

Belize National Spatial Data Infrastructure (NSDI) Policy

National Spatial Data Infrastructure (NSDI) Working Committees

Belize

21st August 2012

Approved at meeting of Cabinet held 21st August, 2012

Cabinet-Confidential Memorandum No. 40 of 2012

ACRONYMS

BNSDI	Belize National Spatial Data Infrastructure
GIS	Geographic Information System
GOB	Government of Belize
IP	Internet Protocol
ISO	International Organization of Standardization
IT	Information Technology
KB	Kilobyte
LIC	Land Information Center
MNRA	Ministry of Natural Resources and Agriculture
NEGIS	National Environmental and Geomatics Information System
NGOs	Non-governmental Organizations
NSDI	National Spatial Data Infrastructure
SDI	Spatial Data Infrastructure
TBSL	Total Business Solutions Limited
TORs	Terms of Reference

INTRODUCTION:

The National Spatial Data Infrastructure (NSDI) is a national initiative that is driven by multiple stakeholders, particularly agencies in the country that are actively producing spatial data. The focal Ministry leading the development of Belize's NSDI is the Ministry responsible for Lands in collaboration with Five (5) NSDI Working Committees and various local and regional agencies.

This Policy was approved at the meeting of the Cabinet held on 21st August, 2012 as per Cabinet-Confidential Memorandum No. 40 of 2012 submitted by the Ministry of Natural Resources and Agriculture.

Cabinet approved the Draft National Spatial Data Infrastructure (NSDI) Policy as:

- (a) The first step in the start of developing a fully functional NSDI in Belize;**
- and**
- (b) The commencement of pilot project of the NSDI.**

BACKGROUND:

A National Spatial Data Infrastructure (NSDI) is an asset for all nations and should be considered as a key part of a country's wider infrastructure assets such as roads, electricity, telecommunications networks etc. It is conceived to be: an umbrella of policies, standards, and procedures under which organizations and technologies interact to foster more efficient use, management and production of spatial data.

Spatial data is concerned with the size, area and position of any location or phenomenon. In historic times, static maps were used to portray spatial data; in modern societies digital spatial data can be "mapped" and analyzed – translating to better decision making processes.

The main goal of the NSDI is to develop the rules and standards, and a mechanism for the sharing of spatial data in Belize. ***There are currently no standards in the country for spatial data, and many challenges are faced by stakeholders in accessing and sharing of spatial data due to this lack of standards.***

Fostering the use of spatial data through this initiative enables translation of measurable units of information for physical and social science knowledge by location into information for decision-making in development processes for the benefit of the present population without jeopardizing the needs of future generations (sustainable development). These same measurable units of information are needed to help the country to measure its progress towards meeting international treaties and agreements such as the Millennium Development Goals (United Nations Indicators on Sustainable Development). Nationally this initiative is also important as a key mechanism to assess the country's progress in achieving national goals. For example, access to data is ingrained in achieving the results under each of the thematic areas elaborated in Horizon 2030, a long-term development framework for Belize. Successful implementation of Horizon 2030 over the next 20 years will depend on several key factors – the first is the establishment of meaningful targets and indicators, which requires good data quality and coverage. Through the NSDI, the organization of and easy access to good quality data across all sectors in the country for decision-making will be made possible!

Countries, primarily developed countries began to develop their NSDIs around 1994 in recognition of the importance in establishing mechanisms for sharing of spatial data and making use of the available technologies such as web portals. Up to 2001 when a survey was carried out on the status of NSDIs worldwide, 59 countries had already developed their NSDIs. Another study done in 2006 indicated that several developing countries have exhibited readiness for development of their SDIs. Thereafter many of these countries have developed their SDIs including Trinidad and Tobago, St. Vincent and the Grenadines, Barbados, Mexico, Cuba, and Columbia, among others. Belize would join the list of countries with SDIs under this national initiative.

