

Update of British Columbia Geological Survey Geospatial Databases and Applications

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INTRODUCTION

The Fraser Institute's Annual Survey of Mining Companies 2005/2006 recognized British Columbia as having the top-ranked geological database in the world. More than 300 mining, exploration and consulting companies responded and rated BC's attractiveness for investment in mineral exploration and mine development. In 2005, these mining companies invested approximately \$2 billion in exploration worldwide. In BC, the industry invested approximately \$200 million in the same period. This ranking, in comparison with 64 jurisdictions, is a strong indicator of the competitive advantage that results from a superior geological database as well as the opportunity to attract a larger share of worldwide expenditures.

The BC geological database includes geological knowledge produced and recorded for over 110 years by a diverse range of geoscientists. These include those who have worked in industry, academia and government, as well as independent, entrepreneurial prospectors and miners. The exceptional value of this database is that a high percentage of the geological work carried out in BC has been documented and is easily accessible, using state-of-the-art information management technology.

The BC Geological Survey (BCGS) is only one of several key organizations that contribute annually to this body of knowledge. The BCGS's main map and database access tool is called the MapPlace. The strength of this Internet-based system lies in its ability to retrieve geological and mineral-related data from our own corporate datasets as well as data and map information from other sources, both within and outside of BC.

The BCGS databases are continually evolving with the addition of new data and improvements to accessibility and functionality. The purpose of this paper is to provide an update on the status of the following corporate databases:

- MINFILE, the provincial mineral inventory with over 12 300 mineral, coal and industrial mineral occurrence records compiled over the past 35 years;

- The Property File, an *ad hoc* collection of hardcopy reference materials supporting the descriptions of occurrences in MINFILE;
- ARIS, the Mineral Assessment Report Indexing System with over 28 000 reports submitted, documenting the results of industry exploration investments in BC since 1947, and;
- The MapPlace, an Internet-based, interactive GIS tool for viewing, analyzing and interpreting BC's geological database in the broadest sense, including MINFILE, COALFILE, ARIS and numerous internal and external geoscience-related datasets.

The BC geological database should be considered an integral component of the infrastructure fabric that supports the province, its economic and resource development and the protection of its physical environment. The above databases are of strategic importance to the provincial mandate to manage the stewardship of its mineral and coal resources.

The right tools, such as interactive maps, appropriate downloads and scanned reports, can help effectively and efficiently retrieve mineral-related information to develop exploration investment strategies, conduct geoscience research, evaluate the resource potential of an area or plan for land-related decisions.

MINFILE ENHANCEMENTS

MINFILE/www is an internet-based mineral inventory database system for over 12 300 metallic mineral, coal and industrial mineral occurrences in BC. MINFILE/www is recognized internationally as an exceptional geoscience information system. The system is a 'desktop prospecting' tool used for planning exploration programs, investment, resource management, policy planning, land use planning, teaching and research. The site is located at <http://www.MINFILE.ca>.

The 2005 system upgrades to MINFILE/www included rewriting the DOS-based MINFILE system — the first in 20 years — and establishing it as an SQL database accessed through the Internet. While the database formats have changed, the fundamental, underlying data architecture has remained the same. This aspect has maintained the overall robustness of the original MINFILE system. MINFILE/www was optimized for Microsoft® Internet Explorer® (IE) 6; however, it will work on IE 7 and Netscape®. MINFILE/www searches can be used with dial-up connections, but better performance is achieved with higher bandwidth connections.

MINFILE/www is interconnected with other Ministry database interfaces. Location information is linked to the MapPlace by clicking on the latitude-longitude link, which

This publication is also available, free of charge, as colour digital files in Adobe Acrobat® PDF format from the BC Ministry of Energy, Mines and Petroleum Resources website at http://www.em.gov.bc.ca/Mining/Geosurv/Publications/catalog/cat_fldwk.htm

opens a new window with an interactive map. The resulting linked window shows the series of layers turned on and the occurrence at the centre of the map. MINFILE/www is also linked to the ARIS (Assessment Report Index System) data interface. Clicking on an assessment report number link in the MINFILE bibliography connects to the ARIS Summary Report with a link to the PDF report. This interconnection structure has been designed to increase the accessibility of our data. Part of the system upgrade focused on the ability to crosslink all three of these data interfaces so it is possible to reach any one from another.

The new MINFILE/www system has a user-friendly interface with Online Help throughout (Fig 1). The layout has thematic tabs grouped by Identification/Location, Mineral Occurrence, Host Rock, Geological Setting, Inventory, Production and Capsule Geology/Bibliography. Searches can be done using input text, including partial text strings, drop-down pick lists and check boxes. Significant improvements include free-text searches on all comment fields and the Capsule Geology and Bibliography fields. Searches can be stacked to refine a series of results to very specific criteria. The default Basic Search has a link to the Advanced Search, which includes more fields and allows for complex searches around Boolean logic operators.

Initial search results are delivered in tabular format, showing several key fields. Clicking on the MINFILE number links to a summary page and further links connect to the full MINFILE detailed report, as well as production and inventory reports, if available. At all stages of the search, download information is available, differing in type depending on the depth within the search result stack. Download formats include PDF documents, Microsoft Word documents, plain-text files and Microsoft Excel spreadsheets.

