Information Services Activities in April 2017 to March 2018

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Introduction

The Information Services group is responsible for developing and maintaining the Geoscience and Mines Branch (GMB) Geographic Information System and associated databases, the NovaScan publications and maps database, for supplying digital data and services to clients and staff, and for developing and maintaining the GMB Internet website. Permanent Information Services staff consists of Jeff Poole (supervisor), Jeff McKinnon (geologist/GIS specialist), Angie Barras (GIS specialist/cartographer), Courtney MacMullen (geologist/GIS specialist), Sonya Cowper (GIS and map server specialist), and Susan Saunders (web/desktop publishing technician). Brian Fisher was manager and moved to director this year. Sonya Cowper went on maternity leave in the spring of 2017, and Courtney MacMullen started with the group in late June 2017.

Digital Geoscience Data Products

A collection of digital geology maps, databases and images of Nova Scotia (in ESRI shapefiles, ArcGIS file geodatabase, KML/KMZ, DXF, ARC export, TIFF, JPEG, and MrSID formats in a UTM projection using the NAD83 datum, and in PDF format) has been developed and is available for viewing or free download from the GMB website (https://novascotia.ca/natr/meb/download/gis-data.asp). ArcGIS file geodatabase (GDB) and ESRI shapefiles are now our main data distribution formats. We are no longer producing the ARC E00 export and DXF formats. A licence agreement is issued with all digital data sets. This agreement allows unrestricted use of the data with the understanding that the Nova Scotia Department of Natural Resources (DNR) remains the owner of the data and is not transferring copyright to the user. Several of our datasets are also available through the Nova Scotia Government's Open Data Portal (https://data.novascotia.ca/).

GIS Development

Information Services GIS staff worked together with other GMB staff on numerous projects in 2017–2018. This included providing advice and assistance as requested, along with developing databases and maps for the projects outlined below.

Valley Aggregate Project: This year geologist Garth Prime retired from the GMB having completed dataset work for the Valley Aggregate Project. The resulting dataset contains 9357 aggregate site observations that are linked to 9340 photos, 972 sample analyses, and site descriptions. The final touches are being made towards the release of the digital data and publication of a preliminary online interactive map application for stone resource potential in western Nova Scotia. This application will provide valuable information to the stone resource industry, public works agencies, and others looking for sources of materials to make stone-based products

Antigonish Highlands Mapping: Section staff have been working with Chris White to produce a 1:75 000 scale bedrock geology map of the Antigonish Highlands and an accompanying digital product. This is near completion and will be released in early spring 2018. The geology includes new work from a block in the Antigonish Highlands as well as some legacy compilation data.

Cape Breton Compilation Project: Section staff worked with geologists Chris White and Dr. Sandra

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Barr of Acadia University to compile and integrate previous field work and detailed bedrock geological mapping initiatives over the last 25 years in Cape Breton Island. The databases and cartographic work were completed and released in the spring (maps) and summer (digital product) of 2017. This consisted of one 1:220 000 scale overview map (OFM ME 2017-006) and twenty-five 1:50 000 scale bedrock maps (OFM ME 2017-007 to OFM ME 2017-031) covering all of Cape Breton Island. The complete legend for these maps was published as an Open File Illustration (OFI ME 2017-001). Open File Report ME 2017-002 provides a complete list of compilation sources and references for these maps. The digital product (DP ME 433) consists of 27,893 outcrops, 14,100 structures, and 1857 geological polygons representing 352 geological units. It also includes 1121 mineral occurrences, 4750 drillholes, and 49 named coal seams. Assistance was also provided to Dr. Barr and Dr. White to create and update rock slab, thin section, and geochemistry databases associated with this project. These will be included in future versions of the digital product.

Parrsboro Map Project: Information Services staff provided GIS support to John Calder while he compiled data for outcrop and fossil locations from Cape Sharp to McKay Head in the Parrsboro region of Cumberland County. Data were collected by Dr. Calder over several years and are now being compiled by GIS staff with the intention of releasing an open file map and a digital product later this fiscal year.

Warwick Mountain (Eastern Cobequid Highlands) Project: Information Services staff worked with geologists Trevor MacHattie, Denise Brushett, and Geoff Baldwin to compile data from field work in the Warwick Mountain closure area of the eastern Cobequid Highlands. The compiled data are distributed as three datasets based on survey type: bedrock lithogeochemistry (DP ME 505), till geochemistry (DP ME 502), and stream sediment geochemistry (DP ME 503). Collectively the three datasets record 3422 locations with descriptions, laboratory assays for 588 samples, and portable X-ray fluorescence analyses for 2640 samples. The digital data were released on March 5, 2018, as were preliminary 1:35 000 scale surficial and bedrock geology maps (OFM ME 2018-002 and OFM ME 2018-005; Fig. 1), which span the closure area near Warwick Mountain. Additional bedrock geology and lithogeochemistry spanning a larger area surrounding the closure will be compiled and released in the future. This will include additional assay and portable XRF samples, structure readings, and photos.

