Corporate Geochemical Sample Database Project – Till Geochemistry

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Introduction

Despite the amount of geochemical data available to the public, there is no source for geochemical analysis results organized into a single dataset. This pilot project was initiated with the aim of determining the work needed to integrate till geochemical data into a single data model, with the future goal to expand it to include geochemical analysis of other media types such as rock, sediment, soil, and biological geochemistry. Organizing all geochemical data into a single dataset will provide the Geological Survey Division (GSD) staff, industry, academia, and the public, better access to data to improve their research, decision-making, and understanding of the geology in the province.

The objectives of this project are to (1) merge a subset of till geochemistry sample locations into a single database table; (2) develop a data model that will integrate all associated information for each sample including geochemical analysis results, lithological information about the sample and the environment the sample was taken, and other analysis performed on the sample (e.g. rock or sediment composition, sieve analysis, etc.); (3) create a framework for an application that will serve as a geochemistry portal, in which the public and internal staff can access and query the data so they can find the specific information needed.

This report shows the findings from this pilot project, which includes noting the challenges that arose when dealing with complex data, identifying inefficiencies to streamline the process, and mapping future work that will be done next year to expand the project.

Till Geochemistry Sample Locations

To complete this pilot project efficiently, a subset of the till geochemistry for the province was chosen. The datasets chosen to be included consisted of; (1) three large provincial scale geochemical surveys undertaken in the 1970s and 1980s; (2) a recent regional scale till survey; (3) a subset of geochemical data extracted from assessment reports indexed in NovaScan. The large scale (small area) surveys were chosen because of the large volume of samples taken, the regional scale survey was chosen because of the complexity of the data and the broad range of elements that were tested, and the

assessment reports were chosen to provide data from industrial geochemical logs.

The till geochemistry survey data that was included in this pilot project consisted of 9,079 samples, which are listed below, and illustrated in Figure 12 with the Surficial Geology Map of Nova Scotia:

Historical Till Geochemistry Surveys

- DP ME 134, Version 2, 2006, Compilation of Seabright Resources Inc. Till and Soil Geochemical Data by the Nova Scotia Department of Natural Resources over the Meguma Terrane, Nova Scotia, 1986-1989
- DP ME 137, Version 2, 2006, Regional Till and Rock Geochemical Surveys of the South Mountain Batholith by the Nova Scotia Department of Natural Resources over western Nova Scotia, 1984-1989
- DP ME 138, Version 2, 2006, Till Geochemical Survey by the Nova Scotia Department of Natural Resources over mainland Nova Scotia, 1977-1985

Regional Till Geochemistry Survey

- DP ME 502, Version 1, 2018. Till Geochemical Data from the Warwick Mountain Area, Eastern Cobequid Highlands, Nova Scotia, by D.M. Brushett and C.C. MacMullen

Assessment Reports*

AR ME 2010-045	AR ME 2011-101	AR ME 2012-075
AR ME 2010-062	AR ME 2011-105	AR ME 2012-099
AR ME 2010-066	AR ME 2011-119	AR ME 2012-125
AR ME 2010-094	AR ME 2011-120	AR ME 2012-164
AR ME 2011-062	AR ME 2011-122	AR ME 2012-168
AR ME 2011-069	AR ME 2011-123	AR ME 2012-191
AR ME 2011-095	AR ME 2011-135	AR ME 2012-192

