

**A NOVA SCOTIA TOPOGRAPHIC DATABASE (NSTDB)**  
**MANAGEMENT POLICY**

**Prepared by the Base Mapping Policy Task Group  
Land Information Systems Advisory Committee  
NS Land Use Committee**

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## Table of Contents

Purpose .....	i
Policy Goal and Summary of Policy Statements .....	ii
1.0 Background .....	1
1.1 Introduction .....	1
1.2 The Current Suite of Digital Products .....	2
2.0 Outline of Policy Goal .....	3
3.0 Implementation of Policy Statements .....	3
3.1 Creation of the NSTDB .....	3
3.2 Standard NSTDB Products .....	4
3.3 Maintenance of the NSTDB .....	6
3.4 Standards, Specifications, Processes and Technology .....	7
3.5 Distribution and Use of the NSTDB .....	8
3.6 Partnerships .....	8
3.7 User's Needs .....	9
3.8 Production Priorities .....	10
Appendix A1 .....	1:10,000 Orthophoto Maps
Appendix A2 .....	1:10,000 Digital Maps
Appendix B .....	Nova Scotia Urban Mapping Program
Appendix C .....	1:50,000 Digital Maps
Appendix D .....	1:250,000 Digital Maps
Appendix E .....	Definitions
Appendix F .....	Task Group Membership

## **A Nova Scotia Topographic Database (NSTDB) Management Policy**

### **Purpose**

The purpose of this document is 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.

**Note:** Definitions of technical terms used in this document are included in Appendix E

## **Policy Goal and Summary of Policy Statements**

### **POLICY GOAL**

**To provide long term vision and guidance for the creation, distribution and maintenance of the Nova Scotia Topographic Database (NSTDB) System, to provincial standards, and to meet the overall needs for geographic information in the Province of Nova Scotia.**

### **POLICY STATEMENTS**

- 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.**



## 1.0 BACKGROUND

### 1.1 Introduction

Quick and easy access to complete, current and accurate geographic information is essential to effective resource management and economic development. With the introduction of automated information management tools and technology, such as Geographic Information Systems (GIS) and Image Analysis Systems, there is an increasing demand for geographical information in digital form. The Province has responded to this requirement through the creation of its **Nova Scotia Topographic Database (NSTDB)**. Responsibility for creation, and maintenance of the NSTDB, and distribution of its products, has been assigned to the Nova Scotia Geomatics Centre (NSGC), Land Information Management Services Division (LIMS), Department of Municipal Affairs.

The **NSTDB** is a database created from aerial photography flown to established "mapping quality" standards for the purpose of creating this specialized database. The database shows the correct horizontal and vertical positions of physical and cultural features such as roads, structures, water courses and contours (depicting the elevation of land features relative to sea level) at several resolutions. Numerous products, at a variety of scales, are generated from this database (base maps, topographic maps, digital elevation models, etc.). These products are used constantly for a wide range of purposes, by a multitude of users; in areas such as engineering, surveying, planning, development, resource management, and others.

It is the intent of the government to produce a seamless database in terms of both area and content. A seamless database in terms of area means that, irrespective of one's area of interest, a user can obtain a digital file without having to be concerned about conventional map sheet edges or the proverbial area at the corner of four adjoining map sheets. A seamless database can be provided for a study area, a management area, a municipality, or other user defined administrative areas irrespective of the number of "map sheets" required to provide complete coverage. Seamless content refers to maintaining the database so that input data are collected at source and the database is updated or changed only once. The database is then used to generate the variety of products (e.g. maps) required by users of the database. This is a cost effective approach to maintain the database. However, equally important is the enhanced quality and versatility of such a database. For instance, thematic maps created on top of a base map generated from such a database will be much easier to overlay, combine or integrate, because features displayed at a variety of levels of detail will have been generated from a common source. Such a database can be maintained on an ongoing basis, obviating its requirement for major recompilations at regular intervals as is the case with the conventional approach. It is acknowledged that a seamless database in terms of content may not be possible in all instances; however, to the extent possible this must be attempted.