Process Improvement: Staff have been working on a Workflow Process Improvement Project. This initiative, led by DNR Policy and Planning staff, is looking to review and improve our current process of collecting, creating, and compiling data, which are ultimately published. The goal is to make the current process faster and more efficient, while ensuring the quality and format of published products are current and useful to our clients. This improvement process is on-going with plans to

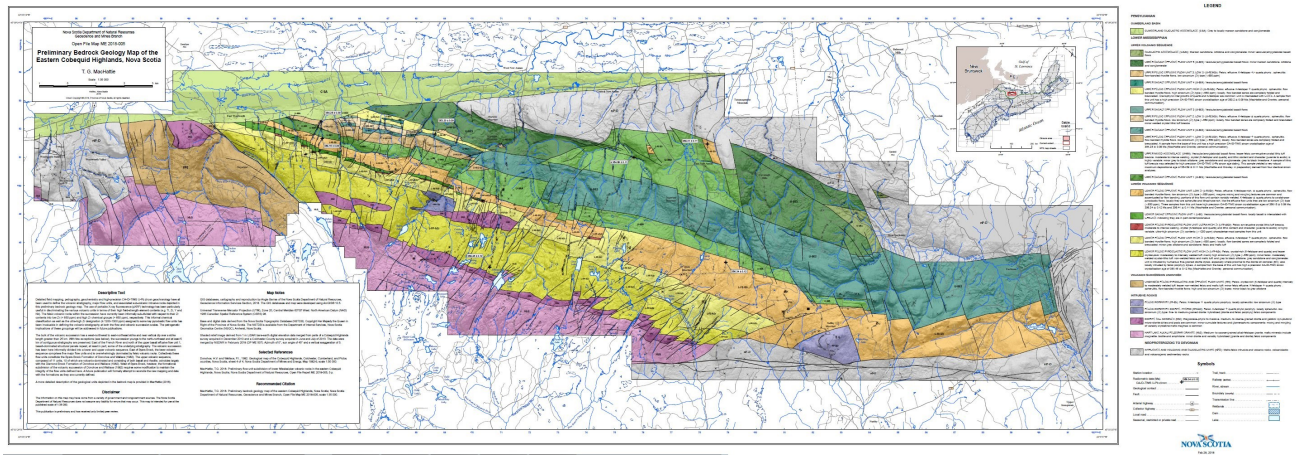

Figure 1. Preliminary bedrock map of the eastern Cobequid Highlands (OFM ME 2018-005) released in March of 2018.

implement and test suggested improvements in the summer of 2018.

Geoparks: Staff worked with John Calder to produce two maps required for the Cliffs of Fundy aspiring Geopark nomination. Both maps were used in the formal application submitted on March 30, 2018, to the Canadian National Committee for Geoparks and Canadian Commission for UNESCO.

Karst Risk Project: Work continued with geological staff on the development of a karst risk dataset and an online interactive map. Areas of karst risk, based on 1:50 000 scale bedrock geology maps in the province, have been compiled into a database and ranked according to levels of potential karst risk. A database of mapped karst occurrences in the province has also been compiled. Work is currently being completed on the creation of an online interactive map in lieu of a hardcopy preliminary karst risk map. Along with a digital product, the map will be available to the public in the near future.

Registry of Mineral and Petroleum Titles Database/NovaROC: Staff made updates to several geospatial layers that will be incorporated into the next update of the NovaROC application. Staff also worked with registry staff to maintain the GIS digital product (DP ME 493) Nova Scotia Mineral Rights Database (NovaROC). The product is normally updated daily and released at 2:00 AM (https://novascotia.ca/natr/meb/download/dp493.asp).

Assessment Report Migration from NovaROC to NovaScan: Information Services staff worked with registry staff to migrate 277 assessment reports from NovaROC to NovaScan in December 2017. Zip files are now available for download for each assessment report and contain the report documents in PDF format along with any associated data submitted with the reports. Searches are limited at this point because indexing is not complete for these documents, but the GMB is hoping to improve this over time. Documents are now migrated from NovaROC to NovaScan on a monthly basis.