Other features include the 'Import Numbers' tab, MINFILE/pc and the online MINFILE Coding Card. The Import Numbers tab allows a user to manually input individual MINFILE numbers to search. The numbers can be input from a previously developed search where the result-

ing MINFILE numbers were downloaded, a text file list developed by a user or typed directly into a special window in the search application. This feature allows searches to be 'saved' for future use or to have user-specific requirements met, such as a client's property portfolio.

MINFILE/pc is a user-friendly, Microsoft Access application that is downloadable for offline use. It has an interface similar to MINFILE/www and consists of Basic/Advanced searches, on-screen occurrence summary data and other reports and downloads. MINFILE/pc provides a portable extract of the MINFILE database, along with search forms and printable reports. This is useful for those that want to take the full database into the field. The data can be updated simply by connecting to the Internet and downloading again.

The online MINFILE Coding Card allows clients to update existing or report new descriptions of mineral occurrences. It is similar to the search pages and is supplied with many drop-down lists, pick boxes and automated fill fields designed to make coding convenient. Once an addition is made and approved, the update is immediately available online. Those wishing to do online coding must contact the BCGS for access and more information.

The upgraded MINFILE system software and reports provides convenient and comprehensive access to the MINFILE database. The move to an Internet-based system makes it accessible from anywhere in the world. The enhancements have increased the variety and sophistication of searches that can be done. Downloadable products and interconnectivity with other Ministry applications make MINFILE/www a world leader in geological search and retrieval data systems.

MINFILE Database

The first computerized database of mineral occurrence information for BC began at The University of British Columbia in the early 1970s and was known as MINDEP. It

Figure 1. MINFILE/www search screen.

soon migrated to the BC Geological Survey as a mainframe application and database that became known as MINFILE. In 1986, after the advent of minicomputers, MINFILE was completely restructured for the smaller platform and rewritten as a relational database. Since 1984, the information in the MINFILE database has undergone extensive expansion. The data has been updated by experienced geologists to ensure that the information available is factual, concise and high quality. By June 1990, MINFILE had 4950 occurrences updated and released, which represented 48% of the provincial total. As of April 1995, 85% of MINFILE had been updated. By January 2002, MINFILE had 12 098 occurrences and by the end of 2005, all 12 300 occurrences were completed to the standard set in 1986. Challenges still exist to maintain currency of the data and add new occurrences. The recent focus has been to update the major exploration projects and mines.

PROPERTY FILE PROJECT

Property File is an *ad hoc* collection of documents that have been acquired over the years by Ministry staff as well as donations from the mining industry and academic institutions. Property File currently contains over 90 linear metres of reports and maps that are generally unavailable elsewhere. These documents can be extremely valuable to researchers. It comprises, but is not limited to unpublished reports; theses and papers; field notes; company prospectuses and pamphlets; historical information; geology, geochemistry, geophysics and drill information; claim maps, sketches of workings; photographs; memos; letters; news clippings and articles, all from as far back as the late 1800s. The documents vary in size, from small notes and newspaper 'clippings' through to 4' by 6' drawing sheets. The bulk of the contents are original documents, with photocopies typically of news-type items such as trade papers and trade/technical journals. Property File also contains general, regional, geological and mineral deposit information on mineral occurrences in BC, the National Mineral Inventory data cards, topographic maps and some work histories. In addition, Property File has been a location for placing miscellaneous information (such as promotional material), which may have little or no technical importance, but provides background material to specific mineral occurrences or camps. Many of the documents are unique and have historical (archival) relevance. Property File also has several special collections that were donated by mineral exploration and mining companies. These sizable collections are currently housed in offsite storage. The uniqueness and age of the information contained make Property File a valuable research tool, yet it is greatly underused due to limited access and its lack of a comprehensive, centralized index.

In 2005, the Property File project was initiated to make this material Internet accessible. Property File documents will be scanned and indexed in a metadata catalogue and made fully searchable. The documents will be linked to MINFILE/www and the MapPlace. Upon completion of a pilot project to determine the most effective way to scan and index the wide variety of documents, the project will start with the Ministry's collection in the Library. Following that, our other collections of donated files will be incorporated into the database. As well, other collections in the regional offices including Cranbrook, Kamloops, Prince George and Smithers will be reviewed for inclusion. The data structure and metadata catalogue are currently in the

development stage. As the project proceeds, depending on annual funding, scanned documents and metadata will be posted to the Internet. This project will be ongoing, similar to the mineral assessment reports being made available online. The BC Geological Survey will be pleased to receive additional donations of company or personal geoscience documents to add to the Property File collection. Donations will be acknowledged as part of the database and will be posted on the Property File web page (<http://www.em.gov.bc.ca/mining/Geolsurv/Minfile/propfile.htm>).

