

## THE GEOSCIENCE ATLAS AND GEOSCIENCE DATA UPDATES IN 2023

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### ABSTRACT

*The geoscience-data specialists at the Geological Survey of Newfoundland and Labrador performed one update to the Geoscience Atlas in 2023. This update comprised the addition of a new Author Index layer for our seamless bedrock geology, a new province-wide Drill Hole layer, and minor corrections and updates to other layers and Help files. New symbols were incorporated into our surficial Landforms layers. Newly digitized surficial geology data were added for western Labrador, as well as a series of geophysical compilation images for east-central Labrador. Efforts to enhance the user experience, internal data management and client data delivery continue in 2024.*

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### INTRODUCTION

The geoscience-data specialists at the Geological Survey of Newfoundland and Labrador (GSNL) are tasked with maintaining and updating our online geoscience data portal – the Geoscience Atlas – with new and newly digitized or compiled archival data, as well as enhancing the organization’s geoscience data strategy and implementation. This report describes updates to the Geoscience Atlas completed in 2023, updates to client data delivery processes and presents planned enhancements to our geoscience data management program.

### THE GEOSCIENCE ATLAS

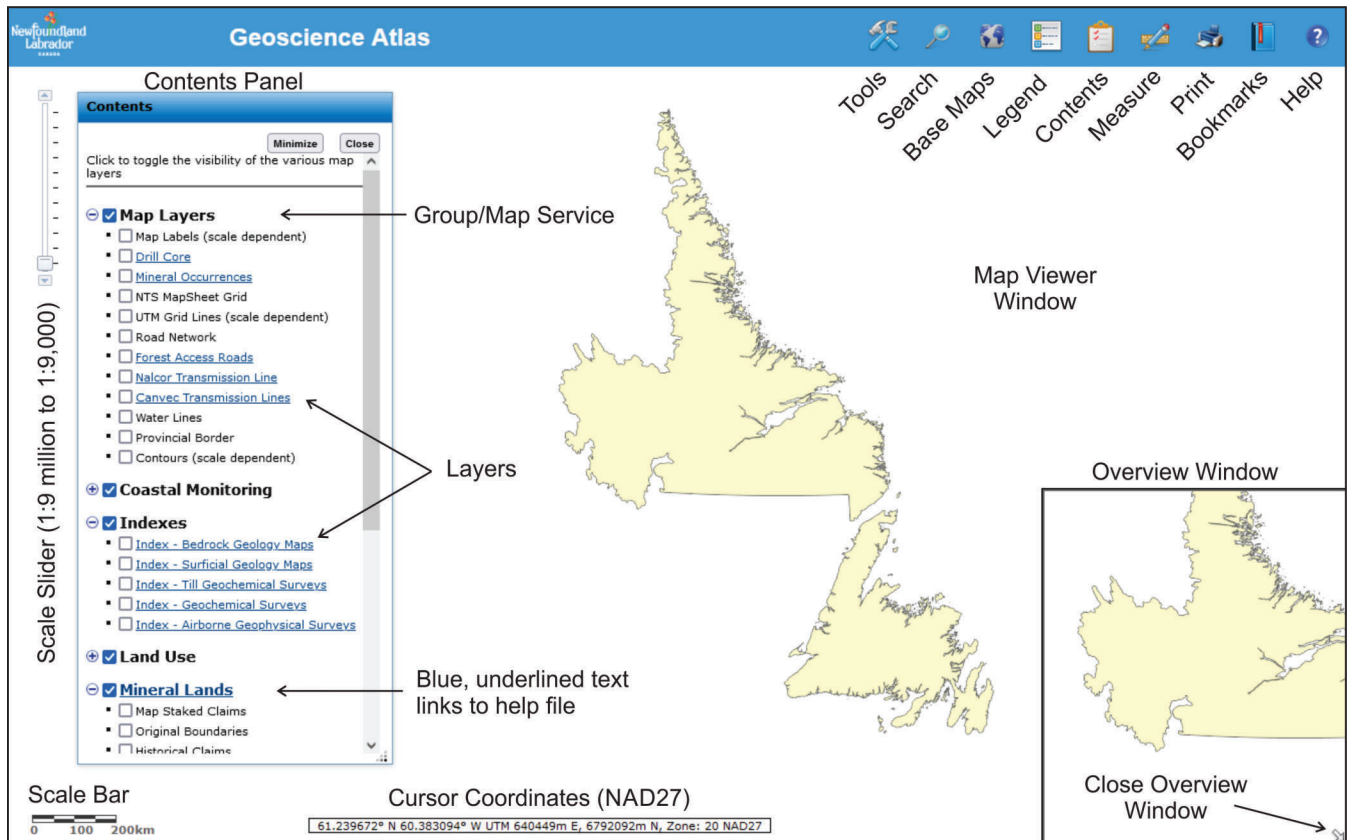
The Geoscience Atlas (Atlas; Figure 1) is a web-accessible interface to a geographic information system (GIS) that provides Newfoundland and Labrador geoscience datasets (e.g., geology maps, mineral occurrences, map-staked claims information, geochemistry data, geophysical images, and links to reports) that may be of use to prospectors, mineral-exploration companies, and the public. The Atlas hosts more than 180 geoscience data layers and more than 200 unique data visualizations (e.g., geochemistry dot plots for individual elements). The Atlas also displays ancillary data layers generated by other provincial and federal government agencies to aid in decision-making, such as the locations of transmission lines, municipal and planning area boundaries, quarry locations, and staked claims.