Abandoned Mine Openings Database (AMO): In July 2017 version 7 of the Abandoned Mine Openings Database was released as an updated digital product and map service (https://novascotia.ca/natr/meb/download/dp010.asp). The online AMO Search application was also updated at this time (https://gesner.novascotia.ca/amosearch/searchpage.aspx).

GeoNova and Government IT Initiatives: In 2017 GIS staff of GMB, other branches of DNR, and GeoNova were involved with testing of the latest versions of ArcGIS Desktop 10.51 and ArcGIS Pro 2.0. At the same time, there is a government wide upgrade plan to move all computer systems to the Windows 10 operating system, and GMB GIS staff have been and will be involved with a DNR testing group into the next fiscal year.

Internet Map Server Applications

The section continues to maintain three primary public Internet Map Server (IMS) interactive map applications: the Geoscience Atlas, the Groundwater Atlas and the Mineral Resource Land-Use Atlas. All the applications are built using ArcGIS Server and Geocortex and have a common ‘look and feel’, consistent behavior, and placement of tools in the interface. These applications all use HTML5, which makes them compatible with most browsers and do not require any plug-ins to run.

The Geoscience Atlas application (Fig. 2) provides the public with a single geographic compilation of geoscience maps, databases, and images. The application displays a number of different layers from previously released digital products. Mineral occurrences, drillholes, and abandoned mines openings are present along with the provincial bedrock geology map and shaded relief imagery. Mineral-rights information is available in the application through a connection to NovaROC and is up-to-the-minute in its currency. We also added private property and Crown land layers to the application in 2016. Layers were updated as required and included the Abandoned Mine Openings layer in July 2017. The URL link to the Geoscience Atlas application is https://fletcher.novascotia.ca/DNRViewer/?viewer=Geoscience.

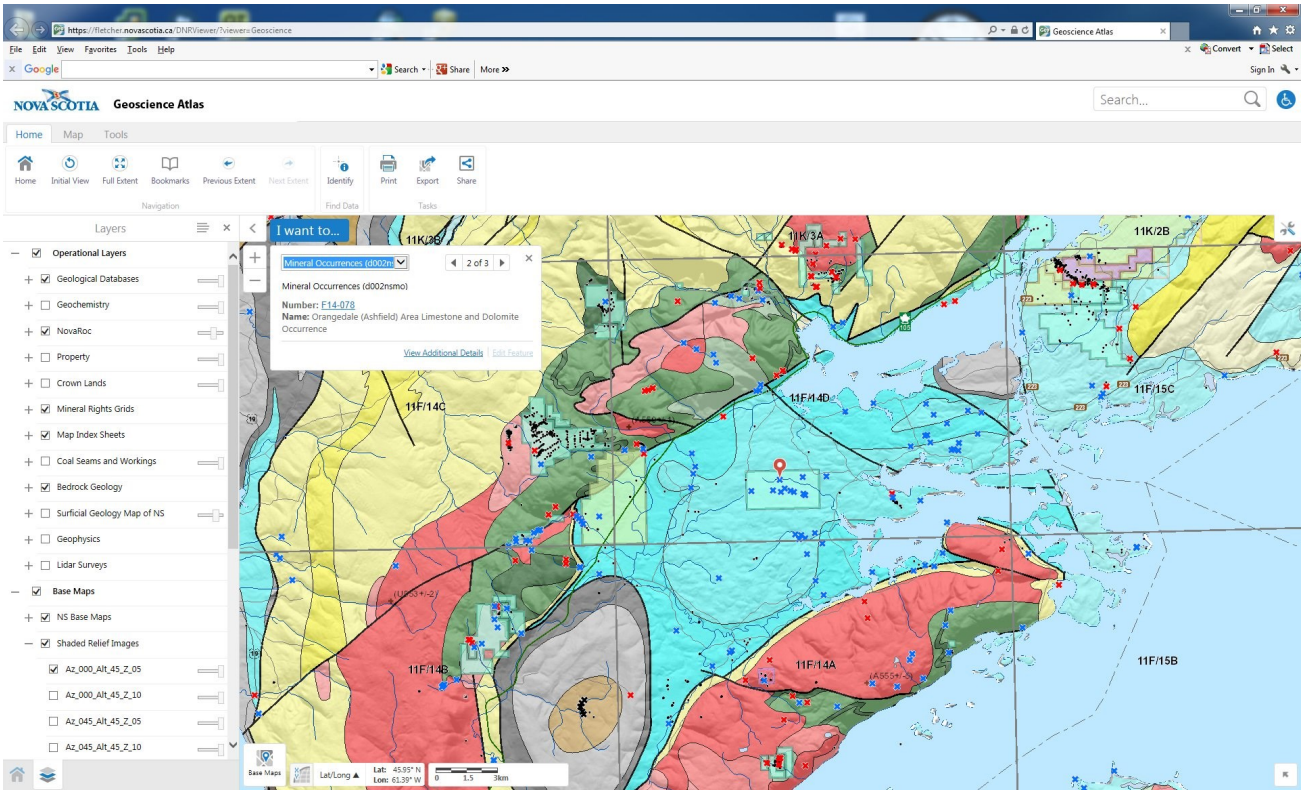

Figure 2. An example of the Geoscience Atlas application with shaded relief imagery turned on, transparency adjusted for the bedrock geology, NovaROC mineral rights layers turned on, and a mineral occurrence selected.