COALFILE

Coal is the second-most important resource exported from BC, next to wood products. The Ministry maintains a library of 828 coal assessment reports. These reports have been scanned as PDF documents. Partial versions are available for download from the web or full versions are available on DVD at a cost of \$20 per report. An online COALFILE search application allows searches on COALFILE Number, Report Year, Coal Field and NTS Map (<http://webmap.em.gov.bc.ca/mapplace/coal/search.asp>). Results include links to Coal Assessment Reports, Boreholes, Bulk Samples, Trenches, MINFILE, MapPlace and Google Earth.

ARIS (ASSESSMENT REPORT INDEXING SYSTEM)

Results of mineral and placer exploration and development programs are required to be submitted to the Ministry in the form of an assessment report and reviewed for compliance with the *Mineral Tenure Act* (MTA) Regulations. The reports are indexed in the ARIS (Assessment Report Indexing System) Assessment work comprises approximately 40% of the overall mineral exploration carried out in the province. Of this 40%, about 75% is filed to maintain claims and 25% is filed in portable credit accounts (PAC).

The Assessment Report Library contains over 28 000 reports describing exploration work valued at over \$1 billion. After the one-year confidential period, all reports are scanned for distribution on CD-ROM/DVD and the Assessment Report home page. A total of 26 250 reports (96%) are currently scanned and available for free downloading.

The ARIS database can be accessed through ARIS/www, an online search tool (Fig 2), and the MapPlace. The electronic distribution of mineral assessment reports enhances our current Internet service and eliminates the production of microfiche. Benefits of this project are faster access to data for 'desktop prospecting', improved user friendliness and worldwide access for prospective investors.

Brief History of ARIS

The assessment report system was introduced in 1947 to archive information collected by the mineral exploration industry. These reports are used by prospectors and exploration companies to facilitate the discovery of new mines. It also plays an important role in mineral resource assessments by governments.

ARIS Assessment Report Database

Search on any combination of fields:

New Search Import Reports Help

AR Number	<input type="text"/>	Latitude	<input type="text"/> <input type="text"/> <input type="text"/>	To	<input type="text"/> <input type="text"/> <input type="text"/>
Affidavit Date	<input type="text"/> To <input type="text"/>	Longitude	<input type="text"/> <input type="text"/> <input type="text"/>	To	<input type="text"/> <input type="text"/> <input type="text"/>
<i>Dates must be in the format YYYYMMDD.</i>					
Claim Name	<input type="text"/>	<input type="radio"/> NAD 27 <input checked="" type="radio"/> NAD 83			
Property Name	<input type="text"/>	Mining Camp	<input type="text"/>		
Individual Name	<input type="text"/>	Keywords	<input type="text"/>		
<input type="checkbox"/> Operators <input type="checkbox"/> Owners <input type="checkbox"/> Authors		General Work	<input type="checkbox"/> Drilling <input type="checkbox"/> Geochemical		
Mining Division	<input type="text"/>		<input type="checkbox"/> Geological <input type="checkbox"/> Geophysical		
NTS Map Number	<input type="text"/>		<input type="checkbox"/> Physical <input type="checkbox"/> Prospecting		
BCGS Map Number	<input type="text"/>	Specific Work	<input type="text"/>		
MINFILE Number	<input type="text"/>		<input type="text"/>		

Search on All 27,789 Assessment Reports (Approved or Under Review)

Figure 2. ARIS search screen.

The Assessment Report Library ceased microfilming the assessment reports in 1999 and switched to scanning the reports as PDF (Adobe Acrobat™ portable document files). This began through a partnership with Abitibi Mining Corp., Black Bull Resources Inc., Eagle Plains Resources Ltd, Kennecott Canada Exploration Inc. and Klondike Gold Corp. Since that time, the BC Geological Survey has entered into several other major partnerships. The following companies are acknowledged for their contribution in helping scan portions of the reports: Heritage Explorations Ltd., International Wayside Gold Ltd., St. Andrew Goldfields, Ram Explorations, SYMC Resources Limited and Geoinformatics Exploration Ltd.

ARIS MapBuilder

The ARIS MapBuilder was created to quickly produce location and claim maps of properties to partially fulfill assessment reporting requirements. Users simply enter the property name and all associated Tenure ID Numbers in the online form and click a Create Map button. A Tenure Report button creates a list of tenures on the property with links to details from Mineral Titles Online. The resulting index map of the property, the claim map (Fig 3), and a list of all the claims can then be included in an assessment report. This saves the author time in drafting the map or looking for the required information. The site also creates a Keyhole Markup Language (KML) file to show claims in viewers such as Google Earth.

NEW AND UPDATED MAPPLACE DATA LAYERS AND TOOLS FOR THE PROSPECTOR

Overview

The MapPlace (www.mapplace.ca) uses the Internet to provide interactive access to an extensive array of

geospatial map information related to BC bedrock and surficial geology, terrain information, mineral resources, mineral exploration and onshore/offshore energy resources. The site is hosted by the BC Ministry of Energy, Mines and Petroleum Resources and has been in operation since 1995. The award-winning site (BC & Yukon Chamber of Mines Award 2000 and Service to the Public Award 2001) has proven very successful in providing easy access to current information and a number of spatial analysis capabilities.