## 1.2 The Current Suite of Digital Products

A variety of products can be generated from the NSTDB, however, the most commonly used products have been in the form of maps. Currently there are three major product groupings for which the Province has exclusive responsibility. These are commonly referred to as the Provincial Scale Map Series, the Resource Base Map Series and the Urban Base Map Series. In addition to these, the Province regularly uses map products produced by other agencies such as the federal government, international agencies and others.

The current suite of products derived from the NSTDB and for which the Province has exclusive responsibility include:

### Provincial Scale Map Series

1:500,000 scale database and map of the Province

### Resource Base Map Series

1:10,000 scale database and maps of the Province

(see Appendices A1 and A2)

### Urban Base Map Series

1:5,000 scale database with map products displayed at scale 1:2,000

(see Appendix B)

1:1,000 scale database and map products for the Halifax-Dartmouth Metro area

(see Appendix B)

In addition to the familiar map products derived from the NSTDB, a variety of other products are or can be produced. Examples of these products include: digital files, digital terrain models, the foundation layer for resource inventories such as forestry, soils or geology. The proposed coastal mapping program which will draw the integration of hydrographic features into the NSTDB by merging electronic navigation charts, as produced by the Canadian Hydrographic Service, to provide mapping which would be available at resolutions of 1:50,000 or greater. These are examples of how the NSTDB, maintained to provincial standards, can serve multiple uses while at the same time reducing duplication of effort and ensuring that products generated by these diverse programs can be easily exchanged and integrated.

Geographic information users often require access to products generated by other agencies, or which may have been jointly produced and maintained by the Province with other agencies such as the federal Department of Natural Resources. It is in the best interest of the Province to enter such partnerships on behalf of its geographic information users. In addition to gaining access to the products, the Province can provide data and other update material to assist in maintaining and revising the databases in a cooperative manner. Such partnerships are cost effective, reduce duplication of effort and facilitate compatibility between the different databases through use of the same source data to create or maintain them.

Map products generated by other agencies but frequently used by provincial users include:

- 1:1,000,000 scale Digital Chart of the World
- 1:250,000 scale National Topographic System maps (see Appendix D)
- 1:50,000 scale National Topographic System maps (see Appendix C)

The source databases from which these products are derived, when held by the Province, are also considered to form part of the NSTDB.

## **2.0 OUTLINE OF POLICY GOAL**

### **2.1 To provide long term vision and guidance for the creation, distribution and maintenance of the Nova Scotia Topographic Database (NSTDB), to provincial standards, and to meet the overall needs for geographic information in the Province of Nova Scotia**

The previous policy document, **Digital Base Mapping Policy For Nova Scotia**, (revised October 26, 1990), essentially provided general direction and guidance to the Land Registration and Information Service (LRIS) in terms of specifications and priorities for the production of the general base mapping requirements of the Province. It did not treat the total provincial requirement for precise digital geographic information. Since that time, the responsibility for the development of a corporate NSTDB has been transferred to the Province. At the same time the requirement for and use of digital information has increased. Since then also, related initiatives have been undertaken that require coordination: e.g. partnerships with other agencies to create and maintain other databases, the need to revise and update existing databases, and development of new applications built upon the NSTDB (Coastal Mapping Program, forestry, geology, soils and other resource inventories).

This Policy sets out a strategy to meet this diverse set of requirements for digital geographic information from within a corporate NSTDB. It recommends a series of Policy Statements to accomplish this goal.

## **3.0 IMPLEMENTATION OF POLICY STATEMENTS**

### **3.1 To create (to a high level of content and accuracy and to provincial standards) a single, seamless topographic database**

Completion of the Nova Scotia Topographic Database by 1997 (that portion of it required to produce complete provincial map coverage at the 1:10,000 scale - subsequently referred to as "1:10,000 resolution") is the highest provincial priority. A major effort is presently being devoted to populating this portion of the NSTDB with data derived from aerial photography acquired at a scale of 1:40,000 intended for the production of 1:10,000 scale map products. Photography is also being acquired at an approximate scale of 1:18,000 in support of mapping for urban and more densely settled areas of the Province intended to be mapped at scale 1:5,000 and larger (in the past, photography was acquired at the scale of 1:5,000 to produce 1:1,000 scale mapping, however, due to cost this has been discontinued).

