



THE DIGITAL TERRAIN MAP LIBRARY: AN EXPLORATIONIST'S RESOURCE

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INTRODUCTION

The Digital Terrain Map Library provides terrain and related maps in digital format on the Internet at www.ei.gov.bc.ca/geology/. Vector and raster image maps presently in the library include early terrain maps produced by the Ministry of Environment, Lands and Parks and new Terrain and Terrain Stability maps that are currently being produced through B.C. Forest Practices Code Act requirements.

Terrain maps and their derivative products are becoming increasingly more popular and widely used in the province. Surficial materials displayed on terrain maps form the primary building blocks for many terrestrial mapping systems. In addition to their use in developing logging plans and road construction in the forest industry, these maps are routinely being used in engineering and geotechnical consulting, land-use planning, terrestrial ecosystem mapping, aggregate development, placer and glacial drift exploration. This paper is primarily directed to mineral explorationists that may be unfamiliar with terrain maps and their availability.

Since 1989 the British Columbia Geological Survey Branch has been responsible for Quaternary geology studies in the province. This includes mapping, drift exploration studies, geological hazard research and data inventory. The Geological Survey Branch is the custodian of digital map data and makes this information available over the Internet. The Digital Terrain Map Library project, which began in October 1996, is providing terrain information in an easily accessed format at no cost to the user. Funding for this project is provided by Forest Renewal B.C..

INTRODUCTION TO TERRAIN MAPPING

The terms terrain, surficial geology, Quaternary geology and the older term superficial geology are somewhat synonymous, however terrain maps do not differentiate units on a time-stratigraphic basis. Terrain refers to a tract or region considered as a physical feature, ecological environment or a site of planned activity; terrane is a tectono-stratigraphic grouping of bedrock formations.

To ensure data consistency between disciplines utilizing terrain information a standardized approach has been established through guidelines published by the Resources Inventory Committee (RIC). Information may be shared between all members of the terrain community. The B.C. Ministry of Environment, Lands and Parks (MELP) pioneered many of the early standards. The Terrain Classification System for British Columbia, Version 2 (Howes & Kenk, 1997) is designed to classify and inventory surficial materials, landforms and geomorphological processes. This document forms the basis for terrain mapping in British Columbia and can be either viewed or downloaded from the MELP Internet site located at <http://www.elp.gov.bc.ca/rib/wis/terrain/inventory/manuals.htm>. The objective of this website is to provide access to all material required and related to terrain mapping. Listed below are other publications located at this site.

- ♦ A User's Guide to Terrain Maps in British Columbia
- ♦ Guidelines and Standards to Terrain Mapping in British Columbia
- ♦ Terrain Stability Mapping in British Columbia: A Review and Suggested Methods for Landslide Hazard and Risk Mapping
- ♦ Standard for Digital Terrain Data Capture in British Columbia