The MapPlace has over 50 maps, many with theme data and some with interactive tools. Data themes available on the MapPlace cover a broad range of spatial data in vector and attribute form, including bedrock geology; geochemical surveys; mineral occurrences; exploration assessment reports; and mineral, coal and petroleum tenure locations. These data can be combined with other base data, including administrative boundaries, topographic features and raster images such as Landsat images and aeromagnetics. User-defined map views can then be printed or pasted into common graphics packages (e.g., Microsoft PowerPoint®, CorelDraw™). Many individual map objects are linked to valuable attribute data or to a separate website, allowing further search and retrieval capabilities. All geospatial data maintained by the BCGS is available for free download in shape or Microsoft Access™ formats.

Each map has a 'More Details' link to provide further information, such as unique layers, special instructions to view certain features and links to additional information. The MapPlace website has pages for online help, FAQs, links to workshop notes, site updates, geospatial downloads, metadata summaries and an extensive list of links to other data and maps.

Main Maps

The Main Maps page has links to 11 maps. The British Columbia Geological Survey Geoscience Map accesses

most of the geospatial datasets. The Exploration Assistant map features eight analysis tools, including the Image Analysis Tool, to display information based on query selections. The Mineral Titles map has additional title layers and a split screen to view reports. Two maps, the MapperWrapper and MapBuilder, offer different approaches to annotate and save maps. The MapPlace Lite WMS Viewer displays the main geoscience data, such as geology, mineral occurrences, assessment reports and mineral tenure, without the use of the MapGuide® Viewer. It has limited functionality, but has a WMS service which can be used in other WMS compliant viewers. The UTM Zone maps display BC, projected for each of the five UTM zones in the province.

EXPLORATION ASSISTANT WITH REMOTE SENSING IMAGE ANALYSIS

The Exploration Assistant map offers mineral exploration clients GIS tools and data to enhance their research capabilities in planning new exploration programs. Clients can use the new location tools (Fig 4) to search, display and Zoom Goto Indian Reserves, Latitude-Longitude Co-ordinates, Mapsheet, Municipality, Place Name, Scale or UTM Co-ordinates. The Discovery Potential tool displays where deposit types are likely found (based on the Mineral Resource Assessment program). The MINFILE database can be searched and displayed by commodity, deposit type, name, Mining Division or NTS Map. Clients can display geology by age, lithology and terrane. Tools are also available to search and display Mineral Titles by Name, Owner ID, Anniversary Date and Acquired Date. The Geochemistry Element section features the selection of 38 elements,

from the Regional Geochemical Survey program, for display as provincial or map sheet thresholds; symbols can also be resized. The Search Publications section, described below, features searches on the BCGS publications by Author, Title, Keyword, Abstract, Year, Scale, Series, Publication ID, Map Extent and All Fields. The Layer Finder helps locate any of the over 500 layers using keywords.

The Exploration Assistant supports a set of Image Analysis Tools (IAT), providing sophisticated analysis capabilities to be performed on geopositioned multiband and hyperspectral imagery. The site now includes 68 Landsat and 239 ASTER images to analyze. The site is supported with a tutorial manual and video tutorials. For details on the IAT, see the 2004 to 2007 papers by Kilby *et al.* in the Bibliography and More Information section.

The following recent geochemical datasets were added as separate layers to the Exploration Assistant: Geofile 2006-12, Golden, Brazeau Lake, Canoe River and Mount Robson; Geofile 2006-9, Re-analysis of samples from the McLeod Lake area; Geofile 2006-11, Anahim Lake – Nechako River; RGS 57, Fort Fraser; RGS 58, Bowser Lake and Spatsizi River. The data from these surveys will be integrated into the provincial geochemical database of the RGS layers of over 50 000 samples.

MAPPERWRAPPER AND MAPBUILDER

An online mapping application called the ‘MapperWrapper’ allows users to build on existing MapPlace maps by adding new layers and map objects of their own and saving the resulting custom map. The MapperWrapper also features the ‘UnPluggger’, which al-