The present emphasis must continue to be placed on completion of the NSTDB (1:10,000 resolution). At the same time, however, consideration must be given to collecting the data required for the urban and more densely settled areas of the Province; as well as to the revision, update and maintenance of all of these data as described elsewhere in this document. Cooperative projects undertaken with federal and provincial government departments, municipalities and others, continue to accelerate the creation of the NSTDB.

There is a growing requirement for data products derived from the Nova Scotia Topographic Database in support of programs, economic development, resource management and other related activities of government and non-government users of geographic information. This information must be available for the entire Province as quickly as possible.

The NSTDB must be developed to consistent standards of accuracy and content. It must be available and distributed in standardized form as digital products, or as hard copy maps and other derived products.

The NSTDB must be seamless in terms of area and content so that data extracted from anywhere in the database are complete and not created as a mosaic of map sheets or tiles. The NSTDB must supply data of consistent quality, content and accuracy throughout the Province.

It is recommended that the Province:

- < *complete the NSTDB (1:10,000 resolution) by 1997; and*
- < *continue to collect the data for urban and more densely settled areas of the Province as funding permits.*

### **3.2 To develop a standard suite of database and map products**

Completion of the Nova Scotia Topographic Database (1:10,000 resolution) remains the provincial priority. Upon completion of that portion of the database, a suite of products must be produced to meet the needs (scales and content) of geographic information users. The priorities for production of products are as follows:

- < completion of provincial coverage of map products with and without contours at the 1:10,000 scale by 1997.
- < create digital products in several standard exchange formats (e.g. NTX-DXF, etc.) on request.
- < completion of Digital Elevation Models for the entire Province.
- < continue production of detailed maps for urban and more densely settled areas of the Province at scale 1:5,000 specifications, displayed as hard copy at 1:2,000 as funding permits.

The current suite of products derived from the NSTDB for which the Province has exclusive responsibility includes:

**Provincial Scale Map Series**

1:500,000 scale database and map of the Province (maintained by the Nova Scotia Geomatics Centre (NSGC), Amherst);

**Resource Base Map Series**

1:10,000 scale database and maps of the Province (being completed and maintained by the NSGC) (see Appendices A1 and A2); and

**Urban Base Map Series**

1:5,000 scale database with map products displayed as hard copy at scale 1:2,000 (being created and maintained by the NSGC in cooperation with cost sharing partners whenever possible) (see Appendix B). This series provides map coverage for urban and densely settled areas of the Province.

1:1,000 scale database and map products for the Halifax-Dartmouth Metro area (completed by the NSGC and being partially maintained by the municipalities) (see Appendix B)

Partnership projects continue to assist in the creation of these products.

Databases produced by other agencies but which are frequently used by geographic information users include:

1:1,000,000 scale Digital Chart of the World (produced cooperatively by a number of world nations);

1:250,000 scale National Topographic System maps (maintained jointly by the NSGC and Natural Resources Canada) (see Appendix D); and

1:50,000 scale National Topographic System maps (maintained jointly by the NSGC and Natural Resources Canada) (see Appendix C).

It is recommended that the Province:

- < *Create products derived from the NSTDB required by geographic information users according to the following priorities:*
  - C 1:10,000 scale maps with and without contours;*
  - C digital files in several standard exchange formats on request;*
  - C Digital Elevation Models (DEM's); and*
  - C continue production of maps for urban and densely settled areas compiled to 1:5,000 scale specifications and displayed at scale 1:2,000.*
  
- < *Cooperate with other agencies to produce, update and maintain databases and products required by the Province, e.g.:*
  - C 1:1,000,000 Digital Chart of the World;*
  - C 1:250,000 National Topographic System; and*
  - C 1:50,000 National Topographic System.*

### **3.3 To maintain and revise the NSTDB on a continuous basis; utilizing data collected at source, where cost effective**

The utility of geographic information to users decreases with the passing of time, unless the databases from which it is produced are kept up to date. This is especially true of the NSTDB. The next most important priority to creating the databases and disseminating products must, therefore, be to update and maintain them on a continuous basis.

