

# GIS LAYERS-RESOURCE LIST

A GIS Technician's & Land Manager's quick reference

December 2021



*Disclaimer:* This document is designed to assist Framework Agreement First Nation GIS Technicians and Land Managers in locating digital data, land layers and information for mapping projects. This information may assist those First Nations with decision-making and land management. If you discover a disconnection with any of the links provided in this document, please contact the GIS Specialist at the Lands Advisory Board Resource Centre: Leeanna.Rhodes@labrc.com.

The most important parts of a GIS project are the datasets you are using to make your map. You may want to use vector (linework), raster (images), orthophotos or aerial imagery, and spreadsheets with statistical information. The vector layers are quite difficult to build yourself. Luckily, in Canada there are several GIS savvy companies and organizations within each province that together produce a wide range of open-source digital GIS Layers, which can be accessed by the general public through the links provided in this document.

Before you begin any GIS project, you should start by creating a digital data library that lists the types of digital information you will need to assist you in your land management mapping and include links to access that information later. For example, you can display land base features using aerial images that show roads, water systems, municipal boundaries, forest inventory, and digital elevation models, to name a few. The digital data library must consist of comprehensive, current, and accurate data which will be fundamental to the success of your GIS projects.

The following links have been researched by the Resource Centre's GIS Specialist and are listed by province for your convenience. You may want to contact your local municipal or regional government for more precise and resource focused layers in your area of interest. Remember to review the metadata provided for each dataset to confirm when it was last updated. It is up to you to keep your information up to date, by checking the source to see if updates are available. It is good practice to go in and check your links every so often to ensure they are still working/up to date. We are also in the habit of updating our resources, often, so if you do see links out of service, check our website, we may have already updated the links for you. <https://labrc.com/resource/mapping-gis-lgm-resources/>

A Web Map Service (WMS) defines an interface that allows a client to access online "maps" of geospatial data and detailed information on specific features shown on the "map". A "map" is defined here as a visual representation of geospatial data, not the geospatial data itself.<sup>1</sup> Web Map Service (WMS) files are also available for each province. These require a constant internet connection and if the internet fails, the GIS projects that use these layers will fail to open. It is best to store the URL links to these WMS files in a spreadsheet, preferably a .csv format, within your mapping project, for quick and easy access. Also, keep the .csv in the data section in your digital data library as well as your map's table of contents. From what I have noticed, some layers require you to create a layer file before the information can be added to your screen.

To use some of the digital files offered by some of the sources listed below, a data sharing agreement or review of the data standards document may be required. The file formats offered on most of these sites are google earth compatible (.kml and .kmz), QGIS and

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<sup>1</sup> Natural Resources Canada, Web Map Services (WMS), 2015, Government of Canada, <https://www.nrcan.gc.ca/earth-sciences/geomatics/canadas-spatial-data-infrastructure/standards-policies/8938>

ArcGIS compatible (.shp) and AutoCAD compatible (.dwg). The web map service files are WMS and are usually embedded in a link.

Mapping or data browsers within this document are either run by the province, engineered by ArcGIS online, or are part of an open data source called Canadian Data. Downloading the layers from map browsers may be in a WMS open data format or contained in a zipped file, holding in the format you choose. Not all browsers have shapefiles available. I tried to identify the ones that have .kml or .kmz only, where you will need to convert to a shapefile once you download.

The following links are recent as of November 2021. You may want to check to see if there are more current versions of the data at each link prior to its use.