The purpose of the Groundwater Atlas application (Fig. 3) is to provide the public with an interactive map application containing layers of spatially referenced maps, databases, grids, and images of interest to hydrogeologists, particularly those interested in the hydrogeological properties associated with the identified groundwater regions. Private property and wetlands layers were added to the application in 2016. There were updates to a number of layers in this application this year, and the month and year are now indicated at the end of many layer names to indicate its currency. The URL link to the Groundwater Atlas application is https://fletcher.novascotia.ca/DNRViewer/?viewer=Groundwater.

The main purpose of the Mineral Resource Land-Use Atlas (MRLU) interactive map application is to provide the public with a single geographic compilation of mineral resource and related land-use information at a reasonably detailed scale of 1:50 000. A key objective is to create a useful reference for practitioners working in land-use and environmental planning, geotechnical firms, and groups involved in community economic development. The MRLU displays the location and distribution of mineral and energy resources, activities related to these resources, and aspects of environmental geology that relate to land-use and environmental planning. Special land-use designations on Crown and some privately owned land are shown to indicate how Nova Scotia's land-base varies regarding the ability of mineral resource interests to access land and hold secure tenure. A major update of several protected land layers was made in the fall of 2016. The URL link to the Mineral Resource Land-Use Atlas application is https://fletcher.novascotia.ca/DNRViewer/?viewer=MRLU.

The GIS group also maintains a number of simple but more focused applications for the Branch that use ArcGIS Server technology. These applications are HTML5 Geocortex applications. These are the Potential for Radon in Indoor Air application (https://fletcher.novascotia.ca/DNRViewer/?viewer=Radon), the Bedrock Acid Rock Drainage Potential for Southwestern Nova Scotia application