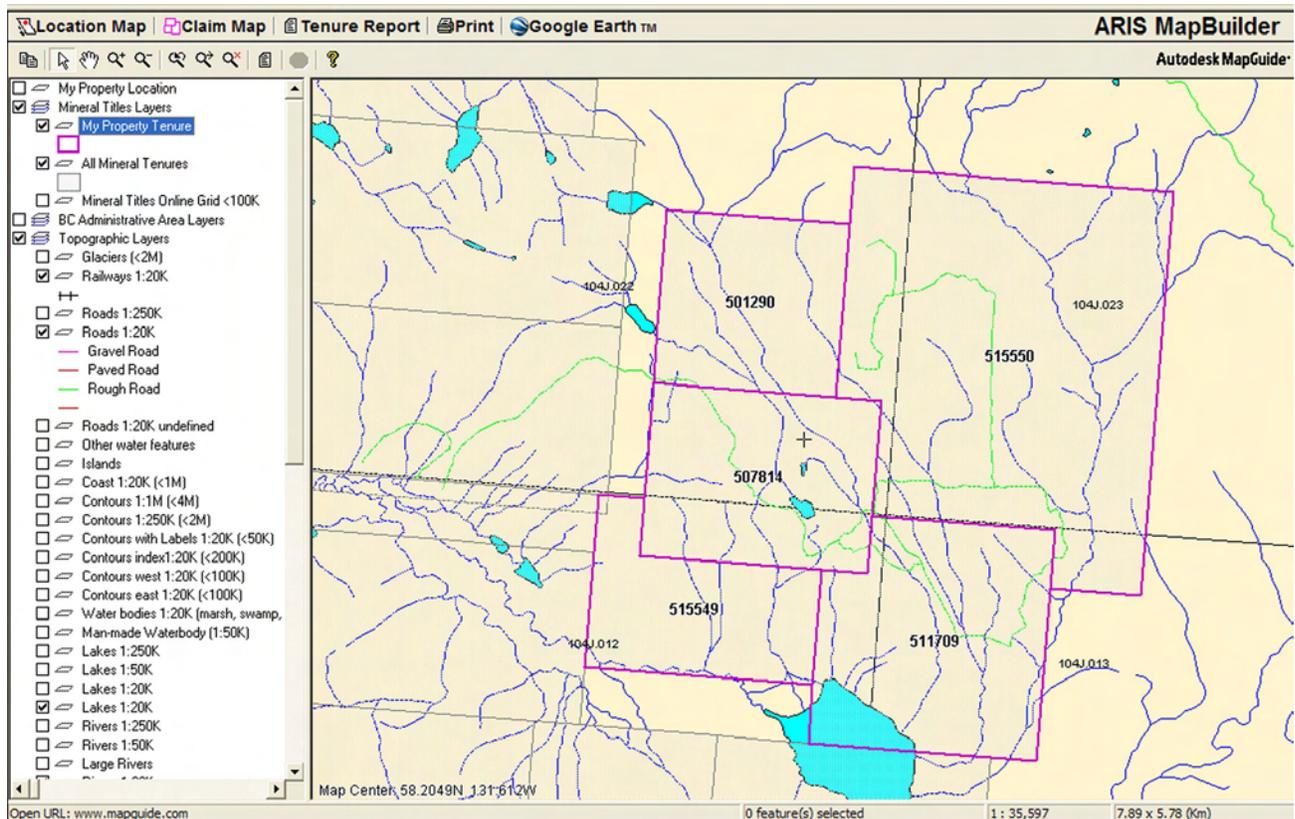


Figure 3. ARIS Map Builder tenure location map.

