serve as the primary recommendations stemming from this strategic planning initiative. The objectives are designed to allow the Program to achieve the goals and mission laid out in previous sections. Each objective supports one or more goal, with each goal supported by at least one objective. Objectives were developed using feedback from stakeholder workshops where concepts resembling strategic objectives commonly emerged.

1. Create data development and maintenance processes focused on clients' business needs.

Description

The NSTDB is composed of nine layers of topographic data, all developed to a uniform standard. These layers were decided upon in 1988 and first quoted in the Digital Base Mapping Policy for Nova Scotia[9]. The layers were selected based on an understanding of Nova Scotia topographic data needs and industry best practices of the time. During strategic planning workshops, clients indicated that many of the layers remain relevant and frequently used. However, there was consensus that the themes and standards of the NSTDB should be reevaluated in a new data development and maintenance process.

The goal of the NSTDB's data development and maintenance process should be to best support clients' business needs. While the data currently provided is fulfilling this goal, it is possible that some layers have grown or diminished in importance since their conceptualization in 1988. Opinions differ on what information is most valuable to clients. This creates a need for a more stringent determination of data needs through workshops or a committee of users. Input would also be needed from NSGC staff who

[9] Digital Base Mapping Policy for Nova Scotia, 1988

have the expertise to determine the effects changes in data maintenance and development will have on workload. In addition to looking at the value of individual themes and features, the initiative should also determine user requirements for accuracy and currency. It may come to light that standards could be relaxed for some data sets, freeing resources to focus on data sets which provide the most value. When gathering information from clients it is important to be cognizant that the primary client of the NSTDB is provincial government users.

As Department of Natural Resources orthophotos are collected for the province and shared with SNSMR the need for large scale orthophotos may be altered. In addition to the nine layers which compose the 1:10,000 dataset, an assessment of the value the large scale orthophoto program may be completed.

Another group which must be engaged during this process is data development partners. This will provide an opportunity to glean insight into emerging technology and processes in the development and capture of geospatial information. Being aware of these trends in technology could lead to future efficiencies and allow the NSTDB to produce products which best align with clients' business needs.

Benefit

Focusing efforts on features most vital to customers will improve efficiencies by maximizing the return on investment that the Program receives from its human and monetary resources. Developing a new data development and maintenance process may not lead to a reduction in Program workload. However, the benefits will be visible externally to customers who will see a more valuable and client centric product being produced, while resources at the NSGC remain constant.

Focusing on meeting client business needs will lead to increased appreciation and awareness of the Program. This may also lead to increased use of the Program's data in provincial GIS systems, supporting the Program's mission of being the sole source of base GIS data.

Finally, including stakeholders in the needs assessment will improve customer relations and allow stakeholders to feel a sense of ownership in the NSTDB. This is highly beneficial because it creates an environment where stakeholders are comfortable and forthright in communicating their ideas for improvement and offering positive feedback on the value provided by the NSTDB. In the future, these positive customer relationships will lead to further opportunities for collaboration, which will allow the NSTDB to seek input, build awareness and pursue partnerships among its users.

Goals Supported

- **Support Clients' Business Needs –** A new data development and maintenance process must be developed to support to this goal. The process must be developed to first support the needs of the Program's primary client, the Provincial Government. On a whole, the process will create a new set of priorities within the NSTDB outlining where resources should be focused within the Program to produce a product which maximizes the value provided to clients.
- **Ensure Efficient Use of Resources –** The development of a new data development and maintenance process will create internal efficiencies among staff who contribute to the NSTDB. This will be achieved through processes that allow staff to focus their efforts on components which are seen as providing more value to clients.
- **Proactively Communicate With Clients and Stakeholders –** Fulfilling this objective requires significant input from clients in the form of a needs assessment. This will also build upon existing customer relationships and lead to more user input in the future.
- **Monitor and Anticipate Trends in Technology –** Aligning with clients' changing technical environments, and ensuring efficient access to data, requires an understanding of the current and future state of GIS technology. As well, engaging private companies who specialize in data collection and development

will assist in educating NSTDB staff on emerging technologies these companies use that may provide value to NSTDB deliverables.

- **Ensure Viability and Sustainability of the Program -** In order to remain a sustainable program, the NSTDB must ensure that it aligns its maintenance priorities with those of the local geomatics community, particularly geomatics resources within the provincial government. By directly supporting the business activities of its clients, the Program will build awareness of its value to organizations and emphasize the need to sustain it long term.

Alignment with Pillars

Data Development

- Data will be developed with input from clients, guiding the selection of features, standards, and technology to best support business activities.

Data Maintenance

- The NSGC will receive valuable input into what features and areas of the province should be given priority during the maintenance cycle.

Data Dissemination

- Through customer consultations insight can be gleaned into the preferred data dissemination mechanisms, data formats and technology.

Data Use

- Data use will be enhanced with a product which supports the business needs of users.

Implementation Considerations

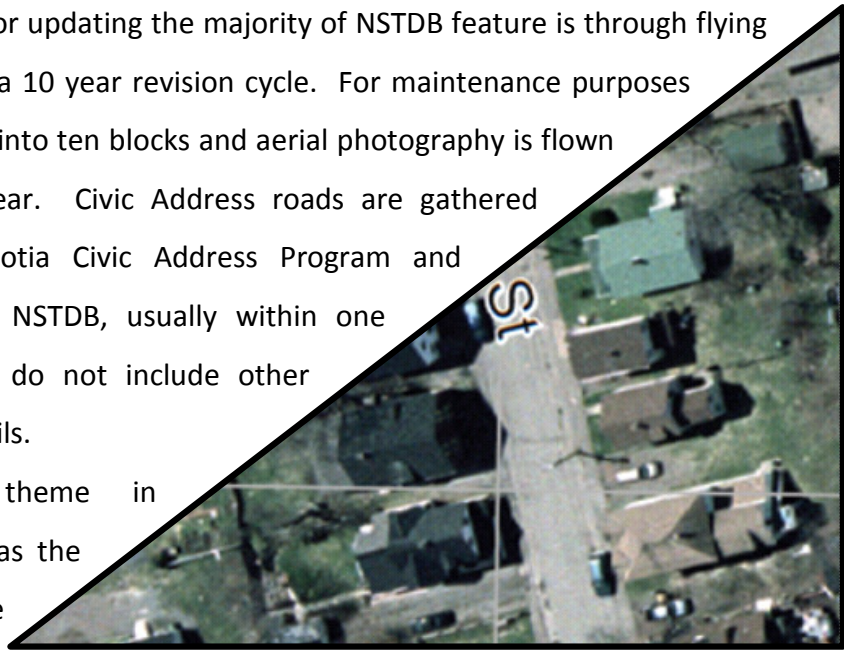
- The primary intended client of the NSTDB has and continues to be the Nova Scotia Provincial Government GIS users. Therefore, these clients should be identified and engaged early in the process. If deemed necessary, key clients outside of the provincial government can be identifying and engaged subsequently.
- During the client engagement, a detailed analysis of feature codes and standards is required. This could involve an exercise where lists of features are prioritized or scored for importance, required accuracy and required currency.

- Once results of this exercise have been compiled, a plan should be developed in conjunction with NSGC staff so as to develop a new data development and maintenance process.
    - New Brunswick uses a *Technical Advisory Committee* to determine data and technology priorities for provincial users. A similar committee could be used in Nova Scotia to validate user requirement results.
    - At this point in the process, private data developers should also be engaged to discuss possible approaches to data capture in light of the new customer priorities.
- It should be noted that this is not a one time exercise. Refreshes of data needs must be conducted at periodic intervals through user workshops or another feedback mechanism such as an online collaboration space. This will ensure that the NSTDB remains responsive and continually evolves with the needs of the provincial geomatics community.

2. Develop a data collection strategy based on change.

Description

Presently the process for updating the majority of NSTDB feature is through flying aerial photography on a 10 year revision cycle. For maintenance purposes the province is divided into ten blocks and aerial photography is flown for one block each year. Civic Address roads are gathered through the Nova Scotia Civic Address Program and incorporated into the NSTDB, usually within one year. These updates do not include other classes of roads and trails.