The Atlas is updated regularly; the update frequency varies by type of information. Foundational geoscience information (e.g., Geochemistry, Surficial Geology and

Geophysics) is updated annually or bi-annually. Other layers that pertain to mineral rights and mineral exploration (e.g., Mineral Occurrences, Map Staked Claims and Quarry layers) are automatically updated daily or in real-time. Linked help files and metadata pages are updated on an “as needed” basis.

The Atlas can be accessed by direct link (<https://geoatlas.gov.nl.ca/Default.htm>) or *via* the Geoscience Online page (<https://gis.geosurv.gov.nl.ca/>), where notices of planned maintenance or other changes that may impact users are also posted. The Atlas functionality (e.g., query, download, print, help files) is described in previous Current Research reports (Honarvar *et al.*, 2015, 2022). For discussion of Geoscience Atlas data access *via* its REST service endpoints, rather than through the online Atlas application see Jenkins *et al.* (2023). For updates to the Atlas operations and notices of planned maintenance, visit the Geoscience Online webpage at <https://gis.geosurv.gov.nl.ca/>.

Historically, the Atlas logs over 44 000 sessions each year, serving more than 9600 clients worldwide. Atlas use during the September 2022 to September 2023 reporting period was up over the previous year; over 54 000 sessions were logged by the Atlas’ web server. New data from Google Analytics (GA4) provide more detail about our clients and their engagement with the Geoscience Atlas, however these data were only available from June 2023 onward. The GA4 data show that 90% of our clients are from Canada. Provincially, about half of our clients are based in Newfoundland and Labrador (47%), followed by eastern and Atlantic Canada: Ontario (15%), Nova Scotia (10%), Quebec (7%), and New Brunswick (5%). The top



**Figure 1.** The Geoscience Atlas webpage layout. The scale slider and contents panel are located on the left side. The scalebar, cursor coordinates and overview window are located along the bottom. Tools, Base Map options, Legend generator, Print, Help file links and additional function buttons are located in the menu bar across the top right.

international client jurisdictions were United States (4%) and Australia (1%).

## 2023 ATLAS UPDATES

The most recent updates to the Geoscience Atlas occurred in April, 2023. These updates, listed below, included newly compiled data, updated or appended data, and links to reports by GSNL personnel and exploration companies. The list below does not include layers updated in real time (*i.e.*, *Map Staked Claims*) or daily (*e.g.*, *Mineral Occurrences*, *Historical Claims* and *Quarry* layers).