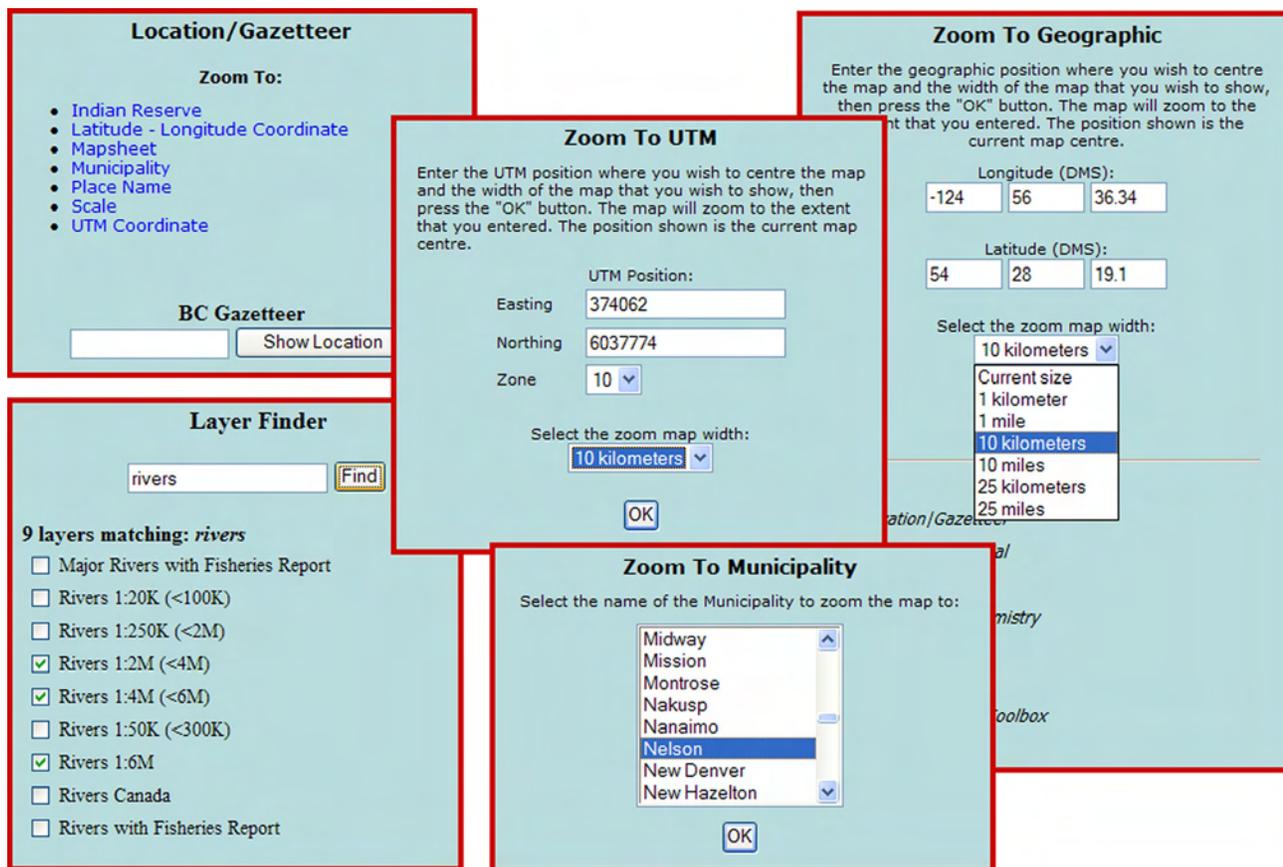


Figure 4. New Exploration Assistant tools.

allows users to create maps for offline viewing. For example, an exploration geologist could create a project map embedded with a limited number of data themes, such as Landsat, topography, hydrology, roads, MINFILE and geology. Once this map is saved, the geologist could disconnect the laptop from the internet, travel to the field and, by using MapperWrapper tool, view the maps with saved layers.

As a complement to the ARIS MapBuilder described above, the MapBuilder was built to quickly create and mark up claim location maps. Here, users can annotate the maps with symbols, lines, polygons and text. Mark-up preferences allow the user to define the colour, size and style of mark-up features added. Users can also adjust layer position and delete layers. The 'Highlight Tenure' button allows a customized tenure layer to be built. Users can also save a map created to their computer that can be opened and edited later.

PUBLICATION SEARCH APPLICATION

The Publication Search application (Fig 5) quickly displays area footprints for many of the over 3300 BCGS publications. It has been redesigned with enhanced searches by Author, Title, Keyword, Abstract, Year, Scale, Series and Map Extent. Users can refine searches with additional criteria. The Map Extent option will return all publications completely enclosed by the current map view. Results of the publication search can either be displayed on the map or as a table in a new window. If available, the map footprint links to the online publication, as does the report summary. An abstract report is also available with the Select and Re-

port tools. The BCGS publication catalogue can be downloaded as a Microsoft Access database.

Thematic Maps

The Thematic Maps page has over 30 maps. The General BC Map section includes three general purpose maps: a map that can be used to display base map features with minimal geoscience data; data in KML format that can be added to viewers such as Google Earth; and the new MapPlace2Go map, designed for non-technical users. Other theme-based maps include Petroleum Tenure & Wells, Offshore Map Gallery (Oil and Gas), various coal maps, Publication Index, Aggregate Potential, Terrain & Soils Digital Map library (funded by Forest Renewal BC from 1996–2002), Geophysical, Detailed Geology and Mining Economy maps.

MAPPLACE2GO

The new MapPlace2Go map (Fig 6) is designed for simple use, to quickly navigate, zoom and produce high-quality, page-size prints for reports and meetings. Limited data themes (Table 1) include Base Map, Mining, Exploration Projects, Tenure, First Nations, Administrative and Environmental Assessment Projects. Some themes include a 'Zoom GoTo' feature that provides the ability to narrow the view to the immediate surroundings of a desired location/item. This feature is accessed by clicking on a magnifying glass button to the right of the layer. A legend tab displays the active layers in a legend.

There are reports associated with all the mining related layers, tenure, First Nations' Aboriginal Communities layer, Federal Electoral Boundaries layer and Environmental Assessment for Mining and Energy projects. To activate the reports, double-click on the desired object on the map.

A 'Project Record Summary' report is generated from the mining-related layers. This report delivers the project status, for example: 'Operating' or 'Significant Exploration', and company contact information, including their website if it is available. From this report, there are links to a KML file for Google Earth display, MINFILE, Notice of Work summary and Environmental Assessment information. Tenure can be viewed at a 1:1 million scale and is linked to the Mineral Titles Online viewer report. The Federal Electoral Boundaries layers link to the Voter Information Service site for the selected district. The Environment Assessment layer links the Environmental Assessment Office (EAO) Project Information Centre (e-PIC) site.

MINERAL PROPERTIES AVAILABLE IN BC MAP

In partnership with the Association for Mineral Exploration British Columbia (AME BC), the Ministry developed a 'mineral properties for sale/option' map within BC. Clients use an interactive submission form to identify properties, their location and the contact information for the owner. Approved submissions are displayed on the MapPlace map with a linked report for details. The new submissions appear as a separate layer at the top of the legend in the map. Hardcopy and PDF provincial-scale maps

were published in January 2005, May 2005 and January 2006. The map will be updated annually.

NEW GEOLOGICAL AND GEOPHYSICAL MAPS

All maps on the MapPlace now display the 2005 geological compilation as the provincial Digital Bedrock Geology. The BCGS Geoscience map has a button to display a coloured legend for the screen view and includes bounding box co-ordinates and the NTS sheets. Layers displayed include quaternary geology, faults and geology contacts, bedrock geology with map unit labels, basins and terrane information, and ocean mask.