A constant theme in strategic workshops was the opportunity to be more

strategic in the way NSTDB maintenance takes place. The current ten year revision cycle may not be the most efficient use of annual maintenance funds if the need for current data is more critical in specific areas of the province. The NSTDB must be maintained and updated because of changes in the features it represents. The surface of Nova Scotia is constantly changing due to natural and human activity. With maintenance being required because of this change it is logical to focus updates on areas where the most change is occurring.

When developing a data collection strategy based on changes in topography, SNSMR must determine what mechanisms are available to measure changes in the Province's topography. Possible mechanisms include:

- Use of satellite and aerial photography for change detection;
- Building permits databases which notify of new suburbs, industrial parks, etc;
- Input from Departments with GIS capabilities such as Environment, Fisheries and Aquaculture, Natural Resources, and Transportation and Infrastructure Renewal; and,
- Input from private industry such as Nova Scotia Power, forestry companies, land survey companies, engineering and consulting companies.

Such a change in the NSTDB business strategy will be complex. Challenges will include how to determine priorities that benefit the majority of NSTDB clients without alienating portions of the customer base. There are risks that a change in data collection will result in certain clients will no longer benefiting from the Program, in direction opposition of the NSTDB's Mission. Development of this new strategy will not be completed before the next flying period in Spring 2010. Recognizing the NSTDB deferred the air photography portion of its 2009 activities, it is recommended that the 10 year revision cycle be reinstituted and continued until a new policy is developed, validated and implemented.

Benefit

- A data collection process based on change will lead to more efficient use of resources as it focuses the Program's efforts on activities which maximize the benefits to customers.
- Implementing a new maintenance policy will produce a tangible benefit for customers, improving the data required for decision making.
- Continuation of the ten year revision cycle until this new policy is implemented will show clients a strong commitment from the Provincial government to continue the provision of the NSTDB. This is important as clients see the maintenance of the NSTDB as a crucial component to its operations.

Goals Supported

- **Support Clients' Business Needs –** The opportunity to develop a data collection strategy based upon change was identified by NSTDB stakeholders as a method of better supporting their business needs using existing resources. While it is important that every part of the province is updated periodically (e.g. every 15 or 20 years), it was evident that users would be willing to accept a longer revision cycle in some areas if those experiencing more change were updated frequently. Areas identified as experiencing a faster rate of change were coastlines, areas of highway twinning, urban development and resource development such as mining.
- **Ensure Efficient Use of Resources –** Using an alternative approach to data collection will not increase the total area of the Province which can be updated in a given year. In fact, it is likely that a smaller total area will be updated because of the diseconomy of scale caused by collecting data in a patch quilt manner. However, the updates will provide a greater total benefit to clients because they will focus on areas with the greatest need for maintenance based on changes in topography.

Alignment with Pillars

Data Development

- Data development for those areas not flown since 2003 will continue under the 10 year refresh cycle.

Data Maintenance

- Maintenance will focus on areas deemed most important by clients based on changes in topography.

Data Dissemination

- Dissemination of areas experiencing the greatest changes in topography will increase as new updates are available more frequently.

Data Use

- Data use will increase as areas experiencing frequent topographic change are a high priority for NSTDB.

Implementation Considerations

- The ten year revision cycle should be resumed during the next and subsequent flying seasons until a new approach can be tested and put into production.
- Updating areas using changes to topography will lead to less efficient aerial capture of data if smaller areas are flown and maintained on each occasion. A complex trade off must be balanced between currency in critical areas and the efficiency of data capture.
- During strategic planning sessions, stakeholders from the academic community expressed interest in working with SNSMR to develop a new data collection framework. Academics could assist with research activities and help to identify similar approaches developed in other jurisdictions.
- It may be possible to provide supplementary updates for areas which experience a longer revision cycle due to a new policy (i.e. rural, wooded areas). This could be done using resources such as satellite photos to provide an indication of change in those areas and serve as a way to manage costs while ensuring that all areas of the province remain as current as possible.
- Any changes in data collection must ensure it does not limit the use and value of NSTDB data for portions of the client base.

3. Develop a framework to identify, evaluate, prioritize, and build potential data partnerships.

Description

The potential to leverage data partnerships was one of the most discussed opportunities during strategic planning workshops. Possible opportunities identified for data partnerships included:

- Wetland and land cover data from the Department of Natural Resources;
- Utilities from municipalities, Nova Scotia Power, renewable energy developers, and communication providers;
- Roads from Transportation and Infrastructure Renewal; and,
- LIDAR from Atlantic Geomatics Research Group. Development of topographic data using LIDAR technology is currently being discussed through a SNSMR hosted LIDAR working group. Feedback from this group could lead to the future development of LIDAR partnerships in the province.

It should be emphasized that data partnerships need not be limited to the sharing of processed digital data. Opportunities also exist to leverage partnerships in the data capture and collection stages. The Nova Scotia Department of Natural Resources captures color aerial photography on an annual basis. A pilot project has shown that these images can be used to maintain NSTDB 1:10,000 map sheets and also enable the creation of color orthophoto maps. Developing an aerial photography partnership with DNR or another organization would allow the NSTDB to maximize the amount of updates which can take place under its annual maintenance budget. In addition to data collection resource savings, the scale color aerial photography would significantly increase both horizontal and vertical accuracies, allowing for the creation of a more precise Digital Elevation Model, a frequently stated requirement from NSTDB stakeholders. Digital color orthophotos can be produced from this photography, which

may be more appealing to users than the black and white orthophotos presently available, but also at a higher development cost.

The concept of developing data partnerships is not new to the NSTDB. Previous strategy documents have recommended that the Program use partnerships to support the goal of collecting data once and reusing. Updating of NSTDB roads and buildings from municipal datasets are examples of successful partnerships. However, the data partnership process can be cumbersome and resource intensive. Past opportunities for data partnering have failed to reach fruition because of obstacles in negotiating partnerships and the resource requirements associated with standardizing data.

This objective is unique from previous recommendations in that it suggests the development and use of a data partnership framework as opposed to the more general objective of simply developing available partnerships. This framework will allow SNSMR to approach potential partnerships with a standardized process that promotes structure and efficiency.

Before building the contents of the framework, two decisions must be made regarding third party data. Firstly, SNSMR must clearly identify what it is willing to accept from potential partners in terms of data accuracy and coverage. Secondly, the Program must identify what level of resources can be committed to the development, implementation and ongoing support of partnerships. This will determine how many partnerships (if any) can be pursued concurrently. These two qualifiers will filter the preliminary set of possible data partners and identify those which should move forward to a more detailed evaluation using the framework.

The framework should serve to provide a level of objectivity when evaluating potential data partnerships. Potential items for the framework include:

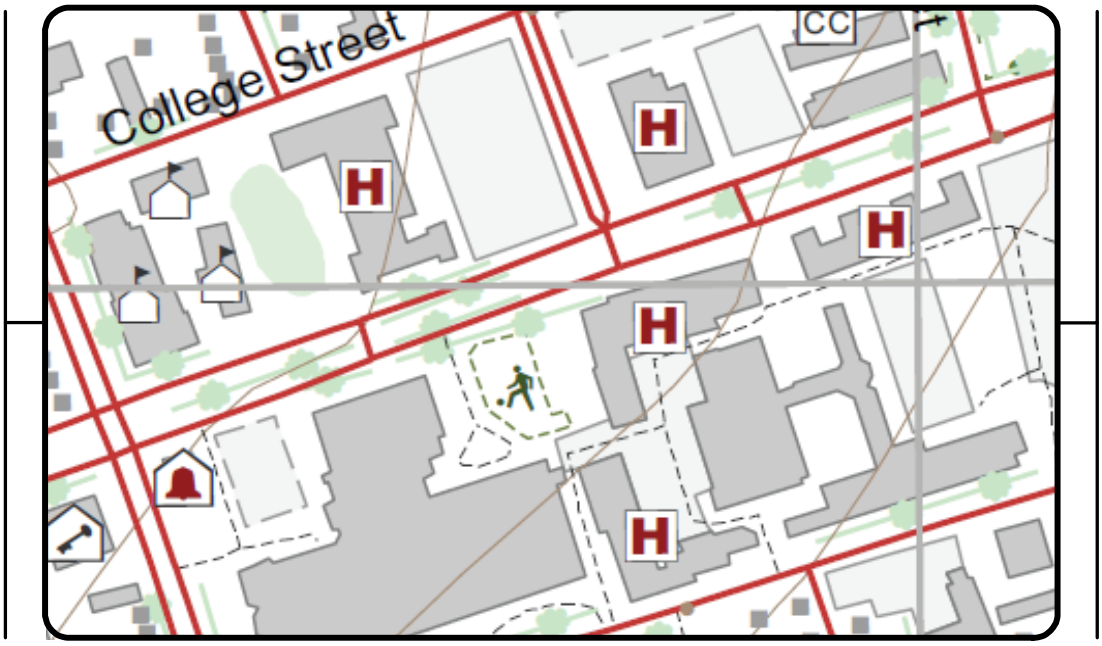
- The value of data available from a partner to NSTDB clients;
- Ease of integration with NSTDB standards;
- Likelihood of success in negotiating partnership;
- The dataset's alignment with priorities for data collection based on change; and,
- Costs and cost sharing agreements.

With the framework in place, SNSMR will be able to evaluate and prioritize potential partnerships in order to pursue them in a sequence that optimally benefits the NSTDB and its clients. This will also reduce the number of meetings required to investigate partnerships, creating a better use of resources.

Benefit

The use of a standardized framework will allow SNSMR to evaluate and prioritize partnership in an objective manner. This will give an improved understanding of what partnerships are possible to pursue from a data, cost and resource view point, allowing the Program to focus on potential partnerships in an order that is most beneficial to operations and clients.

Data partnerships in and of themselves offer a multitude of benefits to the NSTDB. Using data collected at source and updated between revision cycles creates a more current product. Partnerships can reduce SNSMR maintenance costs due to cost sharing agreements with the data collection organization. Sharing data also serves to consolidate the storage locations of data, minimizing the need for GIS users to acquire information from multiple sources. Data partnerships will not replace the need to maintain certain layers within the NSGC.



With the exception of wetland data, collected by the Department of Natural Resources, examples of potential partnerships provided in stakeholder workshops focused on regional or supplementary information, such as wind farm data to enhance the utilities layer. Data acquired through partnerships will provide supplementary information which improves or expands upon current layers.

Goals Supported

- **Support Clients' Business Needs –** The primary purpose in pursing data partnerships to supplement the NSTDB dataset is the provision of data that assists in supporting clients' business objectives. A starting point in the decision to develop a data partnership, and determining if the effort to develop the partnership and integrate data from a third party source is warranted, will be the value the data provides to clients.
- **Ensure Efficient use of Resources –** Using a standardized framework will ensure that minimal effort is expended upon pursuing partnerships which will likely not reach fruition. The development of accuracy, coverage and resource intensity qualifiers will filter partnerships which are less opportunistic. Having a structure in place to evaluate and pursue partnerships will streamline their development and promote more efficient use of staff time.
- **Collect Data Once and Reuse –** This objective is a primary support for the goal of collecting data once and reusing. Throughout the province, various organizations are collecting valuable source data for integration into their geographic information systems. It is highly logical and opportunistic for the NSTDB to reuse this data in its operations to ensure that the entire geomatics community can share in the benefits derived from data collected outside of the NSTDB.
- **Ensure Viability and Sustainability of the Program –** Consolidating partner developed data layers into the NSTDB will ensure that the Program sustains its status of being the sole source of base GIS data in the province. Adding useful

supplementary data to the database will assist NSTDB products in remaining relevant and viable.

Alignment with Pillars

Data Development

- Opportunities exist to partner with other organizations in the data development phase (i.e. DNR aerial photography).

Data Maintenance

- Use of a partnership framework will indicate what data can be integrated without significantly increasing the resources required for data maintenance.

Data Dissemination

- Centralizing data sources in the NSTDB will make it a one stop shop for users of geospatial data, eliminating the need to access multiple sources.

Data Use

- Adding supplementary data to the NSTDB will allow users to fulfill a wider spectrum of business activities using the data.

Implementation Considerations

- The partnership framework should be used to identify what data is available through potential partners, followed by prioritizing those partnerships based on the value of the data, effort to develop a partnership, complexity to integrate data, and other factors. Identification of which data is most valuable in order to pursue partnerships for that specific information cannot be the lone goal of a partnership framework.
- Opportunities exist to build on experiences from past partnership endeavors which produced successful results and to glean lessons learned from those which have failed.
- The integration of partner data into the NSTDB can require considerable human resources in order to develop the partnerships and for the data to meet NSTDB standards. Ongoing resources may be required for integration (as opposed to one time resources), and the effort to maintain a partnership must be considered when determining its potential as part of Program operations.

4. Develop a proactive communications strategy

Description

A constant theme during strategic workshops was an opportunity to improve communications channels and processes with stakeholders by developing a communications strategy which promotes proactive communication from the NSTDB. The communications strategy will focus on increasing awareness of Program products and data within the NSTDB client base and promotion of the Program to senior management in organizations that benefit from the NSTDB.

Feedback received at workshops indicated that clients are very satisfied with inbound communication channels and that staff at the NSGC are always knowledgeable and informative. However, many clients indicated a lack of understand of the products and data provided by the NSTDB and difficulty in determining who to contact at the NSGC for a specific subject. A component of the proactive communication strategy should include improved advertisement of inbound communication options, such as who to contact for data related questions, who to contact to provide feedback, etc.

A focus of the strategy should be a mechanism for disseminating information regarding products, data updates, new products, methods of accessing data, and any changes in policy or direction regarding the Program. Clients also expressed interest in providing feedback to SNSMR if a feedback process was in place. Several possible mechanisms for proactive communications and soliciting feedback were identified, including:

- Building on the NSTDB online presence. DataLocator was seen as a positive Program initiative, with statistics provided by Program staff indicating that between 7,000 and 8,000, of the 1,500 sheets that make up the 1:10,000 dataset, are downloaded each month through the application. Clients suggested increasing promotion of the application and enhancements to improve ease of access and clarification of the data being provided;

- Developing a periodic newsletter available by e-mail subscription or through the GeoNOVA Portal;
- Developing an RSS feed for announcements;
- Building an email subscription list for mass email updates;
- NSTDB forums hosted by SNSMR; and,
- An online forum or collaboration space.

It should be noted that in parallel to this strategic planning initiative, GeoNOVA is in the process of analyzing the use of an online collaboration space. The project is currently in the software selection phase. If the chosen program is implemented it may provide an ideal platform to deliver portions of the Program promotion strategy. In particular, the collaboration space would have the functionality to solicit feedback from NSTDB users on relevant topics.

As a component of the proactive communications strategy the NSTBD should supply clients with the 1:10,000 series ArcGIS style set. Many users expressed the need for a standardized style set when dealing with the 1:10,000 series and agreed that the NSGC

should be the source of the standard. Availability of this file should be accompanied by a communication update detailing how customers can access it.

The NSTDB is a powerful collection of data. Users around the province are leveraging this data to develop deliverables and conduct analysis that is used by decision makers at all levels within organizations. Furthermore, users of the data have integrated it into their business activities to the extent that those activities are now dependent on NSTDB data. There is general awareness of the importance and potential applications of the NSTDB among the user community. However, an opportunity exists to market and promote the NSTDB to non-users of data who knowingly or unknowingly receive deliverables and analysis created using the NSTDB.

An important target audience is executive level decision makers (Executive Directors, Deputy Ministers, Regional Councilors, etc.). These people should be educated on the value that the NSTDB provides to their organizations and the potential for further use. This is particularly important within the Provincial Government where increased awareness of the NSTDB may lead to support of sustained funding for the Program and for future partnership development.