## REFERENCE MATERIALS

Resource	Source	Description
<a href="#">LAND GOVERNANCE MANUAL (LGM), GOOD PRACTICES GUIDE AND BEYOND BOUNDARIES</a>	<p><b>Lands Advisory Board Resource Centre (LABRC)</b></p> <p><b>Geo-Connections &amp; CIER</b></p> <p><b>Natural Resources Canada</b></p>	<p>The LGM is a guide to land governance and provides extensive documentation, process support, guidance and is regularly updated and refined based on First Nation successes, challenges and needs.</p> <p>The Good Practices Guide offers suggestions to the success in building and keeping an aboriginal mapping program.</p> <p>Beyond Boundaries is a manual to viewing the Canada Lands overlays in google earth.</p>
TMPD Webinar - <a href="#">GIS Needs Assessment</a>	<b>LABRC</b>	This site gives access to a GIS Needs Assessment Presentation, a video and a document that is designed to assist you in gathering information from your organization's departments, pertinent information to making an informed decision on what GIS software will be right for your community.
<a href="#">Mapping (GIS) – LGB Resources</a>	<b>LABRC</b>	GIS Frequently Asked Question, GIS Needs Assessment and a Glossary of GIS Mapping Terms, these tools have been prepared by the Resource Centre for knowledge sharing purposes only.
<a href="#">FNLMRC – Signatories' Reserves Maps</a>	<b>LABRC</b>	This site has a collection of the Framework Agreement Signatories' Reserve Location, separated by Province. There are 5 sections in BC which include North, Central, Southeast, South Vancouver Island, and Fraser Valley.
<a href="#">NRCAN Signatory Maps</a>	<b>NRCAN</b>	The following is a collection of signatory maps prepared by Natural Resources Canada (NRCan).

**SOFTWARE LINKS**

<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">QGIS</a>	<b>Quantum Geographical Information Systems (QGIS)</b>	A professional GIS application that is built on top of and proud to be 'Free and Open-Source Software' (FOSS).
<a href="#">ESRI ArcGIS Pro</a>	<b>Esri</b>	This site gives you the full array of ArcGIS Pro's mapping abilities. It is the latest professional desktop GIS application from Esri. Explore, visualize, and analyze data; create 2D maps and 3D scenes. Free 28 day trial is available.
<a href="#">ArcGIS Online</a>	<b>Esri</b>	Cloud-based software that can be used to create, share interactive web maps and supports field work activities. An online subscription is required to access and use Esri GIS software list.
<a href="#">Autodesk</a>	<b>AUTODESK</b>	More than just mapping software, Autodesk is a global leader in design and make technology. With expertise across architecture, engineering, construction, design, manufacturing, and entertainment, they help innovators everywhere solve today's pressing challenges.
<a href="#">Google Earth Pro</a>	<b>Google Earth</b>	Google Earth Pro works on your desktop and is free for users. Import and export GIS data, and go back in time with historical imagery, also available. Free download available here.
<a href="#">Google Maps/My Maps</a>	<b>Google Maps</b>	Free online software. Create and share custom made maps with the places that matter to you. Share and collaborate with friends to see and edit your maps. Also has a mobile app to take all your maps with you.
<a href="#">mapbox</a>	<b>mapbox</b>	mapbox Studio is like Photoshop, for maps. Designer control over everything from colors and fonts to 3D features and camera angles. Gives you access to 4 million global boundaries so you can analyze your data and gain new insights.
<a href="#">MapInfo Pro</a>	<b>Precisely</b>	A complete, desktop mapping solution for the geographic information system (GIS) analyst to visualize, analyze, edit, interpret, and output data — revealing relationships, patterns, and trends. Free trial available
<a href="#">Maptitude</a>	<b>Caliper Corporation</b>	Maptitude provides everything you need to realize the benefits of desktop mapping and spatial analysis with a single, easy-to-use package. Uses existing street view data. Free trial available.
<a href="#">Surfer 21</a>	<b>RockWare</b>	A contouring and 3D surface mapping software program that runs under Microsoft Windows. The Surfer 21 software quickly and easily converts your data into outstanding contour, surface, wireframe, vector, image, shaded relief, and post maps. Free trial available.