Two new geology and metallogenic map compilations were built for MapPlace. The first was created as part of the federal-provincial geological surveys' Targeted Geoscience Initiative (TGI) program and the other was completed through a grant from Geoscience BC to D. MacIntyre. The Geoscience BC – funded map is of the Skeena Arch area, West Central BC and the TGI map is of the Belt-Purcell Basin, southeast BC. For details on these maps, see MacIntyre (2007) in the Bibliography and Additional Information section.

The Geological Survey of Canada released multisensor (gamma ray spectrometric and magnetic) airborne geophysical information for 10 areas of central BC: Indata Lake, Sylvester Creek, Wittichica Creek, Taltapin Lake, Cottonwood, Wells, Hydraulic, Lac La Hache, Eagle (Murphy) Lake and McKinley Creek. These surveys are shown on the 2005 Geophysics Surveys map. Geophysical

Publications Search

Author: hoy
 Title: rossland
 Keyword:
 Abstract:
 Year:
 Scale: No Scale
 Map Extents: Completely Encloses

Add Criterion Delete Criterion

Show Footprints
 Show Results

Click "Show Footprints" to display your search results on the map, or click "Show Results" to display a table of results.

You can refine your search with additional criteria by clicking the "Add Criterion" button. The "Delete

BC Geological Survey Publications

Issue ID	Author	Title	Year	Scale	NTS
B102	T. Hoy and K.P.E. Dunne	Late Jurassic Rossland Group	1997	082F/4	
EXP1988-04	Andrew, K.P.E., Hoy, T.	The Shaft Showing, Elise Formation, Rossland Group	1989	082F	
EXP1989-01	Andrew, K.P.E., Hoy, T.	Geology and Exploration of the Rossland Group in the Swift Creek Area	1990	082F	
P1989-01-04	Hoy, T., Andrew, K.P.E.	The Rossland Group, Nelson Map Area, Southeastern British Columbia	1989	082F/4	
P1990-01-01	Hoy, T., Andrew, K.P.E.	Geology of the Rossland Group, Mount Kelly-Helloaring Creek Area, Southeastern B.C.	1990	082F/4	
P1990-01-02	Andrew, K.P.E., Hoy, T., Drobe, J.R.	Stratigraphy and Tectonic Setting of the Archibald and Elise Formations, Rossland Group	1990	082F/4	
P1991-01-01	Andrew, K.P.E., Hoy, T.	Geology of the Rossland Group in the Erie Lake Area, with Emphasis on Stratigraphy and Structure of the Hall Formation, Southeastern British Columbia	1991	082F/4	
P1991-01-02	Hoy, T., Andrew, K.P.E.	Geology of the Rossland Area, Southeastern British Columbia	1991	082F/4	

Figure 5. Publication Search application with search results.



Figure 6. MapPlace2Go map.

surveys on the MapPlace now total 20, with more to come this year.

A Google Earth Data page includes links for MINFILE, ARIS, Faults, Terranes and Project and ASTER examples in KML format for use in viewers such as Google Earth.

Recent Additions of Non-Mineral/Geological Data Layers and Downloads

These new data layers are available on the Main Maps: BCGS Geoscience, Exploration Assistant, Mineral Titles and some of the Thematic Maps:

- Digital Road Atlas visible below 1:250 000 scale, with Street Name labels visible below 1:20 000 scale;
- Forestry Roads, in Topographic Layers group, visible at 1:250 000 scale;
- Environmental Assessment Office Layer group with EAO Projects separated into Mining and Energy themes;
- Wildlife Layers group with Wildlife Habitat Area, Ungulate Winter Range and Guide Outfitter Areas layers and reports;
- Survey Layers (Tantalus) group with Crown Grants, Survey Parcels, Survey Parcel Right of Ways, Sur-

veyed Transport, Integrated Cadastral Fabric (ICI), No Staking Reserve and Placer Reserves Sites. Survey Parcels are available at 1:100 000 scale and ICI at 1:20 000 scale. The layers are linked to reports with Legal Descriptions and PIN Number. See Metadata on Survey Parcels, with link to Tantalus GATOR System for more information;

- Public layers from the government Land and Resource Data Warehouse (LRDW) using FME Provider for MapGuide. This technology from Safe Software allows access to current spatial data such as mineral titles, that are updated nightly; and

TABLE 1. MAPPLACE2GO DATA LAYERS.

Category	Data Layers
Basemap data	Communities, roads, railways, rivers, lakes, seas and borders
Mining data	Mines, major projects and exploration projects for metals, industrial minerals and coal
Tenure	Mineral and placer tenure
First Nations	Aboriginal Communities, Indian Reserves, Statement of Intent areas
Administrative	Provincial electoral boundaries, Federal electoral boundaries, Mining regions, Regional districts
Environmental Assessment	Mining projects, energy projects

Zoom Goto features are available for Communities, Producing Mines, Major Projects, Exploration Projects, and Statement of Intent areas.

- Shape file downloads for MiDA and MTO available on Geospatial Data Downloads page.

MapPlace Technology Details

The MapPlace uses Autodesk® MapGuide 6.5 to provide free access to the extensive array of information related to BC geology, mineral exploration and energy resources. The MapPlace server acts as an agent for other MapGuide websites and provides a WMS service.