Several potential opportunities for promotion and awareness where identified during strategic planning sessions, including:

- The creation of a Deputy Ministers Council, an initiative used in New Brunswick. GeoNB is recommitting itself to a provincial GIS program including topographic data. Support within the New Brunswick Government is high because of Deputy Minister support generated at council meetings;
- Promotion at municipal forums such as the Union of Nova Scotia Municipalities and the Association of Municipal Administrators, Nova Scotia; and,
- Invitations to government decision makers to geomatics events where NSTDB is promoted, such as Geomatics Atlantic.

Benefit

A primary benefit of a proactive communications strategy is improved dialogue with clients, ultimately leading to strengthened customer relations and higher customer satisfaction. The ability to continuously receive feedback from clients will provide SNSMR with valuable information when key decisions regarding the NSTDB need to be made. Knowing the priorities and preferences of customers will allow management to allocate resources in a manner that optimizes the viability of the Program.

Notification of new product availability and updates to current products will lead to more widespread use of these items. This will also raise awareness of the continuous work done by the Nova Scotia Geomatics Centre to improve the accuracy, completeness and currency of NSTDB products. Proactive notifications will also provide users with increased efficiencies in their business operations. Many users indicated that they download a map sheet each time they produce a new deliverable to ensure that the data in their GIS system is the most current available. With the provision of proactive notifications, these clients will be assured that the data they are using is the most current, until they receive a notice, eliminating the need to download for each deliverable.

Marketing and promotion of the Program will create increased awareness of the Program among current users, potential new users, and downstream beneficiaries of NSTDB data. Participants at municipal forums felt that promoting the NSTDB to regional councilors could lead to the creation or expansion of geomatics programs within municipal units. Education to executive level provincial employees could lead to increased use of geomatics and the NSTDB in departments with limited GIS resources such as Education and Health. The promotion of the NSTDB will lead to increased support for the continuity of NSTDB funding. This support is most critical from executive within the Provincial Government.

Goals Supported

- **Support Clients' Business Needs –** Proactive client communications will ensure clients are aware and have access to all NSTDB products and make full use of the NSTDB resources available. Providing clients the ability to offer feedback will allow the Program to determine the value provided to clients and how the NSTDB can betters support clients' needs.
- **Ensure efficient use of Resources** – Although the initial investment in developing a proactive communications strategy can be significant, the long term benefits can include reduced client inquiries and streamlined data access that does not require staff support. The reduced demands on staff time can provide additional resources for other NSTDB activities.
- **Increase Program Awareness and Support –** The use of proactive communications raises awareness of the NSTDB by constantly reminding users of the work being done at the NSGC to refresh and improve the Program. By promoting the utility of the data, exhibiting current business applications, and outlining potential future uses, those who do not directly deal with the data will be introduced to its value and importance.
- **Proactively Communicate with Clients and Stakeholders –** This objective is a direct corollary of the goal to proactively communicate with clients and stakeholders. The goal is an ongoing directive for the Program, while the objective is the definable activity of creating a strategy to support the goal.
- **Monitor and Anticipate Trends in Technology –** A user feedback mechanism, such as the proposed online collaboration space, offers an ideal avenue to monitor the technology being used by NSTDB clients. The forum could likewise be used to introduce clients to any emerging technologies to gauge interest and suitability.
- **Ensure Viability and Sustainability of the Program –** Promotion of the NSTDB will build recognition of its importance among executive level Provincial employees. This will in turn lead to pressure to sustain the Program's funding.

Alignment with Pillars

Data Development

- User feedback can be used to determine changes in the specifications and data developed and possibly the use of new technologies.

Data Maintenance

- Users receive immediate notification when data is revised and no longer have to search metadata or download map sheets multiple times. Support built to sustain funding for data maintenance.

Data Dissemination

- More immediate and frequent uptake of recently revised data will take place if notifications are implemented.

Data Use

- Potential uses of NSTDB data can be shared among users through collaboration space. Increase awareness among provincial and municipal units.

Implementation Considerations

- The intent of a proactive communication effort is to provide information that customers want, in a timely manner. Communication of relevant and timely material will ensure that customers do not lose interest in incoming communications. Thus, it is key that customer expectations and requirements for proactive communications are clearly defined during the development of the strategy. Resources responsible for the strategy can use ongoing feedback to monitor customer preferences for communications and refine the strategy.
- When developing the strategy consideration must be given to the amount of effort which can be dedicated to the ongoing delivery of proactive communications. Sufficient planning must be done to determine who is responsible for creating, reviewing and approving communications. Resources may also be required to manage potential e-mail subscriptions lists, update web site content and moderate online collaboration space forums.
- Communications must feature consistent messaging and terminology. Many users expressed a level of confusion due to varying naming conventions used for NSTDB products and data. Many clients were unaware that the NSTDB is more

than the 1:10,000 dataset and that the Nova Scotia Road Network and Nova Scotia Hydrographic Network are layers within the NSTDB. Communications should be used to clarify these items. Another source of confusion is the relationship between the NSTDB and NSCAF. Communications formally defining the intentions, boundaries and relationships of the two programs would assist users in differentiating between the two programs.

- Preliminary work in developing the strategy should include investigation into the communications practices of other jurisdictions. Some providers of GIS data utilize RSS feeds which users can subscribe to in order to receive notifications of updates. Others deliver their entire program through a central website such as AltaLIS in Alberta.
- NSTDB promotion was once the responsibility of a business manager within the NSGC. The organization has since been restructured, leaving some question as to who is now responsible for Program promotion. When developing the strategy, consideration must be given to the amount of effort which can be dedicated to ongoing promotion and the development of promotional materials. It must be determined whether internal resources at the NSGC can accomplish these functions or if some responsibility can be shared elsewhere.
- The Program can use mechanisms from the proactive communications strategy to request deliverable examples from NSTDB users for use in promotional case studies. These case studies can demonstrate practical applications of NSTDB data that non-users may not be aware of. This promotional material can be made available over the internet and displayed or distributed at promotional events.

The complete NSTDB strategic plan is represented in Figure 4, outlining the Program mission, why the NSTDB Program exists, the goals that must be achieved for the Program to be successful in achieving its mission, and the objectives to allow the Program to achieve its goals and mission.