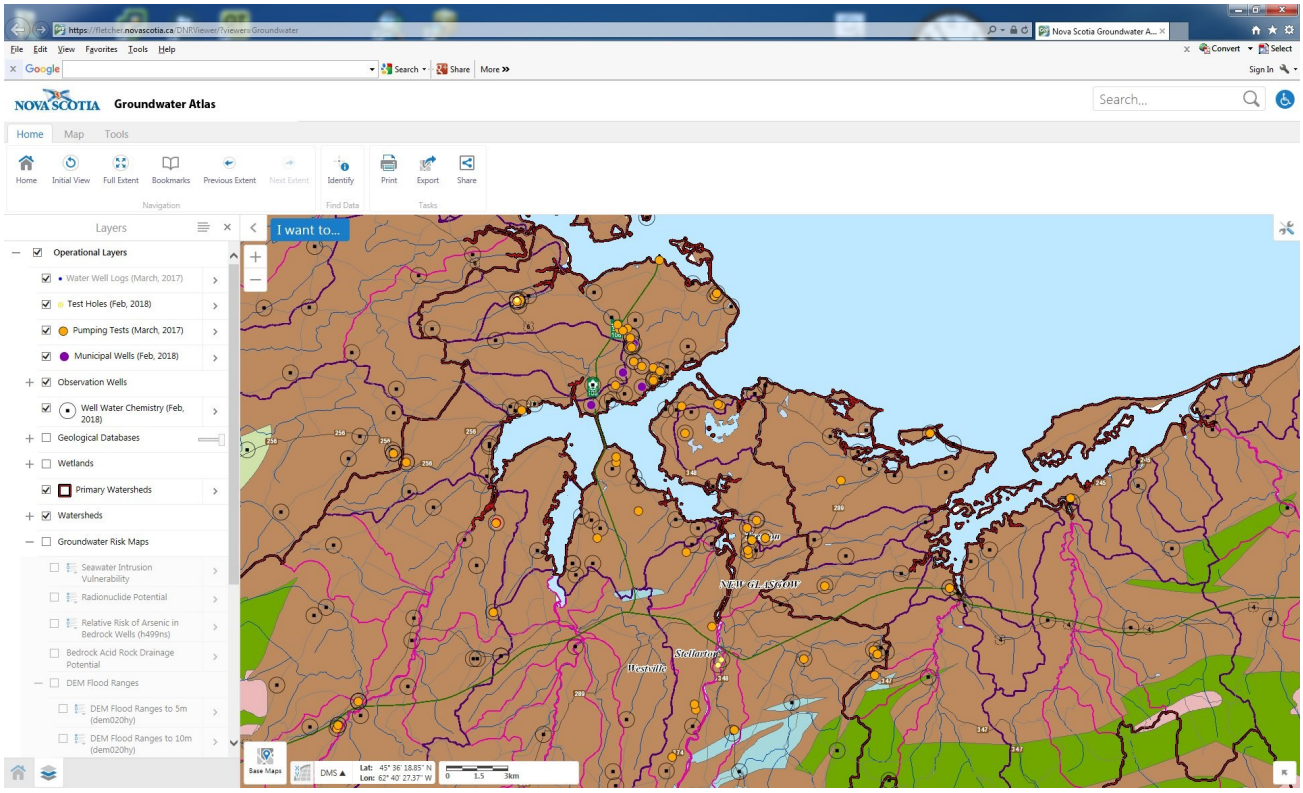

Figure 3. An example of the Groundwater Atlas application zoomed into the New Glasgow area.

(https://fletcher.novascotia.ca/DNRViewer/?viewer=ARD), and the Southwest Nova Bedrock Map application (https://fletcher.novascotia.ca/DNRViewer/?viewer=SouthWestNova). New this year are the Arsenic Risk in Bedrock Water Wells (https://fletcher.novascotia.ca/DNRViewer/?viewer=As_Risk_Wells) and the Potential Impact of Drought to Private Wells (https://fletcher.novascotia.ca/DNRViewer/?viewer=DroughtIndex) applications.

The Potential for Radon in Indoor Air application (Fig. 4) was developed to show areas in the province where people are more likely to be exposed to hazardous radon in indoor air. This application has an address and postal code search capability to help users find their home on the map. It provides a simple high-, medium-, and low-risk ranking scheme but emphasizes that the only way to know for sure how much radon is in your home is to test for it no matter where you live.

The Bedrock Acid Rock Drainage Potential for Southwest Nova Scotia application shows the potential of bedrock to generate acid rock drainage (ARD) if it is physically disturbed or exposed. This map uses a simple high, moderate, and low ranking scheme to inform landowners and planners about the hazards of ARD if they plan to excavate to bedrock in a given area.

The Southwest Nova Bedrock Map application is an interactive map showing the compilation of geological data and in southwestern Nova Scotia by Chris White published in 2012 (https://novascotia.ca/natr/meb/geoscience-online/sw_nova_about.asp). It shows many map layers including bedrock geological units, geological contacts, age dates, anticlines and synclines, drillholes, dykes, faults, fossils, gold districts, mines, mineral occurrences, outcrops, quarries, shafts, stockworks, structural data, and shear zones. It was upgraded in 2016 to better symbolize these layers at various scales.

The Arsenic Risk in Bedrock Water Wells application (Fig. 5) was developed to show areas of Nova Scotia where there is a relative high, medium, or low risk of arsenic in bedrock water wells. It is emphasized that testing your well is the