<b>CANADA – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">Survey Plan Search User Guide</a>	<b>NRCan</b>	Beyond Boundaries – Survey Plan Search User Guide in a PDF format to download. This guide offers numerous links and options to get the most out of all types of plans and the search tools are also explained very well.
<a href="#">Plan Search Tools</a>	<b>NRCan</b>	Plan Search Tools – This page was built to assist in choosing the right tool to assist you in finding the plans and surveys you require.
<a href="#">Survey Plan Search</a>	<b>NRCan</b>	Survey Plan Search Tool - Search your plans by Keyword, plan number or SGB project number. This is one example of a Plan Search tool mentioned in the Guide.
<a href="#">Natural Resources Canada</a>	<b>NRCan</b>	This site offers all links associated with Canada’s Natural Resources. Specializes in storing and maintaining the cadastral fabric spatial data of all Indian Reserves, Parks and the Territories.
<a href="#">Canada Lands in Google Earth</a>	<b>NRCan</b>	This site allows you to download the Canada Lands Overlay in a Google Earth format (KMZ). One file for all of Canada.
<a href="#">Canada Lands in Google Earth User Guide</a>		Best to download the Canada Lands then refer to this guide before using the tools suggested. This is in a PDF format.
<a href="#">Canadian Geographical Names</a>	<b>NRCan</b>	This is a link to files of official geographical names for individual provinces and territories, as well as for the Maritimes offshore. These are available in Text, .SHP Shape file and .KML Google Earth formats. Files are zipped.
<a href="#">Natural Resources Canada FTP Site</a>	<b>NRCan</b>	For GIS users: This FTP site holds all reserve digital admin boundaries and reserve parcel line work, in .SHP and .DWG format. You should know the reserve name before accessing this site, there is no map to assist you. You will need to use Microsoft Edge rather than Google Chrome.
<a href="#">Canada’s Spatial Data Infrastructure</a>	<b>Government of Canada.</b>	There are several links on this page that give you important information on Geo-Connection’s standards-based technologies and operational policies. See “Find out more” for information on other resources available across Canada.
<a href="#">Canadian Open Data and Free Geo spatial Data</a>	<b>Government of Canada.</b>	Various cities and provinces in Canada have done a great job providing <i>Open Geospatial Data</i> and geospatial applications to this site. You will see a map on first page of this site, select your province or scroll down and select from the tabs provided. There will be a long list of URLs, for each province, best to try out all the URL’s to see what data is right for you.
<a href="#">National Road Network FTP Site</a>	<b>Government of Canada.</b>	For GIS users, this FTP site holds, by province, the digital layer of roads in .KML, .GML and .SHP (Shape File) formats, French and English options available.
<a href="#">Government of Canada FTP Site Topographic Raster Maps</a>	<b>Government of Canada.</b>	For GIS users, this FTP site holds Raster NTS maps at a 1:50K scale that you can use for a backdrop or for reference in finding geographic names of roads or rivers. You should know the name of your NTS map sheet needed before going to this site, e.g. 092/O/16. No index available. You will need to use Microsoft Edge rather than Google Chrome.

<b>BC – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">Data Catalogue</a>	<b>BC Government</b>	The BC Data Catalogue provides the easiest access to government's data holdings, as well as applications and web services. Thousands of the datasets discoverable in the Catalogue are available under the Open Government License - British Columbia. Some KML and SHP but most are the WMS for digital mapping. Multiple files, use search engine! May need to sign up for an IDIR account.
<a href="#">iMapBC</a>	<b>BC Government</b>	iMapBC is a map and data browser. This site opens to a Map of BC. You can access and explore thousands of digital map layers of the BC Government and other public sector agencies. This is a good tool to view the data before you download from the BC Data Catalogue. You can also design your own map, save as an image, and print from here. Any work created today cannot be saved for future reference, to keep map, use export.
<a href="#">Integrated Cadastral Information Society</a>	<b>ICI Society in BC</b>	The ICI Society facilitates the sharing of location intelligence data – which leads to better decisions and better outcomes for its members and their stakeholders, the people of BC. To get access to map viewer and data you need to sign up as a member.
<a href="#">Maps &amp; Ortho Photo Store</a>	<b>BC Government</b>	The Base Map Online Store (BMOS) allows you to search, display, and order orthophoto imagery, raster, and vector data. Use the search tools in the main menu bar to find a map sheet tile, geographic place name, or address. There are free products on this site as well. You will need to use Microsoft Edge.
<b>ALBERTA – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">GeoDiscover Alberta Catalogue</a> <a href="#">GeoDiscover Viewer</a>	<b>GeoDiscover Alberta</b>	GeoDiscover Alberta Catalogue provides enhanced details on Alberta's geospatial data. GeoDiscover Viewer is unique, it allows you to sign on, log in and continue the work you started on a previous date. Like other browsers it gives you access to all digital layers listed in their Catalogue. Use Microsoft Edge to access this site.
<a href="#">ALBERTA Lands</a> digital layers	<b>Altalis</b>	This data distributor does not have a search engine, the headings provided are Property, Base, Terrain, Imagery, and Infrastructure. When you select a file, a map viewer will open, and you can add to Cart. Majority of the linework is free, but you will have to pay for the LiDAR and DEM. You will need to setup an account and sign in with an email address so they know where to send the Zip File or the FTP address.
<a href="#">ALBERTA Cultural Resources</a>	<b>The University of Calgary</b>	This site has several links to open data portals, similar to the WMS mapping, you will need to register to download products, places and addresses for Alberta municipalities. Users must sign a data release agreement.