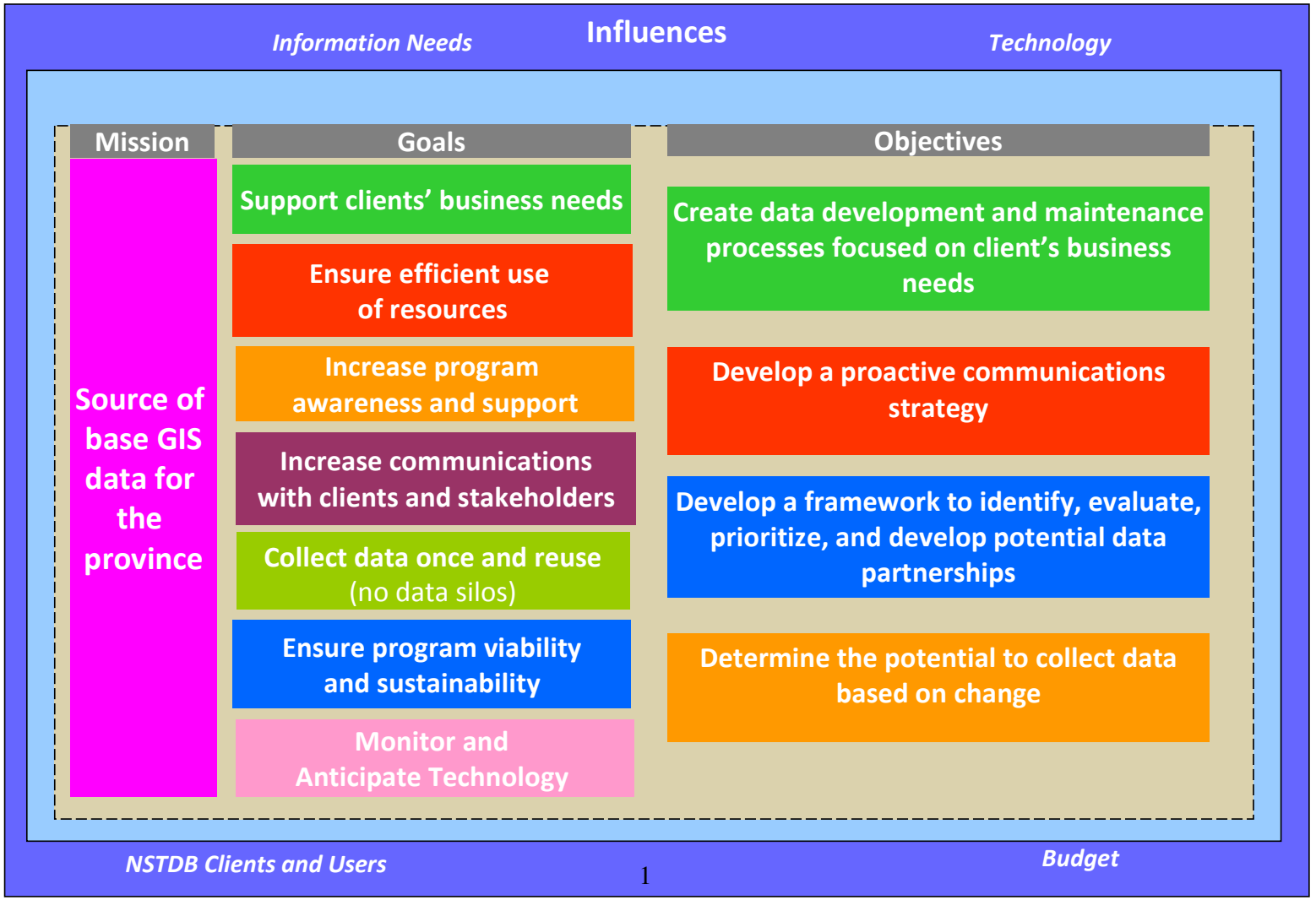


Figure 4 : NSTDB Strategic Plan

IMPLEMENTATION APPROACH

Based upon the strategic plan objectives, a high level implementation approach has been developed to assist Service Nova Scotia and Municipal Relations in moving the strategy forward over the next five years. The approach describes the major activities required to implement the NSTDB strategy. Figure 5 outlines implementation activities. The first phase, Develop Program Definition Document, must occur prior to subsequent activities. Remaining phases can occur as represented, or multiple phases can take place concurrently, depending on Program priorities and the resources dedicated to implementation activities. Implementation activities may be completed through the use of internal resources, such as SNSMR Project Management staff focused on NSGC activities. The resources dedicated to a project stage and the scope of each stage, defined in detailed project planning, will determine the effort and duration of each project stage. In planning implementation of the NSTDB strategy consideration must be given to current NSTDB initiatives within the Geomatics Centre, including the transition to a seamless database and the move from CARIS to ESRI.

ID	Task Name	Start	Finish	Duration
1	Program Definition Document	4/2/2010	7/1/2010	65d
2	Create data development and maintenance processes focused on clients' needs	7/1/2010	3/27/2015	1237d
3	Plan	7/1/2010	9/1/2010	45d
4	Consult Stakeholders	9/1/2010	7/1/2011	218d
5	Implement Changes	3/28/2011	3/27/2015	1045d
6	Develop a Proactive Communications plan	9/1/2010	3/20/2015	1188d
7	Plan and Client Consultations	9/1/2010	2/1/2011	110d
8	Develop Communications	2/1/2011	2/1/2012	262d
9	Ongoing Improvements	2/1/2012	3/20/2015	818d
10	Partnership Framework	1/23/2012	3/17/2015	822d
11	Plan and Develop	1/23/2012	6/22/2012	110d
12	Decision to Pursue Partnerships	6/27/2012	6/27/2012	0d
13	Implement	7/18/2012	3/17/2015	695d
14	Feasibility of collecting data based on change	6/27/2012	8/6/2015	812d
15	Determine Feasibility	6/27/2012	11/27/2012	110d
16	Decision to Change Date Collection	12/7/2012	12/7/2012	0d
17	Implement	12/7/2012	8/6/2015	695d

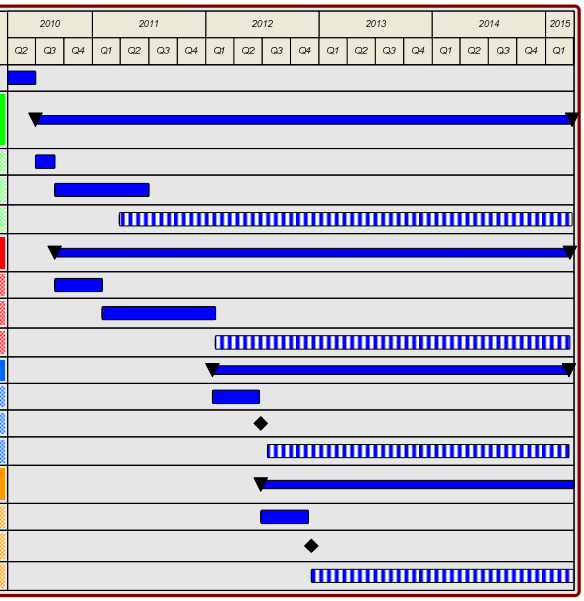


Figure 5 : High Level Implementation Approach

Several factors are required for successful implementation of the strategic plan. These include:

- SNSMR executive level support of the NSTDB program and the activities required to implement the strategic plan;
- Identification of SNSMR resources responsible for implementation activities;
- Commitment of resources and their time to perform implementation activities
- On initiation of each project phase completion of detailed project planning; and,
- Open communications between all SNSMR resources involved in the NSTDB program to address questions and concerns that will arise during the course of strategy related changes, particularly elements of the program definition document.

Phase 1: Create Program Definition Document

The creation of a NSTDB Definition Document will serve as the foundation to execute the NSTDB Strategic Plan. This activity will confirm a common understanding of the Program among employees responsible for its development, delivery and management. The Document can be developed through workshops with all internal stakeholders participating.