The NSTDB should be reviewed for currency and updated on a continuous basis. Rather than establish a regular revision cycle, it is recommended that ongoing update take place based on rate of change, development or other user driven requirements or criteria. This approach differs from criteria used in the past based on the age of mapping, which normally required a major recompilation effort undertaken at regular intervals. The goal should be to automate the update of the databases electronically using data collected at source.

Ideally, update and maintenance of the database should be such that data is captured once, as close to the source as possible, and shared with the database administrator to facilitate the required update. The updated data should, within practical limits, be used to create all database products thereby working towards the seamless database concept. As previously stated this will not always be possible, but it should be a goal.

Proactive administrative arrangements must be established with geographic information users and information providers (particularly, municipalities and provincial government departments) to ensure that new data generated in the normal course of business is used to update the databases, e.g.:

<u>Feature/theme</u>	<u>Potential Source</u>
Provincial Roads & Highways	- Dept. of Transportation and Communications
Local Roads & Streets	- Municipalities
Vegetation & Resource Roads	- Dept. of Natural Resources/Forestry Cos.
Cleared Land	- Dept. of Agriculture and Marketing
Building Development	- Dept. of Municipal Affairs
Infrastructure	- Municipalities
Transmission Lines/Utility Poles	- Utility Companies

The Province must search out every opportunity to collect data from source to update the databases, provided that logistics, adherence to specifications and cost are appropriate; and more importantly, that it does not compromise the quality of the database. If, for any reason, data used for updates is below accepted standard, it should be appropriately flagged. Users, who collect or generate information that may be useful to improving the NSTDB, must be encouraged to provide and share their information to enhance the value of the NSTDB as a corporate resource.

It is recommended that the Province maintain the NSTDB:

- < *based on user driven requirements;*
- < *using automated processes to the extent possible;*
- < *through proactive procurement of data supplied at source by government departments, municipalities, private sector firms, and others; and*
- < *so that it is a seamless database in terms of area and content.*

### **3.4 To establish and use province wide, minimum standards, specifications, processes and appropriate technology, and to review them periodically**

To ensure that the database and its products are uniform across the Province, provincial database

standards and specifications must be established and periodically reviewed. The database standards and specifications developed through the Nova Scotia Geographic Information Standards process, in consultation with the NSGC and others, must be rigorously adhered to, to ensure the provision of a consistent database for the entire Province. At critical stages in the development of the database, e.g. at the completion of the NSTDB (1:10,000 resolution) in 1997, a comprehensive review of accepted standards and specifications may be conducted to ensure that the database remains relevant to user's needs. Meanwhile, it is imperative that there be a stable set of standards and specifications in which users can have confidence.

The Province must be aware of current and developing information management technology to ensure that cost effective and appropriate technology continues to be used in the creation, maintenance, improvement, distribution, and management of the NSTDB and its products. The staff of the NSGC should be involved in appropriate research and development initiatives in partnership with others such as: provincial departments, academia and private sector firms; to investigate and encourage the use of state of the art technology.

It is recommended that the Province:

- < *establish, maintain, implement and periodically review the use of minimum standards and specifications; and*
- < *remain current with new and developing technology to ensure that the NSTDB remains "state of the art".*

### **3.5 To facilitate product distribution and encourage the use of the NSTDB**

A major objective of the Province should be to promote the use of the database and its products. The information contained in the database forms the foundation for many other databases. It is important, therefore, that geographic information users are made aware of the databases and the benefits to be derived from using these standard databases to ensure that their work, and the work of others, is compatible and capable of being shared, merged and integrated as easily as possible.