<b>SASKATCHEWAN – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">SASKATCHEWAN Map Browser</a>	<b>Government of Saskatchewan</b>	This interactive mapping tool is provided as a public service by the Government of Saskatchewan. To search for features, use the search engine upper right, or select Data sources then choose from list.
<a href="#">Historical Maps (Prairies)</a>	<b>University of Calgary</b>	This site provides hundreds of sectional Maps dating back to early 1900's. These are not georeferenced, but very detailed copies of paper maps.
<b>MANITOBA – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">MANITOBA Data Warehouse</a>	<b>Manitoba Government</b>	The Manitoba Conservation and Water Stewardship host this site called the Core Maps – Data Warehouse. Under the "Get Started" section on the left are a list of data available for download. Formats available on some files are .GIF, .DOC, .DXF, .GDB, .SHP, .KMZ and some will give you a WMS link. Refer to the map key to find your area of interest.
<a href="#">MANITOBA Digital Data Search</a>	<b>Manitoba Geoscience</b>	Manitoba's Mineral Industry has provided a GIS Map Gallery which includes 3d Geological Mapping with files of surficial geology, mineral commodities, geological databases and much more.
<b>ONTARIO – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">ONTARIO Map Browser</a>	<b>Ontario Gov't. Ministry of Natural Resources</b>	Make A Topographic Map: The Ministry of Natural Resources and Forestry mapping application showcases Ontario's best available topographic and imagery data. The map shows topographic information, such as roads, trails, lakes, rivers, wooded areas, wetlands, provincial parks, as well as municipal and township boundaries.
<a href="#">ONTARIO GIS Data</a>	<b>Ontario GeoHub</b>	This site offers browsing topics such as Boundaries, Elevations, water to geology datasets. Applications powered by Land Information Ontario interactive map shows Forest Fires, and Watershed maps, create and print custom topographic maps and much more. Note, when you select a layer the Ontario GeoHub map browser will open to show you all of Ontario, you will have to zoom into your area of interest.