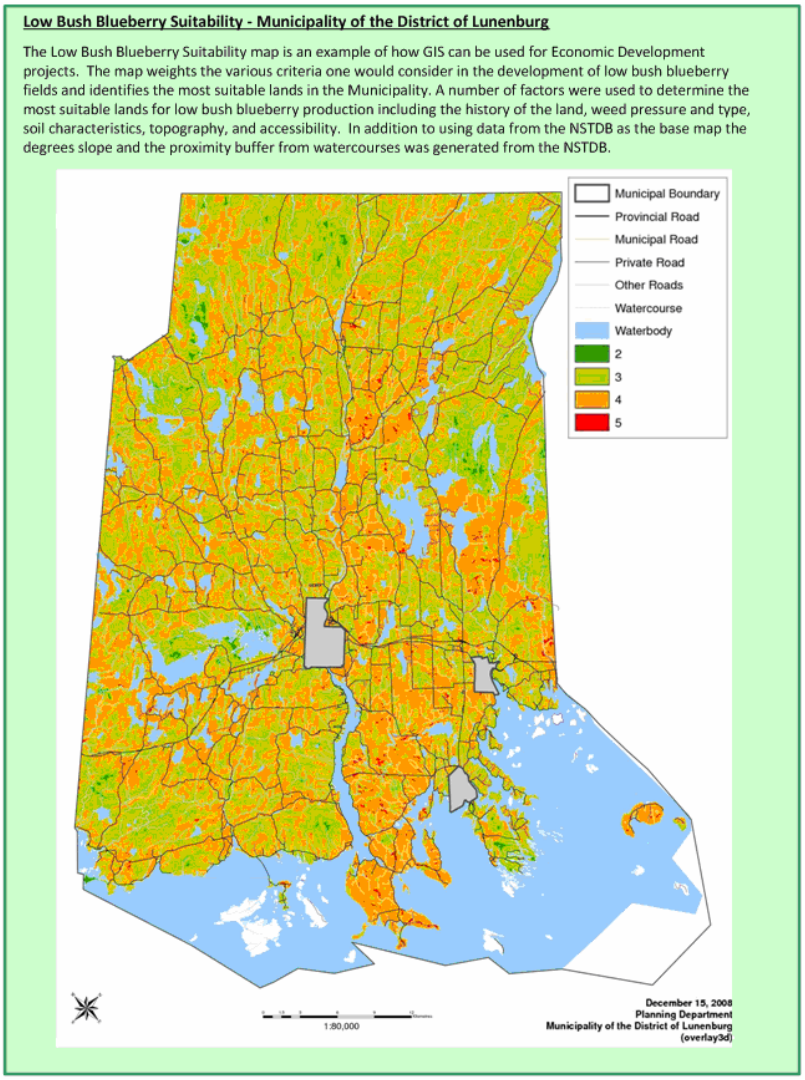
The Document will contain elements which explicitly define the purpose and limitations of the NSTDB. Firstly, participants will develop a common definition of the NSTDB's scope. This is closely related to a definition of the Program's primary clients. To date, the primary intended client has been the Provincial Government. However, staff must reflect on whether additional users should also be viewed as the primary clientele (i.e. should municipalities or private industry be considered primary clients due to their growing use of and reliance on NSTDB data). The Document must also outline how responsive the Program will be to future changes in client needs. If the NSTDB looks to move towards a more client centric model it must reflect these intentions in the Program Document.

In Document workshops, participants can be given the opportunity to discuss elements of the Program strategy, identify possible dependencies between implementation activities, provide input to assist in detailed planning, and develop consensus on the relative priority of strategy activities. Once completed, the Document will be a valuable tool in daily operations and decision making. The Program can use the Document as a set of guiding principles to ensure that operations, projects and management decisions align with its defined priorities. SNSMR Senior Executive and Program staff can use the Document to communicate with Provincial Departments and other NSTDB stakeholders the purpose of the Program and its focus in working to support clients' business needs.

Resources responsible for development of the Program Document must possess facilitation and consensus building skills, as well as an understanding of the elements to be included within a Program Document which will be used as guiding principles for the NSTDB operation. Development of the Document will require several days for workshop preparation, one to two days to conduct workshops, and several days to document results and present findings to NSTDB internal stakeholders and SNSMR Executive. The Program Definition Document Phase can be completed in a two to three month period.

Phase 2: Create data development and maintenance processes focused on client's needs

Throughout stakeholder consultations and internal staff sessions, examples were raised of NSTDB themes and attributes that provide great benefit to users, data elements that are not a focus for clients and, if refined, NSTDB components that could be of greater value to a large portion of the NSTDB user base. Discussion within the consultations included no longer collecting and developing data that does not provide value and using the resources made available to develop information that will assist clients. A frequent example of an opportunity for improved data was refinement of the DEM to assist in analyzing land elevation and water flow.



Client engagement will be fundamental to determine themes and data elements that are not in use, additional features that if collected will add benefit, and features that require refinement to add value. Once this analysis is complete, gaps between the current NSTDB features and standards and client priorities should be determined and a plan developed to bridge these gaps. Both the

1:10,000 foundation and other NSTDB products should be included in this analysis. Pursuing partnerships identified through the partnership framework developed in Phase 4 may assist in bridging any identified gaps.

Resources responsible to develop a data development and maintenance process focused on client's needs must have a detailed understanding of NSTDB data structure and data uses. Depending on Program priorities and availability of the resources, the consultation for this Phase may also include information gathering related to Phase 5: *Determine the feasibility of collecting data based on change*, as there will be overlap in stakeholder engagement, and data development and maintenance processes will influence data collection.

Phase 3: Develop a proactive communications strategy

The client communications portion of the strategy will be developed using client input regarding customer's preferences for updated content, format and frequency, and mechanisms for feedback. The communications plan will outline these items and assign a resource(s) for the responsibility of developing and disseminating communications on a go forward basis.

It is expected that a primary component of the communications plan will be development of an increased NSTDB web presence as this was clearly identified as a priority by stakeholders during the strategic planning workshops. In particular, users would like to see a frequently asked questions (FAQ) section with information such as where specific data is available, the status of the conversion from CARIS to Arc, the status of the conversion from map sheets to seamless, and how and who to contact for specific NSTDB inquiries. It would be beneficial to have the FAQ link returned when a Google search for NSTDB or a related search is made. In addition to the FAQ, a catalogue or reference guide outlining the specific data available on DataLocator and its location would assist clients who are unfamiliar with the complete suite of NSTDB products. When ready, expanding DataLocator to provide access to a seamless dataset, rather than requiring users to download individual data sheets, will enhance clients'

access to data. Web services were frequently raised as examples of how NSTDB can improve client data use. Improving the NSTDB web presence will align with a goal stated in the SNSMR 2009-2010 Business Plan: *"In 2009–2010, SNSMR will maintain and improve the ability of government, business, and the public to access geographic information and services online. Improvements will be made to the way that online access is provided and to the types and amount of geographic information that is available. This will enhance decision-making throughout government and the business sector and provide the public with improved access to the government's geographic information."*

NSTDB stakeholders also stated concerns that senior executives are not aware of the NSTDB and the value it provides. As well, jurisdictional reviews have demonstrated the benefits of executive understanding and support for topographic programs in other Canadian provinces. The first step in developing the Program promotion portion of the plan is determining who within SNSMR is responsible for promoting the NTSTB. This resource must then identify potential avenues for promotion. Two key target audiences identified during planning sessions were provincial government executive level employees and municipal councilors. The promotion plan must outline the resources creating, reviewing and disseminating promotional materials. If possible the NSTDB should leverage marketing and communications resources within the provincial government such as Communications Nova Scotia.

When developing the communication plan, consideration should be given to refining the role of an online collaboration tool. A tool will provide an efficient and effective mechanism for disseminating NSTDB updates if uptake is high among stakeholders. The tool also provides an opportunity to solicit feedback from clients on an ongoing basis.

Resources responsible for Program communications must have written communication skills, access to web resources, and the ability to assess and act on communication requirements. Skills and resourcing effort is dependent on the structure of Program communications. Development of an expanded NSTDB website and

required content will involve significant effort over an initial period. Once proactive communications processes are established, the effort to monitor, update and administer Program communications will decrease and become an operational function.

Phase 4: Develop a partnership framework

In developing the partnership framework NSTDB staff and management must come to agreement on what data is acceptable in terms of standards and coverage. Direction from stakeholders on the value of potential partnership data, their flexibility in accepting non-standardized data, and the level of documentation required will assist in the development of the framework. If a standing committee of stakeholders is created they may be able to develop these qualifiers in conjunction with NSGC staff. Development and operation of partnerships requires significant resource commitments for both business and technical staff. Determining the SNSMR resources that can be committed to data partnerships will be a primary element in the creation of the framework. Other criteria useful in determining if a partnership can succeed are an organization's willingness to share data, potential challenges in determining the ownership of information and costs to purchase data. The framework may also include a standardized implementation guide based upon past partnership experience. Once the framework has been approved the Program can proceed by creating an inventory of possible partnerships, evaluating and prioritizing them using the framework and pursuing them in order as resources permit.

Resources responsible for development of a partnership framework must have experience in the creation of data sharing agreements. Possessing strong negotiation skills, and an understanding of the NSTDB technical environment and its data model will assist in both the development of the framework and the creation of data partnerships. Development of the framework will require significant effort over an initial period and include engagement of both clients and staff. Once made operational application of the framework, and development of each partnership, will require focused effort from business and technical staff.