The process of developing a NSDI for Belize began a few years ago with the recognition of the importance of data in land management, monitoring of environmental issues, disaster reduction, health monitoring, and other salient issues affecting the country, and more importantly, the potential benefits in sharing data and having a mechanism in place to facilitate such sharing. The National Environmental and Geomatics Information System (NEGIS) in 2006 was one of such concepts relevant to the development of the NSDI. Effort towards developing this data sharing mechanism was revitalized in 2009 with the 1st NSDI Conference and most recently in 2011 with the 2nd NSDI Conference and Cabinet Confidential Information Paper No. 6 of 2012 in May, 2012. Furthermore, there are working committees established with Terms of Reference (TORS) – see Annex I, for the development of the NSDI through participation of some of the most technically sound spatial data practitioners in the country. The high interest locally and internationally for development of a SDI for Belize is an indication of the readiness for the country to develop its SDI.

The NSDI is a comprehensive process that will address the existing barriers to spatial data sharing e.g. fear of sharing due to lack of security of ownership issues, and lack of interoperability of different data sets produced by different entities. The five (5) NSDI Working Committees composed of the most technically competent spatial data practitioners in the country are as follows:

1. *Data Quality and Data Standards* – is the Working Committee set up to establish standards and norms for spatial data;
2. *Data Ownership and Security Issues* – is the Working Committee set up to ensure that ownership of data is secured and sensitive data layers are not compromised, while at the same time ensuring that equitable access to spatial data is provided;
3. *Network Assets and System Architecture* – is a very technical Working Committee set up to ensure that the NSDI network components are in place (hardware, software etc.)
4. *Maintenance and Oversight* – this Working Committee is established to ensure that best practices are followed in the development of Belize’s NSDI to make certain that it is

sustainable and will address issues such as the equitable sharing of expenses for the up-keep of the NSDI.

5. *The Executive Committee* – this is a key Working Committee in ensuring that the entire NSDI process is sustained and successful. It is made up of the Chairperson and Vice-Chairperson of each of the above Working Committees (these were newly elected at the 6th October, 2011 Working Group Workshop held in Belmopan), spatial data experts, and the head of the Land Information Center (LIC). This Work Group was also formed to address the issue of inadequate communication, which was highlighted as the major factor in the discontinuation of the process back in July 2009 after the 1st NSDI Conference. This Group will also address the issue of financing for the NSDI, which was identified as the second major challenge.

The above Working Committees have been established to develop Belize's NSDI. The policies and protocols that these Work Groups are responsible for developing will also directly contribute to its sustainability by putting in place policies for equitable cost-sharing for the long-term implementation of the NSDI.

POLICY STATEMENTS

Data Quality and data standards statements:

1. Belize shall adopt the North American Profile of ISO 19115 metadata standards¹, to comply with international standards to allow for interoperability. All new data layers developed shall comply with these standards.
2. Data owners that developed data layers prior to adoption of the ISO 19115 standards will be provided with a compliance period to provide the minimum requirements in order for their data layers to be shared.

¹¹ The ISO 19115 Metadata standards was first developed in 2001 and is widely used, particularly by countries that have established their NSDIs after 2001, including the Caribbean, and a Latin version of this standards (LAMP) has been established in some Latin American Countries.

3. Data shared via geoportals shall be in WGS84 datum to allow for data sharing regionally and internationally. The geographic coordinates (Lat/Long) system shall also be used.

4. Data creators are required to implement all mandatory elements e.g. “Title” and “Date” according to the standard and all optional elements, to the extent that they deem necessary (see modified World Bank Metadata Standards).

5. Specific technical compliance requirements are stated in ISO 19115 Clause 6 (Requirements) and Annexes A (Metadata schemas) and B (Data dictionary for geographic metadata). User-defined metadata shall be defined and provided as specified in Annex C (Metadata extensions and profiles).

6. Metadata claiming compliance shall pass the requirements described in the abstract test suite presented in Annex D (Abstract test suite) of ISO 19115.

