SOCIO-DEMOGRAPHIC AND ECONOMIC SECTOR ANALYSIS

FINAL GEODATABASE DOCUMENTATION



AUGUST 15, 2008

SUBMITTED TO:

NUNAVUT PLANNING COMMISSION

SUBMITTED BY:

Terriplan
CONSULTANTS

Executive Summary

Terriplan Consultants (Terriplan) was contracted by the Nunavut Planning Commission (NPC) to carry out a Socio-Demographic and Economic Sector Analysis for Nunavut, in support of the development of the Nunavut Land Use Plan as required under the Nunavut Land Claims Agreement.

One of the objectives of the study was to illustrate current economic activities and future opportunities in the area. In order to accomplish this objective, Terriplan was required to collect the associated spatial data and produce maps as supporting materials in the final report. The spatial data is stored in a project-specific geodatabase as one of the deliverables to the NPC.

Terriplan developed a file geodatabase, available in ArcGIS 9.2, containing **8 feature datasets and 52 features classes**. Metadata is developed for each of the feature data classes describing the source of the data as well as any of the processing involved prior to data import.

1.0 Introduction

1.1 Overview of the Study

This Socio-Demographic and Economic Sector Analysis for Nunavut, prepared for the Nunavut Planning Commission (NPC), was developed to provide information on demographic trends and economic opportunities and needs to support the NPC in developing a land use plan for Nunavut.

1.1.1 The Nunavut Planning Commission

The Nunavut Planning Commission (NPC) is an Institution of Public Government charged with preparing community-based land use plans to fulfill the objectives established by the *Nunavut Land Claims Agreement (NLCA)*. The Nunavut Planning Commission derives its mandate from Article 11 of the NLCA.

Article 11, section 11.3.1 of the NLCA states that a land use plan document will be developed that contains text, schedules, figures and maps for the establishment of objectives and guidelines for short-term and long-term. The plan must take into account:

- Demographic considerations;
- Natural resource base and existing patterns of natural resource use;
- Economic opportunities and needs;
- Transportation and communication services and corridors;
- Energy requirements, sources and availability;
- Community infrastructure requirements, including health, housing, education and other social services;
- Environmental considerations, including Parks and Conservation Areas, and wildlife habitat;
- Cultural factors and priorities, including the protection and preservation of archaeological sites and outpost camps; and,
- Special local and regional considerations.

The NPC also collects and maintain an extensive database of geographic information, which includes topographic maps as well as specific themes.

1.1.2 Purpose of the Spatial Data Collection

One of the objectives of the study was to illustrate current economic activities and future opportunities in the area. In order to accomplish this objective, Terriplan collected the associated spatial data and produced maps as supporting materials in the final report. The spatial data is stored in a project-specific geodatabase as one of the deliverables to the NPC.

2.0 Data Collection Methodology

2.1 The File Geodatabase

Terriplan developed a "***file geodatabase***" to store, organize and manage all the spatial data collected for this study. As described on the on-line ArcGIS 9.2 Desktop Help[1], the file geodatabase was introduced in ArcGIS 9.2. The file geodatabase (extension .gdb) is similar to the personal geodatabase (file extension .mdb) with a few notable exceptions:

- Individual datasets inside a file geodatabase can be as large as one terabyte and there is no overall database size limit for a file geodatabase; a personal geodatabase can store a maximum of approximately two gigabytes.
- The file geodatabase allows for customized vector storage.
- The file geodatabase is a collection of files; the personal geodatabase is a single file, an .mdb file.
- File geodatabases are easier than personal geodatabases to use cross-platform.

Compared to personal geodatabases, file geodatabases improve performance, store vector data more efficiently, and improve concurrency and multi-user access over a network. They also provide an alternative, read-only format for large vector feature classes and tables that provide additional performance improvements. Therefore, a file geodatabase was used for this project.