On completion of the framework a decision will be made as to whether partnerships benefit the NSTDB Program. If partnerships are advantageous to the Program and will provide valuable data to clients, the Program will be in a position to pursue partners based on priority, and with a clear understanding of the factors key to their successful development and maintenance. If the framework determines partnerships are not advantageous to the NSTDB the Program will have a clear position that partnerships are not to be pursued.

Phase 5: Determine the feasibility of collecting data based on change

Rather than continue a ten year provincial flying program, development of a data collection method based on topography changes is an opportunity to improve efficiency of resources in meeting clients' needs. As previously stated, the benefits in efficient use of resources and providing data that better supports client's business needs must be weighted against the challenges in both implementing a collection process based on change and the risk of NSTDB losing its value for certain customers.

Moving to a priority based collection process is complex. The ability to successfully determine priorities for the broad base of NSTDB users, ensuring that alterations in collection are cost efficient, and understanding the negative impacts of any changes must all be determined prior to making any change in NSTDB data gathering. The feasibility exercise will include determining if a NSTDB Land Cover Change Detection (LCCD) process can be created. In terms of the NSTDB, LCCD can be defined as the process of identifying differences in the state of topography from when the NSTDB was last updated. The following are five aspects of change detection:

1. Detecting that a change has occurred
2. Identifying the nature of the change
3. Identifying the area extent of the change
4. Determining how best to capture the change
5. Determine when the change needs to be captured based on a pre-determined priority status

Additional elements which must be taken into consideration include the age of data in certain areas, minimum flying areas, budgetary constraints and can a feature be captured at source through data partnerships. Investigation should also outline the tools or information sources available to measure changes in topography. Examples of such tools include input from provincial, municipal and private organizations and satellite imagery.

Determining the collection method that provides the greatest benefit to clients, and engaging possible contributors to the change detection process, will require significant consultation with program stakeholders. A working group should be considered. The group may feature a diverse group of stakeholders, private data developers and NSGC staff to ensure that the new policy is objective and transparent.

Resources responsible for the feasibility study must understand topographic changes in Nova Scotia, facilitate working groups on data collection priorities, assess the benefits, costs and limitations of altering data collection patterns, and develop data collection plans based on user input and operational realities.

It is expected that the majority of NSTDB features will continue to be collected by means of an aerial photography program. As stated in the fourth Phase, *Develop a framework to identify, evaluate, prioritize, and build potential data partnership*, an opportunity exists to partner with Nova Scotia Natural Resources in the data capture and collection process for their color aerial photography. If this opportunity materializes the cost savings and provincial efficiencies in data capture will greatly influence the process of NSTDB data capture.

On completion of the feasibility study a decision will be made as to whether the ten year collection cycle or a collection process based on change is most beneficial.

Feedback gathered through stakeholder consultations indicated that there is a strong belief that the ten year revision cycle should be reinstated and maintained until a new data collection strategy is implemented. This both ensures maintenance of data currency and demonstrates a commitment to the NSTDB Program.

CONCLUSION

Stakeholder consultations confirmed that the NSTDB provides a high degree of value to its clients and is used by a wide variety of geomatics practitioners. This provision of value coupled with extensive use is allowing the Program to fulfill its mission of being the base layer of GIS in Nova Scotia. Clients from all levels of government, academia and the private sector echoed this sentiment and emphasized the importance of the Program to Nova Scotians.

Staff from the NSGC responsible for developing, maintaining, managing, and delivering the Program take great pride in the high quality product they create and the value which it provides to Nova Scotian organizations. The Program's achievements to date, along with the continuous drive to meet client expectations, have built a solid base for the future of the NSTDB.

As the use of topographic and geospatial data grows, users have become more sophisticated in their GIS operations, creating heightened expectations of what the NSTDB can accomplish. The Program is in a position to meet these expectations and can begin the process by moving forward with objectives outlined in this strategic plan.

Depending on resource availability and the NSTDB's place within the larger SNSMR strategy, this strategic plan can be implemented in a number of ways. Regardless of the how objectives are pursued, a logical first step is the development of a Program Definition Document which will confirm the widely accepted definition of what the NSTDB is and what it aims to accomplish. With the Document in place, the Program can chose to initiate multiple objectives in parallel or focus individually on those which it deems most important. Regardless of objective chosen, engaging the stakeholder community will be key to determining their requirements and needs for the future use of topographic data in Nova Scotia.

ACKNOWLEDGEMENTS

The project team has requested and received broad support and input from a variety of key stakeholders. Within Service Nova Scotia and Municipal Relations we would like to acknowledge the assistance and support of the Project Sponsor Ed Light, Nova Scotia Geomatics Centre Management and Staff, Danny Gray Director of Geographic Information Services, Rob Doiron Executive Director of Information Management Services, and members of the GeoNOVA Secretariat.

We would like to thank the ninety NSTDB clients who took part in project workshops. Without their participation this strategy initiative would not have been possible. As well, we would like to acknowledge the assistance of Dave Finlay, Manager Topographic Infrastructure, Service New Brunswick, Craig Barnes, Executive Director Resource Information Management, Alberta Ministry of Sustainable Resource Development, and Pat Drinnan General Manager, Spatial Data Warehouse Limited. Their willingness to assist in jurisdictional reviews, and their encouragement of open discussions, has resulted in valuable input for the NSTDB strategy.

APPENDIX A – USER REPORT CARD

Nova Scotia Topographic Database Current State Assessment and Strategic Planning	 Service Nova Scotia and Municipal Relations
Strategic Report Card	
July 2009	

NSTDB Management Policy

Scoring Guide	
High:	The policy has been fully adhered to with successful results which contribute to the overall policy goal of the NSTDB.
Medium:	The policy has been mostly adhered to with results which do not undermine the overall policy goal of the NSTDB.
Low:	The policy has been partially adhered to with results which do not conform to the overall policy goal of the NSTDB.
No:	The policy has not been adhered to.
N/A:	Do not have context to rate the policy.

Policy Goal	Score
To provide long term vision and guidance for the creation, distribution and maintenance of the NSTDB System, to provincial standards and to meet the overall needs for geographic information in the Province of Nova Scotia.	

Policy Statements	Score
1. To create (to a high level of content and accuracy and to provincial standards) a single, seamless, topographic database.	
2. To develop a standard suite of database and map products.	
3. To maintain and revise the NSTDB on a continuous basis, utilizing data collected at source, where cost effective.	
4. To establish and use province wide, minimum standards, specifications, processes and appropriate technology, and to review them periodically.	
5. To facilitate product distribution and encourage the use of the NSTDB.	
6. To encourage partnerships for the creation, distribution and maintenance of the NSTDB and its products.	
7. To identify and respond to the needs of geographic information users for the NSTDB and its products, on a continuous basis.	

Strategic Plan

Strategic Recommendations	Score
It is recommended that the province actively pursue the negotiation of data partnership agreements for the ongoing maintenance of the NSTDB.	
Data Partnerships: General – Implementation Success	
Data Partnerships: General – Operational Success	
Data Partnerships: General – Quality of NSTDB	
Scoring Guide	
High: Partnership was <u>created</u> and is <u>working well</u>. **Medium:** Partnership was <u>created</u> but was <u>not well maintained</u>. **Low:** Partnership was <u>created</u> but <u>never maintained</u>. **No:** Partnership was <u>not developed</u> **N/A:** Do not have context to rate the recommendation.	
Data Partnerships: Buildings	
Data Partnerships: Designated Areas	
Data Partnerships: Delimiters	
Data Partnerships: Land Cover	
Data Partnerships: Land Form	
Data Partnerships: Roads and Railroads	
Data Partnerships: Structures	
Data Partnerships: Utilities	
Data Partnerships: Hyrdrography	
Scoring Guide	
High: The recommendation led to the delivery of a high quality product **Medium:** The recommendation led to the delivery of an acceptable quality product. **Low:** The recommendation led to the delivery of a poor quality product. **No:** The recommendation was not developed. **N/A:** Do not have context to rate the recommendation.	
Alternate Accuracy Specifications – Currently NSDTB Data is being collected to the same accuracy specification (2.5 metres) due to the data complication procedures being used. It is recommended that, for the ongoing NSTDB maintenance process, alternate accuracy specifications should be considered for selected features (for example, tree lines and swamp areas).	
Flexible Data Model – The current facility for storing feature attributes, such as date updated and accuracy, are currently deeply embedded within the data structure. It is recommended that a more flexible data model be employed to simplify storage and retrieval of such attributes.	
Varying Update Cycles – It is recommended that update cycle vary by	

Strategic Recommendations	Score
feature, according to availability of current data, and the importance to users of each feature.	