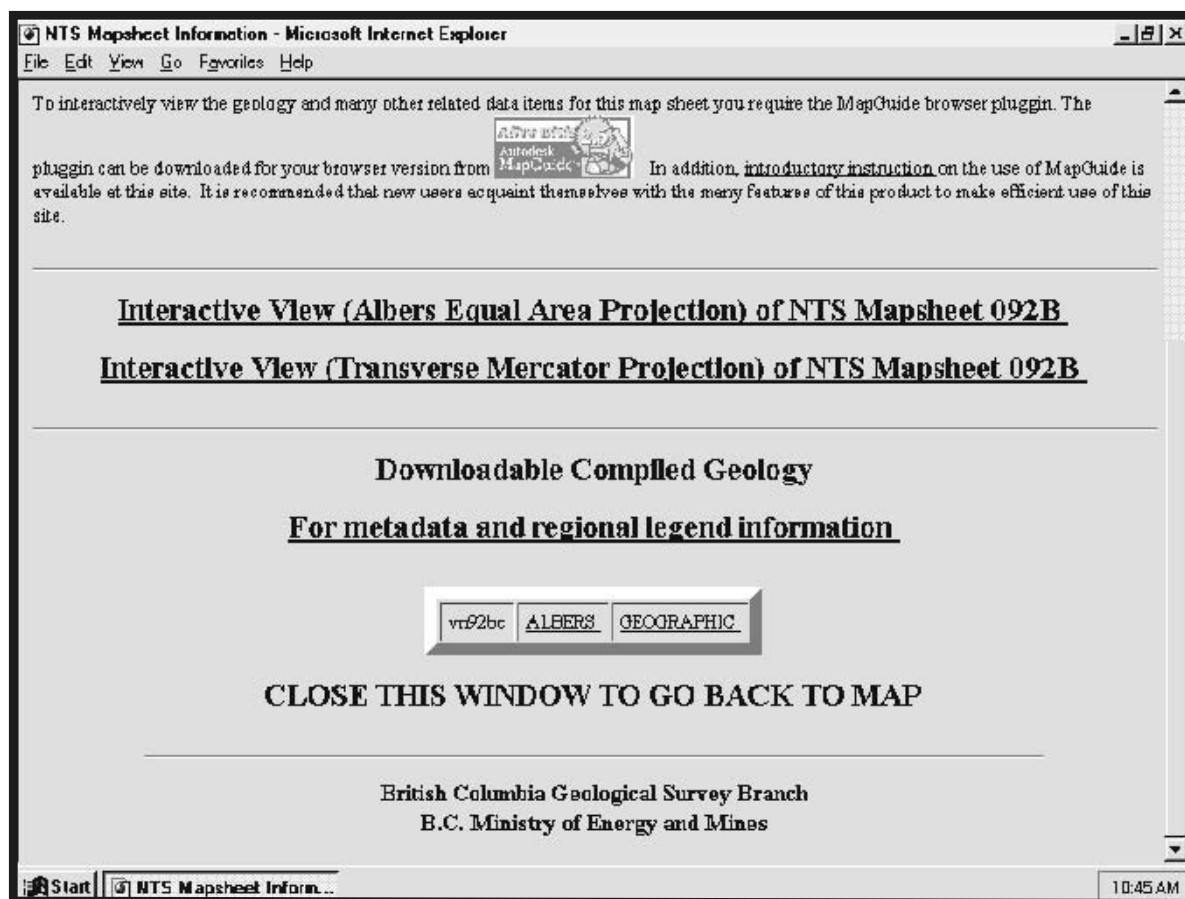


Figure 1. Digital terrain map library screen image showing options to view maps interactively with MapGuide or download as ArcInfo .E00 export file.

A variety of derivative maps are being produced that utilize information provided by terrain maps. Terrain stability maps are derived based on terrain polygon label information plus other criteria such as the frequency of occurrence of existing slope failures, drainage, anticipated usage and local knowledge. The Mapping and Assessing Terrain Stability Guidebook (1995), produced under the *Forest Practices Code Act*, contains information about derivatives such as the Slope Stability Classes I through V.

On-site symbols and line symbology are used extensively on terrain maps to represent features such as ice flow direction indicators, eskers, debris slides and avalanche tracks. A catalogue of all the features including a description and a feature code (number) can be found at the MELP website <http://www.env.gov.bc.ca/gis/featurecodes.html> and in The Standard for Digital Terrain Data Capture in B.C.. Terrain and derivative maps are well suited for Geographical Information

Systems (GIS) because of the variety and associations of information they contain.