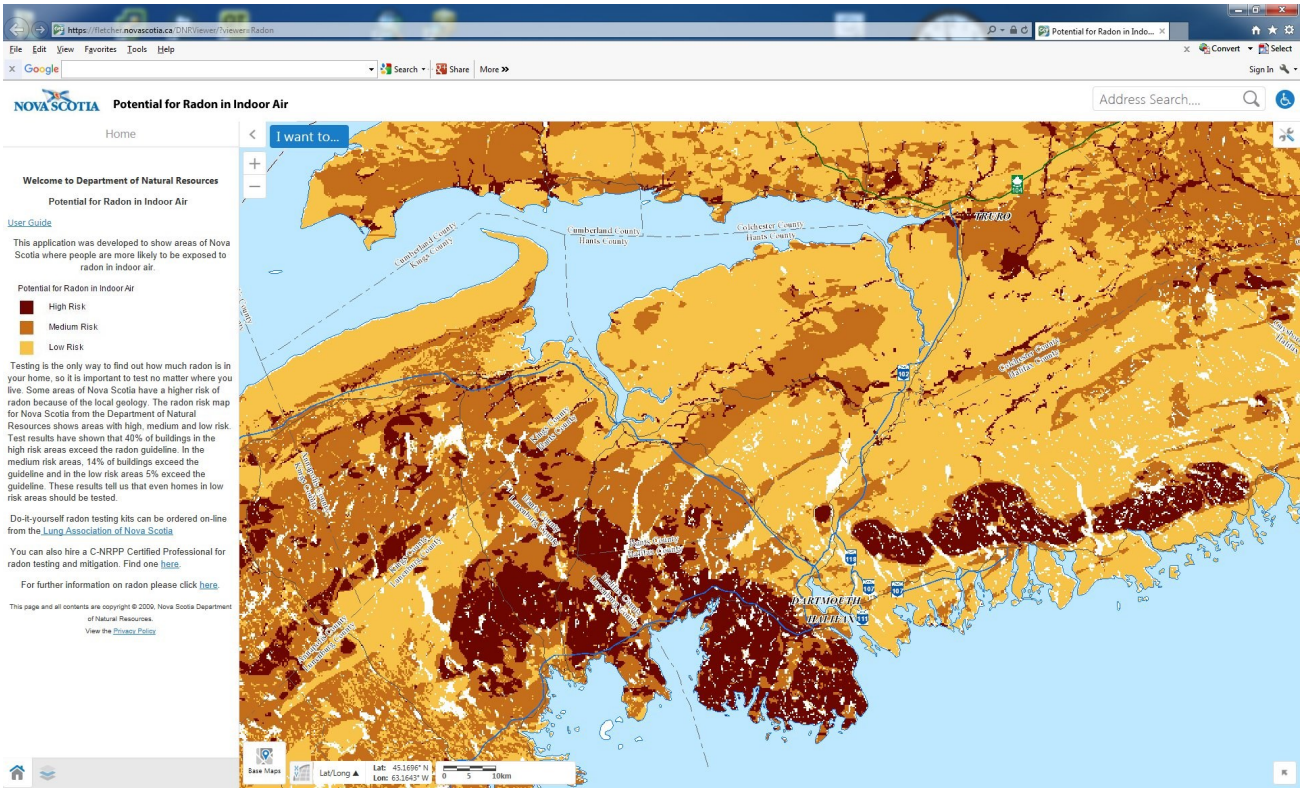

Figure 4. An example of Potential for Radon in Indoor Air application zoomed into central Nova Scotia. Address searches are possible with this application by typing in an address or postal code in the box in the upper right of the application.

only way to find out whether arsenic is a concern in your well no matter where you live.

The Potential Impact of Drought to Private Wells application (Fig. 6) was developed to show areas of Nova Scotia where private-well owners are more likely to experience water shortages (especially owners of shallow wells) if drought conditions develop in the summer and fall of a given year. The application presents a new map every month in the summer and early fall and currently maintains an archive of past maps for the summer and fall of 2016 and 2017.

NovaScan

NovaScan is the geoscience publications and maps database on Nova Scotia and its offshore regions. As of March 31, 2018, the database contained 17,725 records, consisting of 8783 mineral exploration assessment and property reports, 4037 publications, 1410 open file reports, 2124 maps and illustrations, 859 theses, 276 contribution series, 208 digital products, and 28 outside publications.

In order to provide better service to our staff and clients the Branch maintains a public search application that allows the public to query records in the NovaScan database using an Internet browser. NovaScan can be searched by title, author/organization, subject, area, map sheet (NTS), map type, licence type, licence number, document type, document number, year, and map scale. NovaScan is updated monthly as new geoscience maps, publications, open files, and theses become available. The search interface can be accessed at https://gesner.novascotia.ca/novascan/DocumentQuery.faces. Please be cautious with searches involving assessment reports after 2013 because they are incomplete.

Products Released in 2017–2018

The following new digital products were released in 2017–2018. All digital products can be downloaded for free from the URL listed with the product.