It is essential that the Province ensures that the NSTDB and its products are:

- < easily accessible from a central distribution outlet, and that local outlets are established within regions of the Province through which products can be obtained;
- < created, archived and maintained according to established specifications and standards;
- < publicized so that users are aware of the full suite of services and products available.
- < reviewed on a regular (annual) basis with major users to ensure that the products and services offered remain current and relevant.

Staff of the NSGC must be prepared to provide technical assistance and support to users of the database to ensure that it is utilized to its full potential.

It is recommended that the Province:

- < *facilitate equitable access to the NSTDB and its products from all areas of the Province;*
- < *promote and encourage the use of the NSTDB for the common benefit of all users; and*
- < *provide technical advice and assistance to users of the NSTDB.*

### **3.6 To encourage partnerships for the creation, distribution and maintenance of the NSTDB and its products**

Creation and maintenance of a database such as the NSTDB is costly. Opportunities should be explored to form partnerships with provincial, municipal and federal governments, academia and the private sector, to assist with creation and maintenance of the NSTDB. Scarce resources should be used wisely and duplication of effort must be avoided.

Several examples of cooperative efforts have already been demonstrated: between provincial government departments, and through federal - provincial and provincial - municipal agreements. Potential opportunities for partnering with the private sector exist, particularly, with the utility companies. All of these opportunities should be aggressively pursued.

Any such partnerships will require agreement with respect to database ownership and rights of use. These details must be agreed upon prior to entering into formal agreements.

It is recommended that the Province:

- < *aggressively seek opportunities for partnerships to accelerate and facilitate the creation, distribution and maintenance of the NSTDB and its products.*

### **3.7 To identify and respond to the needs of geographic information users for the NSTDB and its products, on a continuous basis**

Unless the NSTDB remains relevant to the needs of users, the benefits of providing a single foundation database for all geographic information users will quickly diminish. The number and complexity of applications being developed regularly by geographic information users is increasing rapidly. The Province must be aware of users' requirements, their applications and the advances in technology within the geomatics industry, and ensure that the database and specialty products are developed accordingly. Staff of the NSGC should maintain an ongoing dialogue with geographic information users to note required change and improvements to the NSTDB.

The Nova Scotia Land Use Committee, can provide the forum for continued interdepartmental input from government users with respect to provincial government's ongoing NSDTB needs, and

can ensure that the policies guiding its implementation and maintenance are revised as required.

An annual geographic information users workshop can provide the opportunity to formally communicate with the private sector and academia, as well as provide an opportunity for the Province to showcase new products, enhancements and additions to databases such as the NSTDB.

It is recommended that the Province:

- < *maintain ongoing dialogue with all of its users to ensure that the NSTDB remains current and relevant to users' requirements.*

### **3.8 To establish and monitor production priorities for the NSTDB and its products**

The Province must establish the priority requirements for the NSTDB with its major users. Production priorities for the NSTDB will attempt to reflect users' priorities as closely as possible.

The Nova Scotia Land Use Committee can provide the forum for identification of government priorities. A suggested annual workshop with major non-government geographic information users is another mechanism for determining other users' priorities.

It is recommended that the Province:

- < *establish and monitor production priorities for the NSTDB and its products in consultation with its major users.*

## **APPENDIX A1**

## APPENDIX A2

## APPENDIX B

## APPENDIX C

## APPENDIX D

## **APPENDIX E**

### **Definitions**

#### **Corporate Data**

Data that is or could be used by two or more organizations. Sometimes referred to as Corporate Land Information.

*Source: Nova Scotia Land Information Standards Manual - 1994 (adapted)*

#### **Data**

A representation of facts and ideas in a formalized manner capable of being communicated or manipulated by some process.

*Source: Nova Scotia Land Information Standards Manual - 1994*

#### **Geographic Information**

Geographic Information is defined as a file or groups of files of information or data which identify attributes about land or parcels of land, water or water lots. This information may be stored in or on a variety of formats including: maps, atlases, aerial photographs, publications, index cards, statistical data, computer processible files, paper files, etc. It may contain basic physical measurements at, above or below the surface of the earth as well as relevant socio-economic information.