ACCESSING MAPS AT THE LIBRARY

The B.C. Geological Survey home page is located at www.ei.gov.bc.ca/geology/. This site provides access to the entire provincial geoscience database available on the WWW and is expanding rapidly. Users are encouraged to explore the options available here for obtaining other geological information. The Terrain Map Library is reached by following the links on this page. The Terrain Map Library homepage contains the following links:

- ♦ General Project Description
- ♦ Surficial Geology Map Index of B.C. (GSB Open File 1992-13)
- ♦ Interactive and downloadable Terrain and Terrain Stability Maps
- ♦ Interactive Aggregate Potential Maps

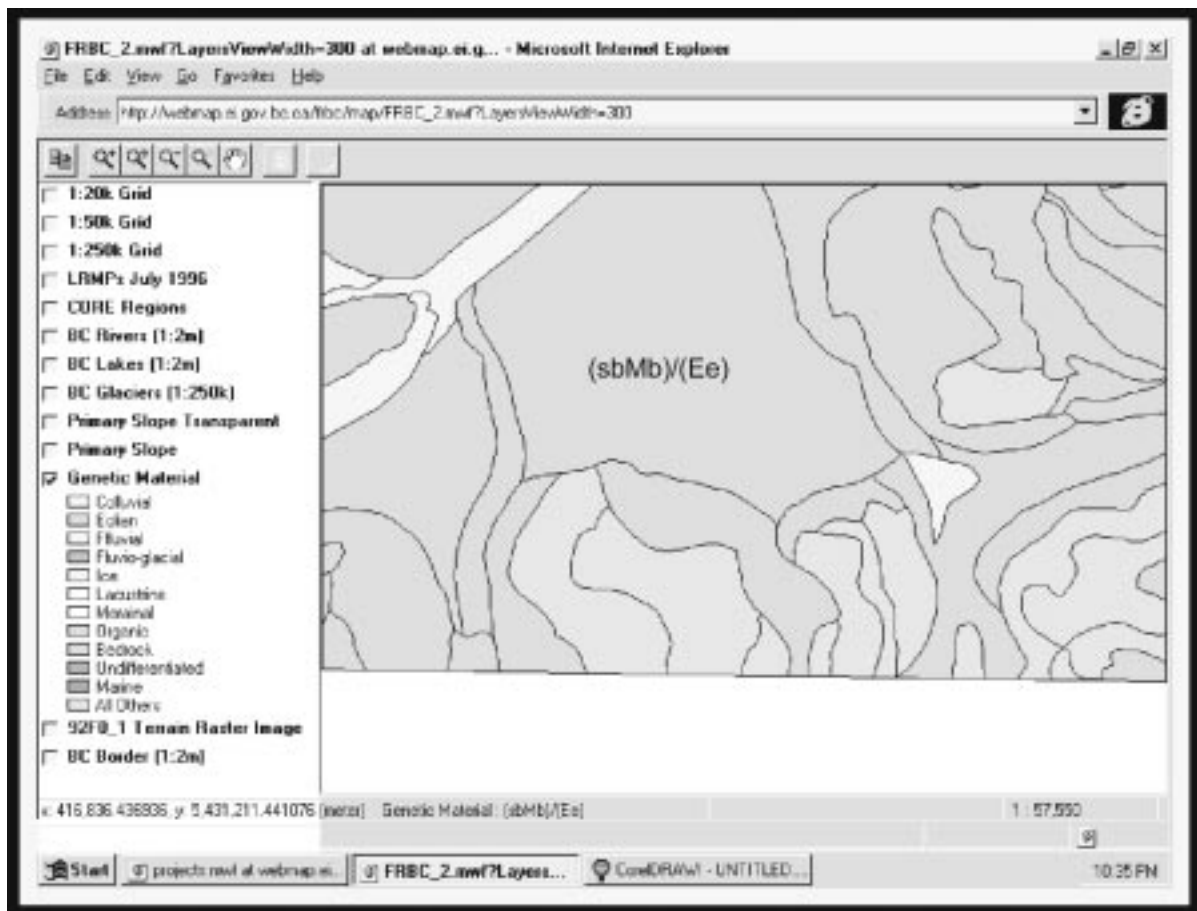


Figure 2. Terrain map library screen image showing example of vector image for part of Nanaimo Lakes mapsheet.