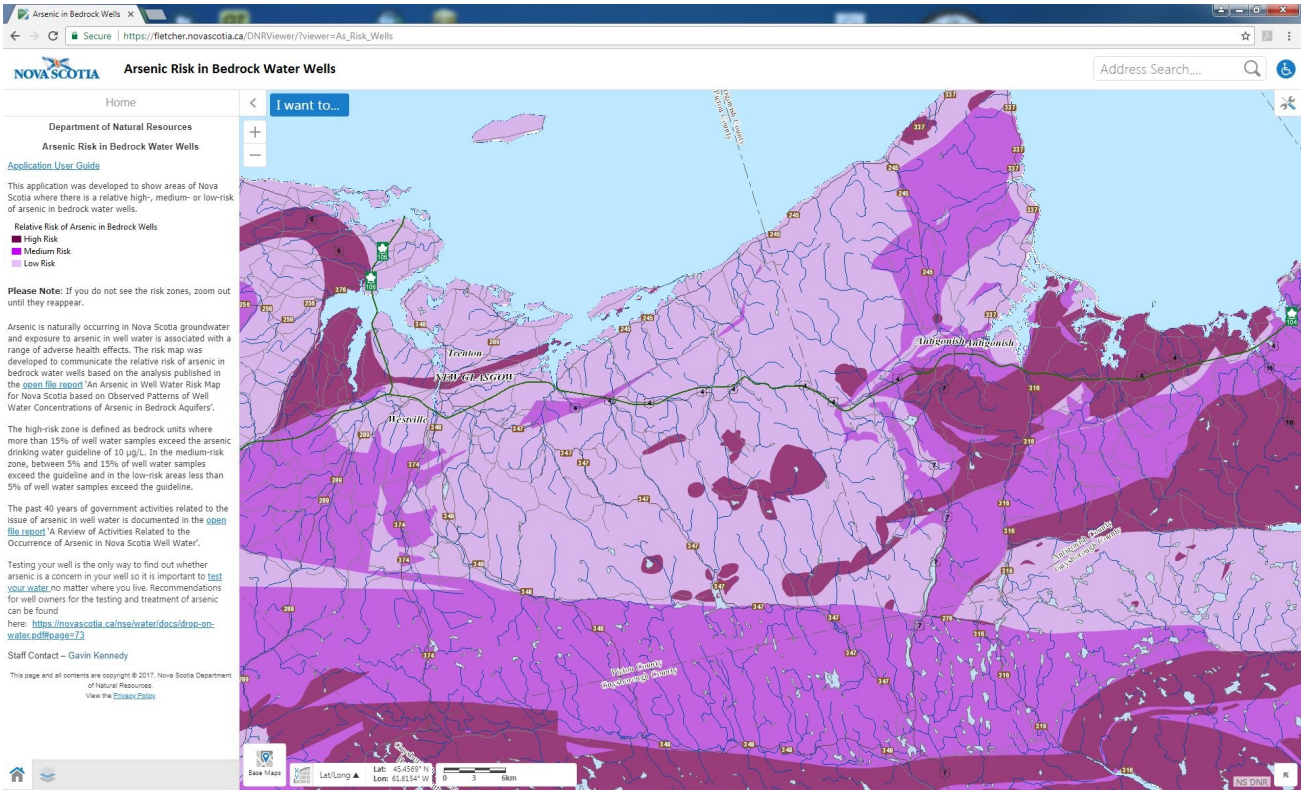

Figure 5. An example of Arsenic Risk in Bedrock Water Wells application zoomed into central Nova Scotia.