*Source: Nova Scotia Land Information Index - 1982 (adapted)*

#### **Geographically Related Information**

Information that is referenced to a geographic location.

*Source: Nova Scotia Land Information Standards Manual - 1994*

#### **Geomatics**

The science, technology and management of geographically-referenced information, including its acquisition, storage, analysis, display and dissemination.

*Source: Nova Scotia Land Information Standards Manual - 1994*

#### **Geo-referenced Information**

Information that is referenced to a geographic location.

*Source: Nova Scotia Land Information Standards Manual - 1994*

## **Information**

That which results from the processing of data. Information is derived from the assembly, analysis or summarizing of data into meaningful form.

*Source: Nova Scotia Land Information Standards Manual - 1994*

## **Land Information**

Any information that can be associated with the land, such as resource, environmental, socio-economic and infrastructure characteristics. Also referred to as Land-Related Information.

*Source: Nova Scotia Land Information Standards Manual - 1994*

## **Primary Databases**

The Primary Databases are essential to accurately record the position of all geographical and cultural features in Nova Scotia. These databases also serve as the underpinning for all overlay themes mapped using either conventional mapping methods or automated geographic information system (GIS) technology.

The Primary Databases are:

**The Nova Scotia Coordinate Referencing System** - including a network of control points positioned throughout the Province which serve as the points of reference from which accurate horizontal and vertical positions can be determined for any feature in the Province.

**Aerial Photography Database** - A database (collection) of photographic negatives and prints of provincial aerial photography acquired over the past fifty or more years. The individual photographs can be referenced to the Nova Scotia Coordinate Referencing System to provide the positional accuracy required by users for mapping, resource inventory or other uses. This database is in hard copy format (film and/or paper) and represents a unique and irreplaceable resource to the province.

**The Nova Scotia Topographic Database System** - The NSTDB is a database created from aerial photography flown to established "mapping quality" standards for the purpose of creating this specialized database. The database shows the correct horizontal and vertical positions of physical and cultural features such as roads, structures, water courses and contours (depicting the elevation of land features relative to sea level) at several resolutions. Numerous products, at a variety of scales, are generated from this database (base maps, topographic maps, digital elevation models, etc.). These products are used constantly for a wide range of purposes, by a multitude of users; in areas such as engineering, surveying, planning, development, resource management, and others.

**The Nova Scotia Property Records Database** - a database portraying the boundaries of individual land parcels with random, unique, identification numbers (PIDs) assigned and linked to associated files listing descriptive, attribute information for each land parcel (e.g. owner name, owner address, location, size, etc.). This database is created as an integrated overlay on top of the Nova Scotia Topographic Database.

### **Resource Mapping**

Topographic maps produced at scale 1:10,000 or smaller.

*Source: Nova Scotia Land Information Standards Manual - 1994*

### **Thematic Databases**

Thematic Databases are those which describe a subject or theme. They are normally built upon one of the Primary Databases which provide them the required positional accuracy and ensure that they can be integrated, merged or otherwise used one with the other. Examples of thematic databases include those which depict geology, soils, vegetation, shipwrecks, aquaculture sties, temperature, population, health, etc.

### **Urban Mapping**

Topographic maps produced at scales larger than 1:10,000.

*Source: Nova Scotia Land Information Standards Manual - 1994*

## **APPENDIX F**

### **BASE MAPPING POLICY TASK GROUP**

#### **Membership**

A Base Mapping Policy Task Group was established under the Nova Scotia Land Use Committee to recommend a draft policy on this topic. Members of the Task Group are listed below:

- < E. Backman, Economic Renewal Agency
- < R. Bowlby, Department of Natural Resources
- < B. Fay, Nova Scotia Land Use Committee (Secretary)
- < D. Keefe, Department of Municipal Affairs
- < M. Langman, Department of Agriculture and Marketing (part)
- < B. Seely, Department of Municipal Affairs
- < D. Rice Smith, Department of Transportation and Communications (Chair)