- ♦ Listing of new additions or changes
- ♦ Related WWW Sites

Follow the link to Interactive and downloadable Terrain and Terrain Stability Maps to view terrain maps or download the digital map files. The information provided at each step is comprehensive and should be read for a thorough understanding of the options available. The free MapGuide viewer must be downloaded and installed to enable the browser to display the maps. An outline of the province will appear with coloured areas indicating where digital coverage is available. Double click on an area. This leads to a page that provides an option to view the maps interactively using MapGuide or to download the files in zipped Arc Export (E00) format or raster image (Figure 1).

There are two digital formats that can be accessed in the Digital Terrain Map Library.

Vector Format

Vector data is available for viewing through

MapGuide or downloading in a standard GIS format. Vector objects can be associated with attribute information and are viewable at many scales (Figure 2). A number of queries can be performed on vector map data using MapGuide.

Raster format

Raster image maps are obtained by scanning the original map and as such, form a static copy of the original. These raster images are georeferenced for viewing with MapGuide in the Terrain Map Library or may be downloaded to produce copies of the original map (Figure 3).

MAP SOURCES

Existing hardcopy maps produced by Ministry of Environment during the 1970s and 1980s are being converted to digital format for inclusion in the library. There is coverage for approximately one half of the province at 1:50 000 scale (Figure 4). Soils and Landforms maps were included to provide coverage, where there