- Autodesk MapGuide 6.5 Server is used to deliver over 400 data layers through over 50 maps in the MapPlace application.
- Autodesk MapGuide Author is used to create, modify and publish maps that users can view with the free Autodesk MapGuide Viewer.
- Autodesk MapGuide LiteView Server is used to deliver Open Geospatial Consortium Inc. (OGC) compliant data through the MapPlace Lite WMS Viewer with Web Map Service (WMS) available at <http://webmap.em.gov.bc.ca/mapplacewms/wmsviewer.htm>. The WMS service requests (GetCapabilities) can be used in other WMS-compliant viewers.
- ColdFusion® Server 4.5 is used to report and distribute data using CFM scripts. Supporting scripts are written in HTML, JavaScript, ASP and KML (for Google Earth use).
- Safe Software FME® Provider for MapGuide provides access to external spatial data sources such as the ARC SDE Land and Resource Data Warehouse (LRDW) of Land Information BC.
- RSI IDL ION – Script 6.1 server is used to process and analyze imagery with the Image Analysis Toolbox in the Exploration Assistant.
- Client-side software required or recommended: Microsoft Internet Explorer 6 or higher, Autodesk MapGuide 6.5 Viewer, Adobe Acrobat Reader 6 or higher, Microsoft Excel® 2003, Microsoft PowerPoint 2003, Microsoft Word 2003, Cute PDF™, CorelDraw 12 and ARC™ Explorer 9.1.
- Database management: Microsoft Access 2000, Oracle® and SQL.
- Spatial and raster formats: SHP, SDF, DWF, TIFF, JPG, SID and ECW.
- Autodesk MapGuide Enterprise and Open Source are currently being evaluated as a complement to the site.
- Application server licenses are less than \$6300 per year. Server maintenance and data backup is assisted by Workplace Technology Services (WTS) staff.
- Microsoft FrontPage® is used to develop and maintain documentation, metadata and marketing on MapPlace and associated databases.

Brief History of MapPlace

The driving force to create this website was the need to distribute the results of provincial geoscience information and the compilation of mineral potential estimates through a graphical user interface that could easily deliver spatial

data and related information. The second major incentive was to create a means to house and deliver the digital library of terrain and soils maps funded by Forest Renewal BC.

In 1995, the server was a desktop Pentium and the original software was Argus MapGuide, by Argus Technologies in Calgary, Alberta, which was acquired by Autodesk in 1996. In 1997, the Exploration Assistant theme map was developed and provided more interaction for the user. Subsequently, new hardware was provided to more efficiently deliver the information and to house very large datasets. The initial development was within the BC Geological Survey, by W. Kilby. The site is currently maintained by two staff members, L. Jones and P. Desjardins, with periodic assistance from students and consultants. MapPlace also partners with other MapGuide sites, such as the Communities Mapping Network (www.cmnbc.ca).

In 2000, MapPlace recorded over 190 000 website hits per year and in 2001, it recorded over 880 000 hits, a 450% increase. In 2002, the website had over 1.2 million hits and over 2500 users had visited the site 4 times or more. By 2005, hits reached over 6 million per year and there were 5600 users with 4 or more visits.

The MapPlace has proven useful to diverse agencies and stakeholders, such as explorationists, land planners, environmental consultants, native groups and university students. Users have save time in research and analysis as well as experiencing the reduction of data costs. See the MapPlace in action at www.MapPlace.ca.

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Significant Internet Links

BC Geological Survey: www.em.gov.bc.ca/mining/GeolSurv/default.htm

MINFILE: www.em.gov.bc.ca/mining/GeolSurv/Minfile/default.htm or www.minfile.ca

Property File: www.em.gov.bc.ca/mining/GeolSurv/Minfile/PropFile.htm

COALFILE: www.em.gov.bc.ca/mining/GeolSurv/coal/default.htm

ARIS: www.em.gov.bc.ca/mining/GeolSurv/Aris/default.htm

MapPlace: www.em.gov.bc.ca/mining/GeolSurv/MapPlace/default.htm or www.MapPlace.ca

MapPlace Online Help and Documents: www.em.gov.bc.ca/mining/Geosurv/MapPlace/onlineHelp.htm

IAT: www.em.gov.bc.ca/mining/Geosurv/MapPlace/MoreDetails/IAT.htm

Publication Search: www.em.gov.bc.ca/mining/Geosurv/MapPlace/MoreDetails/geolindx.htm

MapperWrapper: www.em.gov.bc.ca/mining/Geosurv/MapPlace/MoreDetails/mapperWrapper.htm

MapPlace2Go: www.em.gov.bc.ca/mining/Geosurv/MapPlace/MoreDetails/map2go.htm

Mineral Titles Online (MTO): www.mtonline.gov.bc.ca/

Natural Resource Information Centre (NRIC): www.nric.ca/

Land & Resource Data Warehouse: lrdw.ca/

Sensitive Habitat Inventory and Mapping (SHIM): www.shim.bc.ca/

Community Mapping Network (CMN): www.cmnb.ca/

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