Other Strategy and Operational Initiatives

Scoring Guide	
High:	The recommendation led to the delivery of a high quality product.
Medium:	The recommendation led to the delivery of an acceptable quality product.
Low:	The recommendation led to the delivery of a poor quality product.
No:	The recommendation was not developed.
N/A:	Do not have context to rate the recommendation.

Strategic Recommendations	Score
Large Scale Mapping Program Overview: Provide a large scale map product for the province.	
Provincial Orthophotos: Provide a 1:10000 scale aerial photograph series for the province that has been rectified to remove distortions and geo-referenced.	
Large Scale Orthophotos: Provide a 1:2000 scale aerial photograph or photographs for a specific area that has been rectified to remove distortions and geo-referenced.	
Coastal Map Series: Provide 1:50000 scale maps depicting land and marine features around Nova Scotia's coastline out to the 12 mile limit which supports mapping applications involving coastal resource inventories, aquaculture, community economic development, and environmental planning.	
Nova Scotia Road Network: One geometric representation of roads for all of the Province.	
Nova Scotia Hydrographic Network: One geometric representation of hydrographic features for all of the Province.	

APPENDIX B- GEOMATICS CENTRE REPORT CARD

Nova Scotia Topographic Database Current State Assessment and Strategic Planning	NOVA SCOTIA Service Nova Scotia and Municipal Relations
Strategic Report Card	
July 2009	

NSTDB Management Policy

Scoring Guide	
High:	The policy has been fully adhered to with successful results which contribute to the overall policy goal of the NSTDB.
Medium:	The policy has been mostly adhered to with results which do not undermine the overall policy goal of the NSTDB.
Low:	The policy has been partially adhered to with results which do not conform to the overall policy goal of the NSTDB.
No:	The policy has not been adhered to.
N/A:	Do not have context to rate the policy.

Policy Goal	Score
To provide long term vision and guidance for the creation, distribution and maintenance of the NSTDB System, to provincial standards and to meet the overall needs for geographic information in the Province of Nova Scotia.	

Policy Statements	Score
1. To create (to a high level of content and accuracy and to provincial standards) a single, seamless, topographic database.	
2. To develop a standard suite of database and map products.	
3. To maintain and revise the NSTDB on a continuous basis, utilizing data collected at source, where cost effective.	
4. To establish and use province wide, minimum standards, specifications, processes and appropriate technology, and to review them periodically.	
5. To facilitate product distribution and encourage the use of the NSTDB.	
6. To encourage partnerships for the creation, distribution and maintenance of the NSTDB and its products.	
7. To identify and respond to the needs of geographic information users for the NSTDB and its products, on a continuous basis.	
8. To establish and monitor production priorities for the NSTDB and its products.	

Strategic Plan

Scoring Guide
Criteria: Level of Implementation **High**: Partnerships were developed in a timely manner with clear communication processes. **Medium**: Partnerships were developed in a slightly prolonged timeframe with some communication processes. **Low**: Partnerships were developed in a prolonged manner with poor communication processes. **No**: Partnerships were not developed. **N/A**: Do no have context to rate the recommendation. **Criteria:** Operational Success **High**: Partnerships operated with high efficiency and clear communication processes. **Medium**: Partnerships operated with moderate efficiency and acceptable communication processes. **Low**: Partnerships operated inefficiently with poor communication processes. **No**: Partnerships were not developed. **N\A:** Do not have context to rate the recommendation. **Criteria:** Quality of NSTDB **High**: Partnerships led to the delivery of a high quality product. **Medium**: Partnerships led to the delivery of an acceptable quality product. **Low**: Partnerships led to the delivery of a poor quality product. **No**: Partnerships were not developed. **N\A**: Do not have context to rate the recommendation.

Data Partnerships	I	O	Q
Data Partnerships: Buildings			
Data Partnerships: Designated Areas			
Data Partnerships: Delimiters			
Data Partnerships: Land Cover			
Data Partnerships: Land Form			
Data Partnerships: Roads and Railroads			
Data Partnerships: Structures			
Data Partnerships: Utilities			
Data Partnerships: Hyrdrography			

Scoring Guide	
High:	The recommendation led to the delivery of a high quality product

Medium:	The recommendation led to the delivery of an acceptable quality product.
Low:	The recommendation led to the delivery of a poor quality product.
No:	The recommendation was not developed.
N/A:	Do not have context to rate the recommendation.

Strategic Recommendations	Score
Separation of Detection and Inclusion - It is recommended that the data detection process be separated from the data inclusion process, in order to make maximum use of the valuable information acquired by other entities within the province.	
Alternate Accuracy Specifications – Currently NSDTB Data is being collected to the same accuracy specification (2.5 metres) due to the data complication procedures being used. It is recommended that, for the ongoing NSTDB maintenance process, alternate accuracy specifications should be considered for selected features (for example, tree lines and swamp areas).	
Flexible Data Model – The current facility for storing feature attributes, such as date updated and accuracy, are currently deeply embedded within the data structure. It is recommended that a more flexible data model be employed to simplify storage and retrieval of such attributes.	
Logical Consistency Relationships - As a general rule, logical consistency relationships (e.g. land cover to roads) should not be maintained between features of different accuracies.	
Varying Update Cycles – It is recommended that update cycle vary by feature, according to availability of current data, and the importance to users of each feature.	
Cartographic Updates - It is recommended that cartographic issues be separated from the maintenance process. For example, and updated cartographically pleasing map does not need to be created every time an area undergoes a topographic update.	

Other Strategy and Operational Initiatives

Scoring Guide	
Criteria:	Level of Implementation
High:	The recommendation was implemented to its full extent.
Medium:	The recommendation was implemented as specified, with some exceptions or remaining implementation required to fulfill the recommendations.
Low:	Only a portion of the recommendation was implemented or a separate initiative related to the recommendation was implemented.
No:	The recommendation was not implemented whatsoever.
N/A:	Do not have context to rate the recommendation.
Criteria:	Operational Success

High:	The recommendation led to operations which match expected costs, human resource requirements and technology requirements.
Medium:	The recommendation led to operations which required a minor increase over expected costs, human resource requirements or technology requirements.
Low:	The recommendation led to operations which required a major increase over expected costs, human resource requirements or technology requirements.
No:	The recommendation was not implemented.
N/A:	Do not have context to rate the recommendation.

Criteria:	Quality Service
High:	The recommendation led to the delivery of a high quality product and positive customer.
Medium:	The recommendation led to the delivery of an acceptable quality product and mostly positive customer feedback.
Low:	The recommendation led to the delivery of a poor quality product and mostly poor customer feedback.
No:	The recommendation was not implemented.
N/A:	Do not have context to rate the recommendation.

Strategic Recommendations	I	O	Q
Large Scale Mapping Program Overview: Provide a large scale map product for the province.			
Provincial Orthophotos: Provide a 1:10000 scale aerial photograph series for the province that has been rectified to remove distortions and geo-referenced.			
Large Scale Orthophotos: Provide a 1:2000 scale aerial photograph or photographs for a specific area that has been rectified to remove distortions and geo-referenced.			
Coastal Map Series: Provide 1:50000 scale maps depicting land and marine features around Nova Scotia's coastline out to the 12 mile limit which supports mapping applications involving coastal resource inventories, aquaculture, community economic development, and environmental planning.			
Nova Scotia Road Network: One geometric representation of roads for all of the Province.			
Nova Scotia Hydrographic Network: One geometric representation of hydrographic features for all of the Province.			