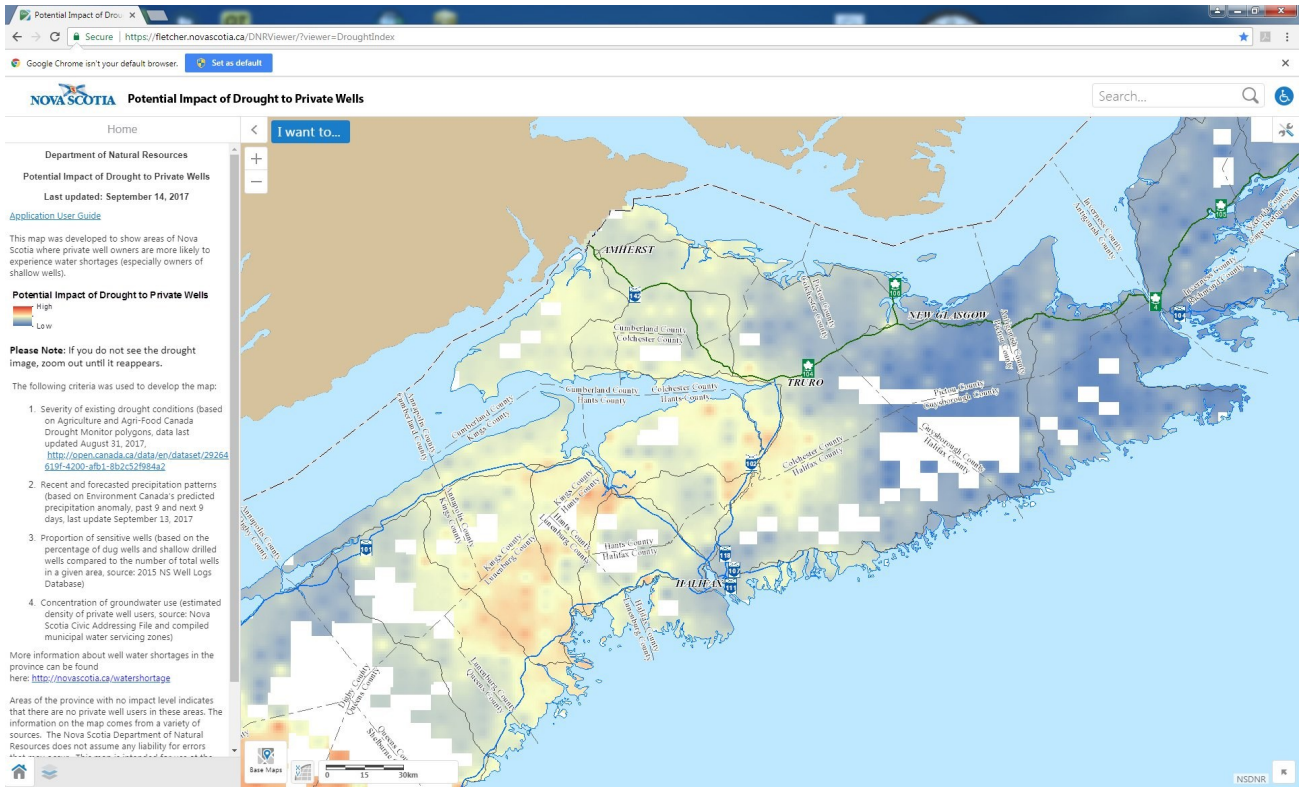

Figure 6. An example of the Potential Impact of Drought to Private Wells application. The map in this example shows an archive image from September 2016, a particularly dry month.

Digital Products

DP ME 10, Version 7, 2017. Nova Scotia Abandoned Mine Openings Database. Digital product compiled by E.W. Hennick, and J.C. Poole. Available in SHP, GDB, KML/KMZ, and XLS formats. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp010.asp

DP ME 433, Version 1, 2017. Digital Geological Data Generated as Part of the Bedrock Geological Mapping Compilation Project for Cape Breton Island, Nova Scotia. Digital product compiled by S.M. Barr, C.E. White, B.E. Fisher, J.S. McKinnon, A.L. Barras, and D.S. Hapgood. Available in SHP, GDB, KML/KMZ, and XLS formats. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp433.asp

DP ME 440, Version 1, 2017. Digital Geological Data Generated as Part of the Bedrock Geological Mapping of the Halifax Area (2007-2012), Halifax County, Nova Scotia. Digital product compiled by C.E. White, M.A. MacDonald, R.J. Horne, B.E. Fisher, J.S. McKinnon, and A.L. Barras. Available in SHP, GDB, KML/KMZ and XLS formats. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp440.asp

DP ME 477, Version 1, 2017. Geoheritage Sites of Nova Scotia. Digital product compiled by J.H. Calder and J.C. Poole. Available in SHP, GDB, KML/KMZ, and XLS formats. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp477.asp

DP ME 501, Version 1, 2018. Digital Version of Nova Scotia Department of Natural Resources Open File Map ME 2018-002, Preliminary Surficial Geology Map of the Eastern Cobequid Highlands, Nova Scotia, scale 1:35 000, by D.M. Brushett, 2018. Digital product compiled by D.M. Brushett and A.L. Barras. Available in SHP and GDB format. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp501.asp

DP ME 502, Version 1, 2018. Till Geochemical Data from the Warwick Mountain Area, Eastern Cobequid Highlands, Nova Scotia. Digital product compiled by D.M. Brushett and C.C. MacMullen. Available in SHP and GDB format. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp502.asp

DP ME 503, Version 1, 2018. Stream Sediment Geochemical Data from the Warwick Mountain Area, Eastern Cobequid Highlands, Nova Scotia. Digital product compiled by G.J. Baldwin and C.C. MacMullen. Available in SHP and GDB format. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp503.asp

DP ME 504, Version 1, 2018. Digital Version of Nova Scotia Department of Natural Resources Open File Map ME 2018-005, Preliminary Bedrock Geology Map of the Eastern Cobequid Highlands, Nova Scotia, scale 1:35 000, by T.G. MacHattie, 2018. Digital product compiled by T.G. MacHattie and C.C. MacMullen. Available in SHP and GDB format. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp504.asp

DP ME 505, Version 1, 2018. Lithogeochemical Data from the Warwick Mountain Area, Eastern Cobequid Highlands, Nova Scotia. Digital product compiled by T.G. MacHattie and C.C. MacMullen. Available in SHP and GDB format. Available as a free download from the GMB website at https://novascotia.ca/natr/meb/download/dp505.asp

Open File Maps

A complete list of Open File Maps published in the 2017-2018 fiscal year is presented in MacDonald et al., this volume, p. 41-44.