2.2 Spatial Database and Sources

Based on background research, publicly available data and direct communications with GIS personnel in various levels of governments, Terriplan Consultants established a variety of spatial datasets to be used for creating a series of maps for illustration in the report showing the locations and spatial extent of some existing economic development activities. The spatial datasets and their metadata are stored in a central repository designed for this project – a *File GeoDatabase* – and can be retrieved by the NPC for future analysis and map compilation.

Terriplan's data activities for this assignment consisted primarily of:

- *Data collection* – Terriplan visited a number of Internet sites and government agencies to search for readily available spatial data for Nunavut.
  - **Internet sites** included: GeoBase, The Atlas of Canada, GeoGratis and GeoConnections Discover Portal
  - **Government agencies** included: NRCan, INAC, Government of Nunavut, and Nunavut Tourism
- *Data conversion and cleansing* – Once the data was obtained, Terriplan staff pre-processed all datasets to ensure that data complies with NPC's required standards. This included: corrected spatial reference (Canada Lambert Conformal Conic Project, NAD83), correct file

[1] http://webhelp.esri.com/arcgisdesktop/9.2/index.cfm?TopicName=Overview_of_MOLE_data&anchor=File%20geodatabase%20versus%20personal%20geodatabase

format (ESRI Shapefile), and metadata standards (FGDC). All data was pre-processed using the ArcGIS 9.2 Suite of software.

- *Data storage and management* – To optimize usage, version updates and data management, Terriplan created a file geodatabase to store all spatial data collected for the purposes of this study. Once the geodatabase was created from the data model, data was imported as a layer into geodatabase using ArcCatalog, and converted them into feature classes.

- *Compilation of Maps* - Terriplan created a series of maps as supporting presentations to the geographic references to Nunavut and its current economic analysis. All maps have been inserted into this report as images.

2.3 Data Assumptions and Limitations

The data and information forming the basis of this geodatabase is subject to the following limitations:

- Economic spatial data for Nunavut was generally not available on the Internet. Yet, through direct communication and data request, INAC and NRCan have supported this project by providing mining and land parcel data which they collected for their own studies. In addition, the Department of Community and Government Services of the Government of Nunavut supplied Terriplan with extensive municipal infrastructure data (by community).

- A variety of maps showing economic activities, such as tourist lodges, and valuable geographic features, like the national and territorial parks, are available in reports reviewed and referenced for this project. These are embedded images that cannot be converted as spatial data.

- Terriplan has made every effort to complete the metadata for each layer with our best knowledge and understanding of the spatial layer. However, metadata for some spatial data is not as comprehensive as others because it was not produced by the owner of the data source.

3.0 Geodatabase at a Glance

The table below summarizes the original data collected and used in the development of the geodatabase.

Table 1. Summary of the original data collected for the geodatabase

Data Description	Source
Nunavut Regional Boundary	Nunavut Planning Commission (NPC)
Nunavut Communities	Nunavut Regional Office, Indian and Northern Affairs Canada (INAC)
Nunavut Municipal Infrastructures	Department of Community and Government Services (CGS), Government of Nunavut
Nunavut Territorial Boundary	ESRI
Canadian Provincial/Territorial Boundary	ESRI
Canadian Lakes	ESRI
2007 Nunavut Mineral Exploration Activities	Nunavut Regional Office, Indian and Northern Affairs Canada (INAC)
Current Mineral Tenure	INAC SID Viewer Online[2]
Current Oil and Gas Rights Licences	Northern Oil and Gas Branch, INAC
Current Oil and Gas Wells	Northern Oil and Gas Branch, INAC
Protected Areas (Atlas of Canada 1,000,000 National Frameworks Data, Protected Areas)	Natural Resources Canada (NRCan) – GeoGratis
Stream Network	GeoBase – National Hydro Network[3]
Waterbodies	GeoBase – National Hydro Network
Road Network	GeoBase – National Road Network[4]
Land Parcels (Nunavut and NWT)	Canada Centre for Cadastral Management, NRCan

Spatial Reference:

Canada_Lambert_Conformal_Conic
Projection: Lambert_Conformal_Conic
False_Easting: 0.000000
False_Northing: 0.000000
Central_Meridian: -96.000000
Standard_Parallel_1: 50.000000
Standard_Parallel_2: 70.000000
Latitude_Of_Origin: 40.000000
GCS_North_American_1983

Metadata Standard:

Federal Geographic Data Committee (FGDC) Content Standards for Geospatial metadata.