*Full listing of assessment reports in References

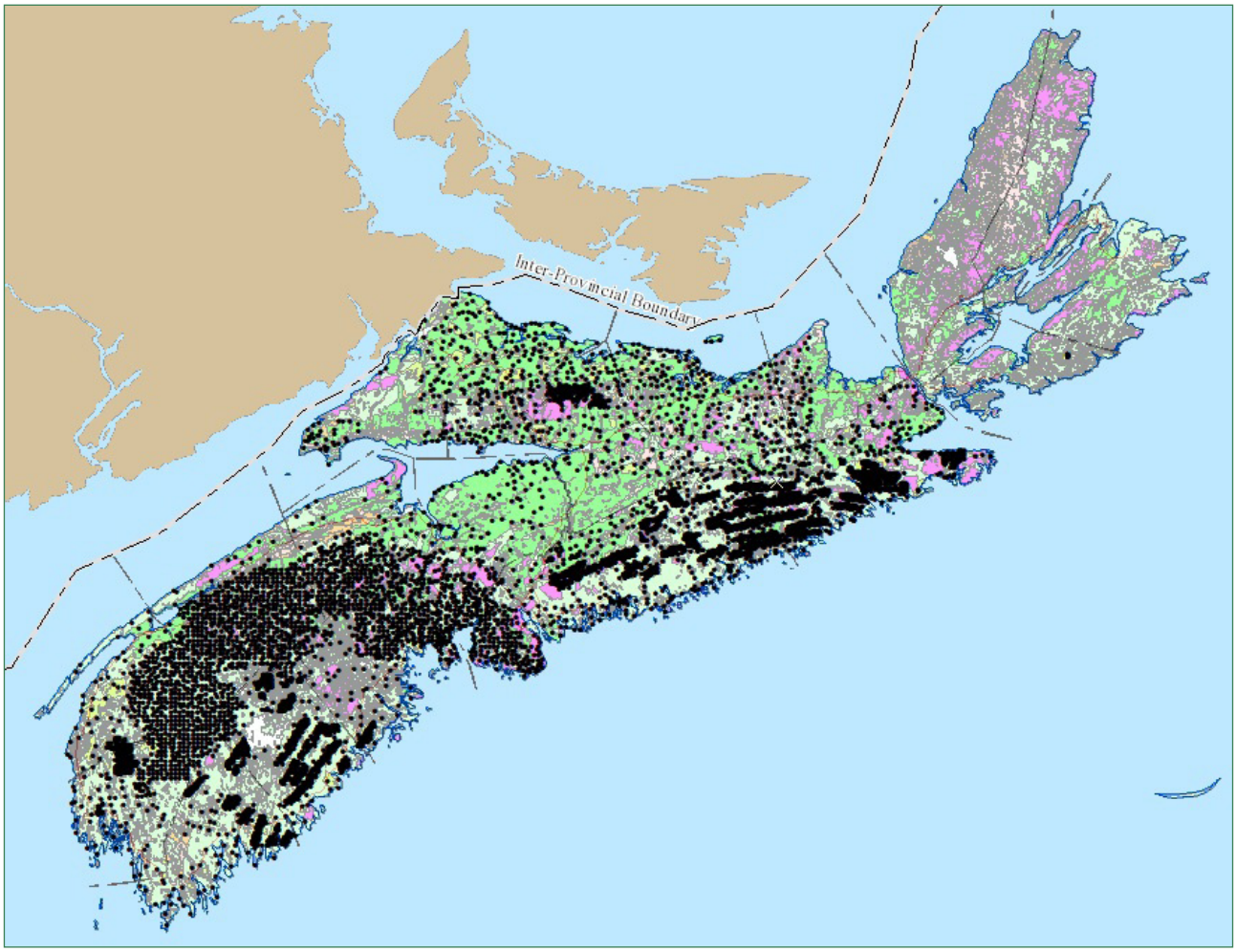

Figure 12. Till sample locations included in the pilot project (n = 9,079), overlain on the DP ME 36 Version 2 (2006) basemap, derived from the Nova Scotia Department of Natural Resources surficial geology mapping (Stea et al., 1992; scale 1:500,000).

Challenges

During this pilot project, a few difficulties arose with combining the data into one source. The biggest issue was dealing with geochemical analysis that involved testing a sample for the same element using differing methods (e.g. Intstrumental Neutron Activation Analysis (INAA) and Total Digestion). This problem was fixed with individual surveys by creating fields in the database table for each method (e.g. Ce_ppm_NA and Ce_ppm_TD). Combining analysis results from multiple surveys into a single table is unsustainable due to the use of multiple analysis methods. As a result, the data model was adjusted to store results in separate, related tables based on testing method.

The data model also had to be adjusted to accommodate till samples that were tested from drill core versus surface sampling to include depth values. Sample analysis results were subdivided by media (surface and drill core) for till analysis and in the future for rock analysis to reconcile downhole rock testing at differing depths. Also adding to the complexity of the data model were other analysis results such as gravel composition and sieve analysis that were performed depending on the media that is being tested, as well as sample preparation information before the analysis. These results, as well as a description of the sample and sampling environment, were subdivided into related tables.

Additional challenges included the need to conduct quality assessments to verify legacy data sourced from outdated formats. Till sampling of the Meguma Terrane especially needs to be cross-checked by evaluating the initial assessment reports and geochemical lab reports to authenticate the results as errors were identified. Lastly, transferring till geochemistry data from the large volume of assessment reports was extremely time consuming, and moving forward should be targeted more towards specific surveys or prospects. Another component is implementing a new data entry template to be used when assessment reports are initially indexed, to streamline the addition of new data.

Future Work

Now that the till geochemistry pilot project has been expanded to incorporate the geochemical analysis of other media (e.g. biological, rock, sediment, and soil), the primary goal for the coming year is to integrate previously released geochemical data from other sampled media into the new data model. Another major objective for the project is to begin creating a Geochemistry Portal dashboard which will provide clients with the ability to search for sample data spatially, query geochemical analysis results by mineral/metal indicators (critical minerals, REE, base metals, precious metals), and also have an option to filter out negative (below threshold) values, as well as standards, blanks, and duplicates used for quality control. These are just some of the features that can potentially be added. Another objective for the year is potentially performing a quality assessment for the Meguma Terrane till survey data.

References (Assessment Reports)

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