- **Map Layers Group:** New *Drill Hole* database layer added. This layer contains the location and ancillary information for over 17 500 drillholes, starting from the most recent exploration company assessment reports (including compiled datasets), and is discussed in greater detail later in this report. Updates were also made to the *Drill Core* and *Forest Access Roads* layers.
- **Indexes Group:** Added links to new map and report releases in the layers *Bedrock Geology Maps*, *Surficial*

*Geology Maps*, *Geochemical Surveys* and *Airborne Geophysical Surveys*.

- **Geochemistry Group:** New fluoride measurements from re-analysis of almost 2500 till samples across Labrador (*see* Campbell *et al.*, 2022) were added to the *Till Sediment Geochemistry* layer.
- **Bedrock Geology Group:** A new thematic layer was added to the “Polygons Newfoundland” subgroup, *Newfoundland Detailed Author Reference*. This layer allows a user to determine, for a given location, the source of geological information incorporated into the compiled *Newfoundland Detailed Bedrock Geology* layer. In some cases, a published map was not incorporated into the compilation in its entirety, therefore, to decipher the history of bedrock study and interpretation in an area of interest, the user is encouraged to consult both this layer and the *Index of Bedrock Geology Maps* layer. A “Name” field was added to the *Newfoundland Detailed Faults – Line* layer to hold the names of faults published in geological literature. Names were added to 179 fault segments in 2023; updates to this layer are ongoing.

- **Surficial Geology Group:** Newly digitized data were added to the *Landforms* and the *Detailed Surficial Geology* layers for western Labrador in 1:250 000 NTS map sheets 23A, B, G, H and J. All features in the *Landforms* layers (lines and points) were updated with the Geological Survey of Canada (2020) geologic symbol standards to facilitate regional to national compilation and interpretation. The symbol codes were also added to the attribute tables for downloadable data, and appear on new map publications.
- **Geophysics – Labrador Group:** Added the Qipuuqqaq–Postville compilation (8 raster images) to the Atlas for east-central Labrador. The download page for the report, maps and data files is linked to the layer name in the Table of Contents.
- **Updated Help Files and Metadata:** The What's New page (<https://geoatlas.gov.nl.ca/custom/help/whatsnew.html>) was updated with the 2023 Atlas updates

## NEW THEMATIC DATASET: DRILL HOLE DATABASE

The new Drill Hole Database (**Map Layers** group > *Drill Hole*) comprises over 17 500 records of drillholes in Newfoundland and Labrador (Figure 2) compiled mainly from publicly available mineral exploration company assessment reports. This is an expansion from the existing *Drill Core* database, thus approximately half of the *Drill Hole* records may be associated with core in the Provincial Core Library. All records in the database have been reprojected into UTM coordinates referencing the NAD27 datum for consistency. The database provides basic information about drillhole location, orientation, and depth that may be of use for three-dimensional modelling and simple cross-sections. To date, downhole data compilation is limited to cover depth and character and thickness of the uppermost bedrock unit; more complete compilation of downhole data is anticipated in future years. Clients can access the corresponding assessment report for most drillholes *via* a direct link to Geofiles in the layer's attribute table.

## MAP DATA PACKAGES

Clients can now access new map publications as compressed, self-extractable ArcGIS Map Packages (.mpk) or ArcGIS Pro Packaged Project Files (.ppkx). These are accessible *via* the Latest Publications website at <https://www.gov.nl.ca/iet/mines/geoscience/reports-maps/latest-pubs/>, *via* Geofiles search, or by links from the *Index*