7. Foundation datasets shall be of the highest quality and be available free of cost (Refer to Data Dictionary).

Network Architecture and Platform Standards statements:

1. Access to data will be made available through the nsdi.gov.bz / bnsdi.gov.bz domains, which are linked.
2. The BNSDI Geoportal will be hosted on the nsdi.gov.bz / bnsdi.gov.bz domains.
3. The Geoportal will be utilized as a central gateway for GIS Nodes within the country.
4. A BNSDI GIS Node is defined as any entity operating within the country of Belize that wishes to share its GIS resources via the Geoportal. The Geoportal will facilitate communication between data nodes and interested data consumers.

5. GIS Nodes must register with the Geoportal's governing body in order for its services to be available via the portal.
6. Geoportal membership shall be required for non-publicly accessible data i.e. data that may have some use restriction.
7. The Geoportal will allow connectivity to non-Belizean entities for international visibility. As such it will allow other geoportals to harvest data on publicly available services and services with restrictions put in place by the individual nodes with their permission.
8. GIS Nodes Minimum requirements include but are not limited to:
 - a. It is optional for a node to have its own Internet Domain Name.
 - b. A node must have its own Internet connection of at least 512 KB with a public Internet Protocol (IP) address; this is to ensure that data is accessible via the same IP address unless otherwise changed by the node owner.
 - c. Nodes must be running on GIS Server technologies recommended, including the following propriety and open-source server technologies:
 - i. ESRI ArcGIS Server (version 9.x or higher)
 - ii. GeoServer
 - iii. MapServer
 - d. GIS Nodes will need to allow access to the Geoportal's harvester so that it may update any services provided by that node unto the Geoportal itself.
9. GIS Nodes are responsible for granting access and defining any restrictions to their own data. Any restrictions that apply should be documented within the metadata of the various services provided.

10. Any new service or updated services encountered by the Geoportal's harvester will be first reviewed by the portal administrator before being made available to ensure that the appropriate type of visibility is provided for the individual service and that the service meets the required standards.
11. Documentation on setting up the various approved server infrastructures will be made available via the bnsdi.gov.bz Wiki, and discussions on topics can also be found on its forums.
12. The bnsdi.gov.bz Wiki shall be the source of information for all standards, policies and requirements pertaining or related to the geoportal and to GIS nodes.

Data Access and Security statements:

1. This policy is developed in order for GOB and all stakeholders to streamline access to data and guarantee the consistency of standards and guidelines.
2. A geoportal will be developed to enable users to search, query, and discover spatial data, to serve as a link between data users and data producers, and which will also provide built in security features.
3. Agreements/licenses shall be developed to clearly define terms of use, access, and distribution protocols for spatial data.
4. The BNSDI geoportal will be created to support Geospatial Data Catalogues on the BNSDI node. This geoportal will allow producers/creators to advertise the availability of data and users to search for, access, and use the data based on policies that promote easy, equitable, and minimally constrained access and use of data.
5. The owner of a geospatial dataset shall be the person or institution who created the dataset. The owner(s) of a dataset shall be responsible for quality control and quality assurance, data content and formats, validation and maintenance, storage and security, maintenance and updates of metadata to the geoportal, among other things.
6. Jurisdiction over data by the official entity in the country shall be respected and data creators outside of these official entities shall comply with the relevant laws and policies e.g. obtain permits for collection and dissemination of data where required.
7. Validation of data will be done through the Land Information Center in collaboration with the relevant agencies prior to publication via the NSDI portal and shall be properly cited to ensure that data owner and data creators are appropriately credited.

8. The custodian of the data shall be the person(s) or organization who is responsible for the production, storage, management and distribution of the dataset on behalf of another organization. E.g. LIC is the custodian of various datasets for GOB.

9. The data creator shall own the copyright of the data produced. Therefore, for value-added data, the producer shall own the copyright of only the value-added component of the data. The original data creator shall also be cited in the metadata and resulting map products.

10. There shall be two basic categories of data access: Restricted/Sensitive and Public Access.

1. Public accessible data shall be available to the public with or without conditions for use.
2. Restricted spatial data relates to sensitive data that are not shared for various reasons; such data will only be available to users by agreement of data owner on a case-by-case basis under specific conditions stated in a license agreement.