[2] http://nwt-tno.inac-ainc.gc.ca/ism-sid/index_e.asp
[3] http://www.geobase.ca/geobase/en/data/nhn/index.html
[4] http://www.geobase.ca/geobase/en/data/nrn/index.html

Table 2 describes how the source data were organized into the geodatabase by feature dataset.

Table 2. Geodatabase datasets and feature classes

Feature Dataset	Feature Class	Source
Base		
	NPC_draft_regional_boundary	NPC
	NU_Communities	Nunavut Regional Office, INAC
	Lakes ProvincialBnd Territorial_Boundary	ESRI
Mineral		
	Nunavut_2007_Mineral_Exploration_Projects	Nunavut Regional Office, INAC
Mineral_Tenure		
	COAL COALOV MC_ALL MINLEASE OVERLAPS PPERMIT	INAC SID Viewer Online
Oil_and_Gas		
	Oil_Gas_Licences Oil_Gas_Wells	Northern Oil and Gas Branch, INAC
GN (Government of Nunavut)[5]		
	Airports_line BuildingFootprints_line BuildingFootprints_poly Infrastructure_line Infrastructure_point Infrastructure_poly NewDevelopment_line Shorelines_line Trails_line TravelledRoads_line Vegetation_poly	Department of Community and Government Services (CGS), Government of Nunavut
Hydro Network		
	HD_SLWATER_1 HD_WATERBODY_2	GeoBase – National Hydro Network
Road Network		
	NRN_NU_3_0_ROADSEG	GeoBase – National Road Network

[5] As per the source of Government of Nunavut, the features on the Autocad layers were not labelled. Hence, feature attributes (except its community) were not available in the Nunavut municipal infrastructure layers. Nonetheless, the features were identified on the communities' Community Plan and Zoning By-laws in PDF format, which are provided in the accompanied CD.

Feature Dataset	Feature Class	Source
NRCan (Land Parcels in Nunavut and parts of the NWT)		
	Nunavut_Protected_Areas_2006	NRCan - GeoGratis
	Administrative_Area Administrative_Boundary Ancillary_Line Condominium_Unit Easement Gwichin_Settlement_Lands Internal_Settlement_Land_Parcel Internal_Settlement_Land_Parcel_Boundary Inuit_Owned_lands Land_Parcel Land_Parcel_Boundary Land_Parcel_Retired Mineral_Claim Plan_Envelope Provisinosl_Line Reference_Point Reference_Point Sahtu_Settlement_Lands Salt_River_First_Nation_Settlement_Lands SubSurface_Oil_and_Gas_Parcel SubSurface_Oil_and_Gas_Surveyed_Unit Surveys_in_Progress Tlicho_Settlement_Land	Canada Centre for Cadastral Management, NRCan

4.0 Response to Comments on GIS Deliverables (dated July 7, 2008)

4.1 Overview:

Terriplan Response: *As per NPC's comment, all maps produced by Terriplan Consultants are labelled in Verdana.*

4.2 Part 2: Summary of Maps in Report

Figure 1: Map of Nunavut, page 2
NPC Comment: Map from mxd in above section. Missing labelling in key map. Undefined scale
Terriplan Response: *Key map labelled; scale text added- 1:13,000,000; "Lakes" layer is added to the geodatabase.*