<b>QUEBEC – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">Climate Change Themes</a>	<b>Quebec Ministry of Env.</b>	This site gives you the English option, where you'll have access to the ArcGIS Online data features. The map is in French. This example is the Climate Change research results for the whole province of Quebec.
<a href="#">QUEBEC GIS DATA</a>	<b>Canadian Data</b>	The Québec government, along with many of the municipalities like Laval, Quebec City and Sherbrooke (all had their own open data portals) joined forces in 2016 to create the Québec open data portal. Many other municipalities then followed, and now the site contains almost a thousand different datasets. <a href="https://www.donneesquebec.ca">https://www.donneesquebec.ca</a> Quebec Data is the best starting point when looking for geographical places in the Province of Quebec. Data formats include. wms, .kml and .shp some do have the .csv table format.
<b>NEWFOUNDLAND AND LABRADOR – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">Newfoundland and Labrador</a>	<b>CIMS - Community Infrastructure Mapping System</b>	Layers found in this map and data browser, are Health, Education, Heritage, Protective Services, Tourism and Justice office locations. The land base maps are clear and very detailed. This also gives you the option of overlaying your own data.
<a href="#">Digital Map Index</a>	<b>Newfoundland and Labrador Gov't.</b>	The Digital Map Index has several data layers listed on left of this page, To view the layers, select 'GIS and Mapping' then select Land Use Atlas Application. This takes you to the map browser, to select the layers, options are on far right. To change earth view, select Base map Gallery.
<a href="#">NEWFOUNDLAND GIS DATA</a>	<b>Newfoundland and Labrador Government Open data</b>	Open data site gives access to a ton of statistical information, takes some searching for spatial data, when found the formats include .KML or .SHP. Best to pick a topic and go from there. I tried to find a map/data browser, none available at this time.
<b>NOVA SCOTIA – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">NOVA SCOTIA GIS DATA</a>	<b>Canadian Data</b>	The province of Nova Scotia's open data portal was launched in 2016 and now has over 500 datasets. You will need to use the browser or search engine to maneuver to the layers you will need. I had some difficulty finding data specific to Nova Scotia. <a href="https://data.novascotia.ca/">https://data.novascotia.ca/</a>
<a href="#">NOVA SCOTIA GEO NOVA</a>	<b>GeoNova</b>	GeoNOVA is the Province of Nova Scotia's gateway to geographic information about Nova Scotia. Access to geographic information is their goal

<b>NEW BRUNSWICK – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">NEW BRUNSWICK GIS DATA</a>	<b>GeoNB Data Catalogue</b>	The data catalogue contains a list of the geographic datasets that are available for download. Formats are DXF, SHP, CARIS and KML. When you do select a SHP it will download a zipped file. Hover over Thumb to review the layer before downloading. Click on "More Info" for a description and purpose of the layer. Where it says "Select Data, this will open a Map Browser Map Downloads Page you must agree to terms and conditions.
<b>PRINCE EDWARD ISLAND – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">PEI GIS DATA</a> -	<b>The Government of Prince Edward Island</b>	This website provides access to GIS data and other geospatial services. It will simplify the ability of all levels of government and citizens to find geographical data. A variety of GIS data is available both for free and for-a-fee. The list of options are on the left. Go to GIS Data Catalog to see themes of layers to download. Everything from Civic Address data to transportation layers will be available for free. I suggest you review the metadata before downloading.
<b>NORTHWEST TERRITORIES – DIGITAL LAYERS</b>		
<b>Resource</b>	<b>Source</b>	<b>Description</b>
<a href="#">NWT Map Browser</a>	<b>ATLAS Map Viewer</b>	The ATLAS (Administration of the Territorial Land Acts System) Map Viewer is a new generation of web mapping that allows users to browse online parcel mapping information and real-time tenure data maintained by Lands Administration, Department of Lands. The help document introduces the components of ATLAS and how to use them. This is a very easy to use map viewer, if you need to download data, draw a small polygon around Hay River for example and select a couple of datasets and format to be compiled into a zipped file. Large data requests may make the browser time out. You will need to share your contact information to use this site.
<a href="#">NWT Geological Surveys</a>	<b>Northwest Territories Geological Survey</b>	This link takes you to the home page, for data download, go to Reports and Data. Then in the dropdown list or list found on left, select other sources of information. Here you will find several themes to open and a map browser will assist. Note: map tools located on left.

*Acknowledgements:* This document is designed to be a quick reference to accessing digital information to help you start your GIS projects with the basic land information. Credit for the above-mentioned digital sources must go to Canada, the Provinces and the companies that post their data online and those who created the map browsers so you can find the data to quickly preview before downloading.

## DEFINITIONS

**Aerial Image:** Are photographs taken from an aircraft or other flying object, usually taken in a grid format for a mosaic effect.

**ArcGIS:** [software] ArcGIS is a GIS software package produced by the Environmental Systems Research Institute (Esri) which allows you to collect, store, manage, visualize, export, analyze and map geographic layers.