11. Foundation datasets should be available with limited restriction, on a non-discriminatory basis for reproduction and distribution.

12. The mode of access shall be defined in the access portal and it may include on-line access (view-only, link to user's database or off-line access (hardcopy delivery or softcopy deliver on storage media such as USB drives, CD_ROM).

13. All data sets and published information used in the BNSDI will be identified with a citation; for data sets an indication of how the data may be accessed should be provided in the metadata.

14. Acceptable security measures shall be put in place to minimize damage to, unauthorized access, modification and loss of current and archived data. This includes but is not limited to access authentication such as password protected to make files read-only when unauthorized downloading occurs.

Maintenance and oversight statements:

1. The National Spatial Data Infrastructure (NSDI) is a valuable national resource developed and owned by its stakeholders. The Government Ministry responsible for lands shall serve as the steward of this resource.
2. Stakeholders shall commit to the maintenance, validation, description, accessibility, and distribution of spatial data, and shall manage data in a way that facilitates sharing and use by other stakeholders and the general public.
3. The NSDI Committee established will be responsible for the development of the components of Belize's NSDI and composed of the top level stakeholders from across the participating stakeholders. This body will be charged with drafting the overall policy and submitting draft policies and protocols to the Cabinet for approval and allocation of resources as required.
4. Costs for operation, modification, and maintenance and responsibility for the NSDI shall be shared in an equitable manner among stakeholders and users. The Government Ministry responsible for lands shall be responsible for the basic infrastructure costs and modification costs will be equitably distributed among other stakeholders and users. A business plan will be developed in consultation with stakeholders that will include a cost-sharing mechanism.

5. Development of Belize's NSDI will be done incrementally using a phased approach and taking into consideration factors such as data format (digital or hardcopy), the ownership and location of the data, data sharing technology available, and access and security issues.
6. Amendments to the NSDI policy will be done after year 1, thereafter every 2 years to reflect advances in available technologies, structure of the NSDI framework, expansion in user groups and other considerations.
7. A Maintenance schedule shall be developed by the Network Architecture and Platform Standards Committee for IT hardware and software that currently exist and new IT hardware acquired through capital investment to support the sharing of data.
8. Each data producing entity will catalogue their datasets and data elements, adhering to the best practices discussed in the Data Quality and Data Standards Policy statements. Each data owner will be responsible to maintain their catalogue.
9. A Maintenance protocol shall be developed by data owners for data assets used in the NSDI. It should allow for communication on downtime of services, updates on services, and other such provisions.
10. No fees are to be charged for Foundation data accessed by participating stakeholders. Data owners can levy charges for certain data and on users as they deem necessary.

CONCLUDING STATEMENT:

This Policy is submitted for review and consideration by the Cabinet. This Policy is one of the first steps in developing a fully functional SDI for Belize. The next steps for the SDI development in Belize include implementing a pilot of the SDI with a cross section of key stakeholders from the public and private sector – at least twenty (20) stakeholder agencies have expressed their willingness and enthusiasm to participate in this pilot. During the pilot NSDI, technical assistance will be provided by the NSDI Committee, the Land Information Centre and regional agencies such as GeoSur in Mexico, and relevant practitioners in the country. This assistance will include guidance in adhering to the national standards as outlined in the NSDI policy and supplemental documents such as the North American Profile of the ISO 19115 Metadata Standards that are being adopted by the country; and assistance in uploading data to the NSDI Geoportal.

Once the NSDI has been piloted (6 months to 1 year), it will continue to be incrementally expanded using a phased approach. Equitable cost-sharing mechanisms will be developed and amended to ensure that the initiative is sustainable, inclusive and affordable to stakeholders across the country. It is envisioned that in the medium term the majority of stakeholders will be benefitting directly and indirectly from the NSDI and that it will be widely used to facilitate decision-making, and also used to measure the progress of the country towards meeting its international agreements and local goals and objectives.

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