Figure 2: Map of Nunavut: Regions and Communities, page 9
NPC Comment: Map cut and pasted from internet. Poor resolution, unreadable labels. Poor colours. Missing regions. Should be replaced by map made from source of Figure 1 map that matches theme, and is readable.
Terriplan Response: *Replaced Figure 2 by a new map made from the source of Figure 1; scale text added- 1:13,000,000.*

Figure 26: Air Routes in Nunavut, page 53
NPC Comment: Cut and pasted from internet. Poor resolution. Unreadable labels. Missing newer routes (e.g. Canadian North-Cambridge Bay to Igloolik and Iqaluit). If possible should be replaced by proper shapefiles.
Terriplan Response: *Spatial data for air routes in Nunavut not available.*

Figure 27: Marine Routes in Nunavut, page 54
NPC Comment: Cut and pasted from internet. Poor resolution. Unreadable labels. Missing newer routes (e.g. Barges from Montreal to Kitikmeot). If possible should be replaced by proper shapefiles.
Terriplan Response: *Spatial data for marine routes in Nunavut not available.*

Figure 28: North Atlantic Regulatory Areas, page 57
NPC Comment: Pasted image from Baffin Fisheries Coalition. Acceptable map for report, but no supporting GIS data provided in database for fishing areas or fisheries.
Terriplan Response: *Spatial data not available.*

Figure 34: Sport Hunting in Nunavut, page 72
NPC Comment: Pasted image from Nunavut Tourism. This map is not acceptable, and should be replaced with a real map using GIS point or polygon data if available, for sport hunting areas or camps.
Terriplan Response: *Spatial data for sport hunting in Nunavut not available.*

Figure 35: Sport Fishing in Nunavut, page 73
NPC Comment: Pasted image from Nunavut Tourism. This map is not acceptable, and should be replaced with a real map using GIS point or polygon data if available, for sport fishing areas or camps.
Terriplan Response: *Spatial data for sport fishing in Nunavut not available.*

Figure 36: National Parks in Nunavut, page 74
NPC Comment: Pasted image from Nunavut Tourism. Although the map is fine, it is mislabelled and should state that it is a map of Territorial parks, National Parks, Wildlife Areas, and heritage sites. Also, this data is readily available from NRCan, so the GIS data should have been used to create a map from the base map for the report. GIS data not present in database.
Terriplan Response: *Replaced Figure 36 by map made from NRCan data; GIS data is added in the geodatabase.*

Figure 39: Oil & Gas – Nunavut, page 80
NPC Comment: Pasted image from INAC. This map should have been made from original GIS data and put on base map for report. GIS data not found in database.
Terriplan Response: *Replaced Figure by map made from INAC data; GIS data is added in the geodatabase.*

Figure 52: 2007 Exploration Sites – Nunavut, page 95
NPC Comment: Nice map, missing scale text, from .mxd map documents
Terriplan Response: *Scale text added- 1:13,000,000.*

Figure 59: Base Metals Exploration in Nunavut, page 101
Figure 61 Gold & Precious Metals Exploration in Nunavut, page 103
Figure 63: Diamond Exploration in Nunavut, page 105
Figure 65: Uranium Exploration in Nunavut, page 107
Figure 66: Iron Exploration in Nunavut, page 108
Figure 67: Coal Exploration in Nunavut, page 109
Figure 68: Gemstone Exploration in Nunavut, page 110
NPC Comment: These are also from .mxd map documents provided in GIS folder with report. Nice maps, but missing scale text
Terriplan Response: *Scale text added- 1:13,000,000 – same scale as Figure 52 to maintain the consistency of the maps.*

Figure 69: Proposed Bathurst Inlet Port & Road, page 116
NPC Comment: Pasted image from Nuna Logistics. No supporting GIS data found.
Terriplan Response: *Spatial data not available.*

Figure 71: Proposed Road from Kivalliq Region in Nunavut to Churchill, Manitoba, page 118
NPC Comment: Pasted image from Nunavut –Manitoba Selection Study (2007) Newsletter. No supporting GIS data found.
Terriplan Response: *Spatial data not available.*