**ArcGIS Pro:** [software] ArcGIS Pro is also produced by Esri in 2015. This GIS software with ribbon styled panes, 2d & 3d views, user-friendly interface, hundreds of geographical and geoprocessing tools. See ArcGIS for more information.

**AutoCAD:** [software] AutoCAD is a commercial computer-aided design (CAD) and drafting software application. Many professionals use AutoCAD for engineering and architectural design.

**Canada Lands Overlay:** Administrative boundaries (surveyed) and cadastral parcels within Indian Reserves, National Parks and the Territories. Available in a downloadable Google Earth Format (KMZ).

**CIER:** Center for Indigenous Environmental Resources

**CIMS:** Community Infrastructure Mapping System

**Data:** Observations or measurements (unprocessed or processed) represented as text, numbers, or multimedia.

**Database:** An organized collection of data stored as *multiple* datasets. Datasets are generally stored and accessed electronically from a computer system that allows the data to be easily organized, accessed, manipulated, and updated.

**Data Format:** Is a standard way that information is encoded while stored in a file on a computer. Many software have different standards (formats). Some examples are:

- .BSB is a MapInfo format.
- .DXF is an AutoCAD format.
- .DWG is a Autodesk and AutoCAD format.
- .GDB is an Esri format.
- .GML is a QGIS format
- .IGDS is an Intergraph format.
- .KML & .KMZ are Google Earth formats.
- .PDF is an Acrobat format
- .SHP Shapefiles used in QGIS and any Esri product.
- .XML open-source format

**Dataset:** A structured collection of data generally associated with a unique body of work.

**Data Source:** In the context of GIS, is the location where data that is being used comes from. The creator or originator of the information.

**DEM:** Digital Elevation Model is a representation of the bare ground (bare earth) topographic surface of the Earth excluding trees, buildings, and any other surface objects. Some GIS software can create this model from a contour layer.

**Esri:** Environmental Systems Research Institute, is an international supplier of geographic information system (GIS) software, web GIS and geodatabase management applications.

**FTP:** File Transfer Protocol – communications protocol used to send files from computer to computer, providing they both have internet access.

**GIS:** Geographic Information Systems

**ICI Society:** Integrated Cadastral Information Society (BC only)

**Layers:** Layers are the contents of a map, making up lines, points and polygons. Descriptions and symbology of each layer will show in the Map's Legend

**LiDAR:** Light Detection and Ranging (lidar) is a technology used to create high-resolution models of ground elevation with a vertical accuracy of 10 centimeters (4 inches).

**NRCan:** Natural Resources Canada

**NTS Maps:** National Topographic System are maps that depict in detail ground relief (landforms and terrain), drainage (lakes and rivers), forest cover, administrative areas, populated areas, transportation routes and facilities (including roads and railways), and other man-made features at a 1:50K scale.

**Open source:** This is a term that originally referred to open-source software (OSS). OSS is code that is designed to be publicly accessible—anyone can see, modify, and distribute the code as they see fit.

**Orthophotos:** Are photos taken from a satellite and are geo-referenced at the source. Orthophotos can be used to measure true distances, because it is an accurate representation of the Earth's surface.

**QGIS:** *[software]* QGIS (Quantum GIS) is an Open-Source Geographic Information System (GIS) licensed under the General Public License. QGIS is an official project of the Open-Source Geospatial Foundation (OSGeo). It runs on Linux, Unix, Mac OSX, Windows and Android and supports numerous vector, raster, and database formats and functionalities.

**Raster Image:** Raster images are made of pixels, or tiny dots that use color and tone to produce the image.

**SGB:** Surveyor General Branch of Canada.

**URL:** Uniform Resource Locator the address of a web page.

**Vector:** A coordinate-based data model that represents geographic features as points, lines, and polygons.

**WMS:** Web Map Service (WMS) defines an interface that allows a client to get maps of geospatial data and gain detailed information on specific features shown on the map. A "map" is defined here as a visual representation of geospatial data, not the geospatial data itself. (Definition Source – NRCan Web map title service provider.)