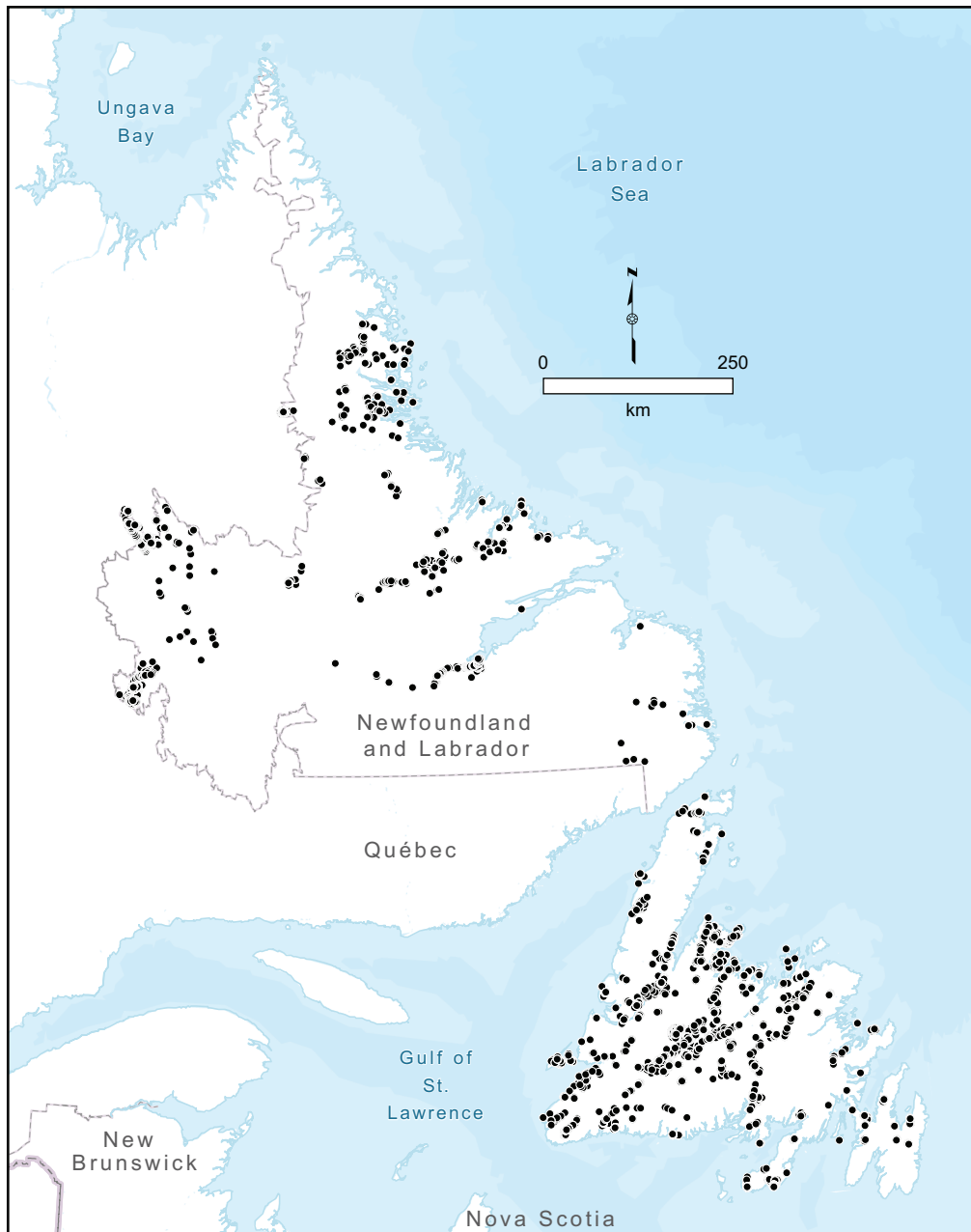
layers on the Atlas. All maps also continue to be published as PDFs for easy viewing and printing.

## PLANNED ENHANCEMENTS IN 2024

The current Atlas interface, developed to leverage the ESRI ArcGIS Server technology, was launched in March of 2014. Whereas this is a valuable tool in its current configuration, the GSNL is committed to ensuring that data delivery is aligned with the requirements of the current and future exploration industry, and other clients. Efforts to develop and implement a modernized version of the Atlas that leverages the full capability of the ESRI product suite and development of a comprehensive relational database management system to facilitate internal data management and client data delivery in a variety of formats are ongoing in 2024.

## REFERENCES

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**Figure 2.** The Drill Hole database connects our clients with more than 17 500 drillhole records (black dots) across the province. To access complete downhole data reports, a link in the attribute table connects the client to the assessment report for most drillholes.