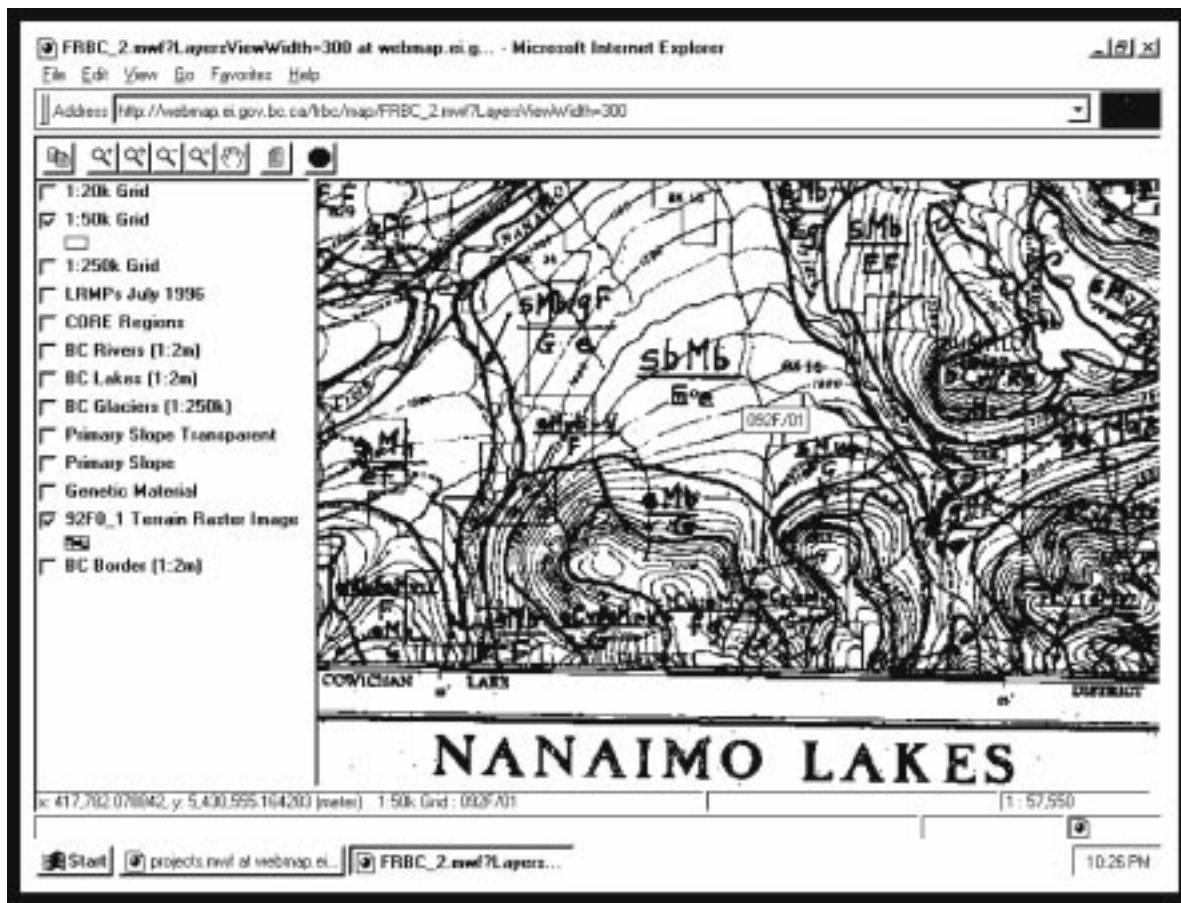


Figure 3. Raster image of original Ministry of Environment map showing the same area as in Figure 2.

were no terrain maps, because the soil types provide information about the parent (genetic) material. The converted digital maps reflect the original map information as closely as possible: no attempt is made to convert the older attribute information to comply with the new standards for terrain mapping. Data is captured in a georeferenced format in the same datum as the original. In most cases this is the NAD 27 datum, conversion to NAD83 is accomplished using the National Transformation Version 2 conversion grid. As digital vector based maps are useable at many scales and may be integrated with a wide variety of basemaps, special digitizing conventions were adopted to deal with the data capture of waterbodies. Existing waterbodies, oceans, lake shores and some large rivers, are not included. Instead terrain polygons are projected out into the waterbodies. This allows for data to be easily incorporated into many different basemaps. GIS operators can clip the terrain maps with the water bodies from their basemaps or simply overly the water features on the terrain data. Different scale digital basemaps have dif-

ferent shoreline positions and shapes and adoption of any one would have created significant problems for users of other basemaps.

Most maps contain inconsistencies in linework or labeling. Where obvious, these problems have been addressed, but in many cases they could not be resolved. Typical examples of these problems are; multiple labels in a polygon, no label in a polygon, labels that are not described in the legend and incomplete linework. Where possible, unresolved problems are left as documented on the map unless their inclusion is completely incompatible. The user does have the option to view the raster image of the original map.

All new FRBC funded terrain stability mapping that is being produced throughout the province under *B.C. Forest Practices Code Act* requirements is submitted to the library in hard-copy and digital format. This new mapping must adhere to RIC standards as outlined in Standard for Digital Terrain Data Capture in British Columbia. Most of these maps are at 1:20 000 scale and will be posted directly at the

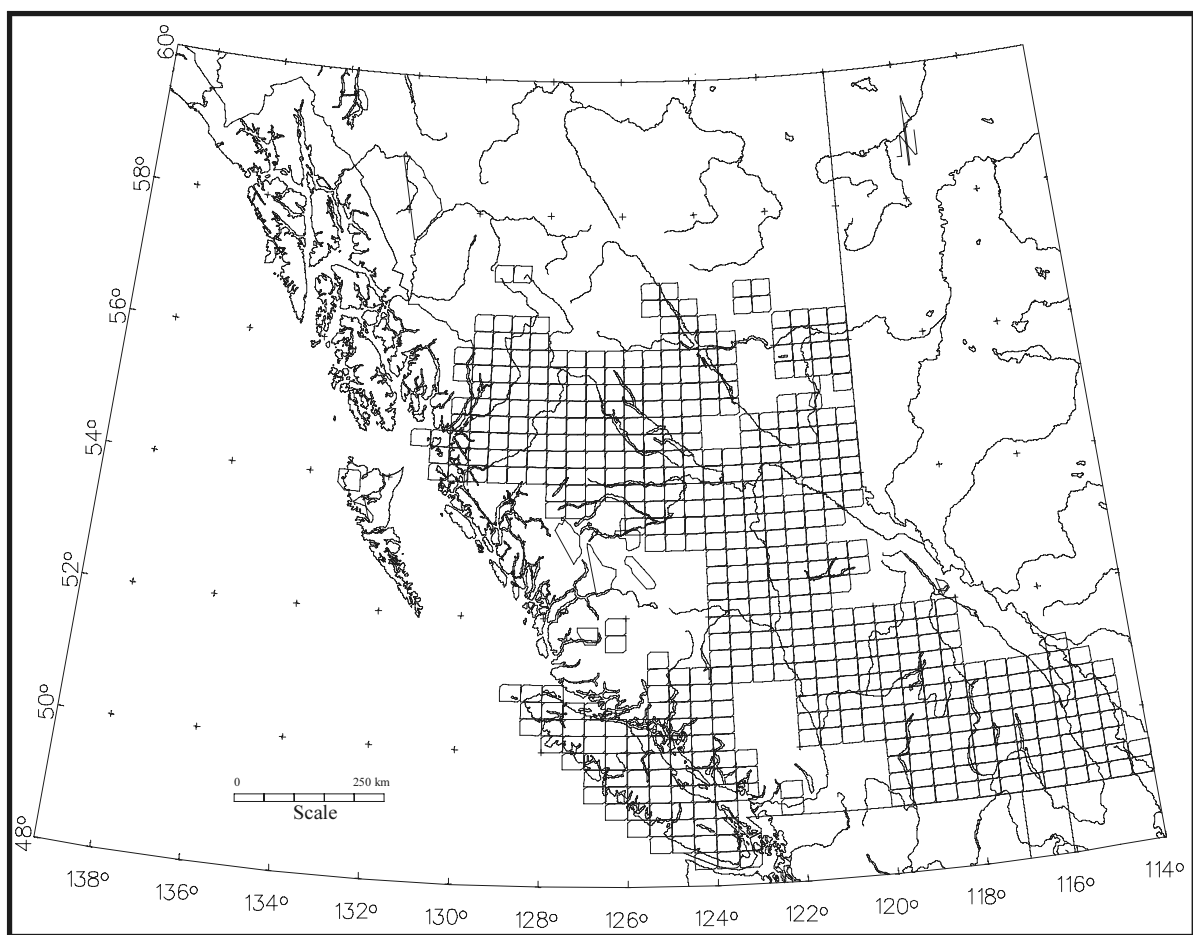


Figure 4. Map of B.C. showing 1:50 000 scale Ministry of Environment, Lands and Parks Terrain and Soils and Landforms coverage.

Terrain Map Library site for downloading and on-line access.

MAP USES

Terrain and terrain stability maps have many potential uses in mineral exploration. Knowledge of terrain materials distribution and processes in an area can assist in the planning and interpretation of geochemical programs such as drift and placer exploration. Terrain maps also provide information about the thickness and the direction from which materials may have been transported prior to deposition. This can assist in determining potential up-ice source areas for anomalous geochemical samples or mineralized float.

Work involving surface disturbance such as access or drill pad construction requires knowledge of slope stability in an area. The Mine Health & Safety Reclamation Code (Mineral Exploration Code) requires special considera-

tion in areas that are mapped as Slope Stability Class V, or class IV and V in community watersheds. Materials, processes and slope stability class can readily be determined at the Terrain Map Library. Other uses of terrain and terrain stability maps include providing information about areas with the greatest sediment delivery potential to fish bearing streams, baseline data for environmental considerations such as biodiversity and habitat possibilities and determining potential sources of aggregate.

SUMMARY

Terrain and terrain stability maps can be accessed from the Digital Terrain Map Library. This is a comprehensive site that provides the information required to understand, use and print maps. It is an important new resource of value to the explorationist.

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