

## Introduction

The Manitoba Geological Survey (MGS) initiated a project to re-visit a number of rare metal occurrences throughout the Province, the results of which have been published in several reports of activities (e.g. Martins et al., 2011, 2012). The goal of this project is to characterize and evaluate the rare metal potential of new and historical occurrences in the Province.

This is an ongoing research project, in which a summary of the results are being published in a web-based format. The website will have a summary report for each rare metals occurrence, with the final objective of building a geoscientific database that can be used by the mineral exploration industry, as well as a technical database for use by local governments in resource evaluations, land use planning and regional development programs.

Two examples of areas with rare metal potential are shown below, accompanied by outcrop photographs; followed by a brief presentation of the website format.

## What is new?

A summary of this project's results will be published in a web-based format. This compilation aims to provide uniformly organized, concise and up-to-date information on rare metal occurrences in the Province of Manitoba. For each location, the report includes an exploration summary, descriptions of the geological setting, mineralization and geology of the occurrence, geochemical data, and pertinent references.

Interactive pop-up map allows accessing documents for free download by clicking in each occurrence on the map

## Burntwood Lake alkali-feldspar syenite

**Medium-grained pink to beige syenite, with pyroxene and titanite as the main mafic mineral phases**

**Red syenite, one of the main syenite phases**

**Example of irregular layering in pink syenite**

**Apatite- and clinopyroxene-rich red syenite (apatite appears chalky white)**

**Metasomatic, mafic-rich vein**

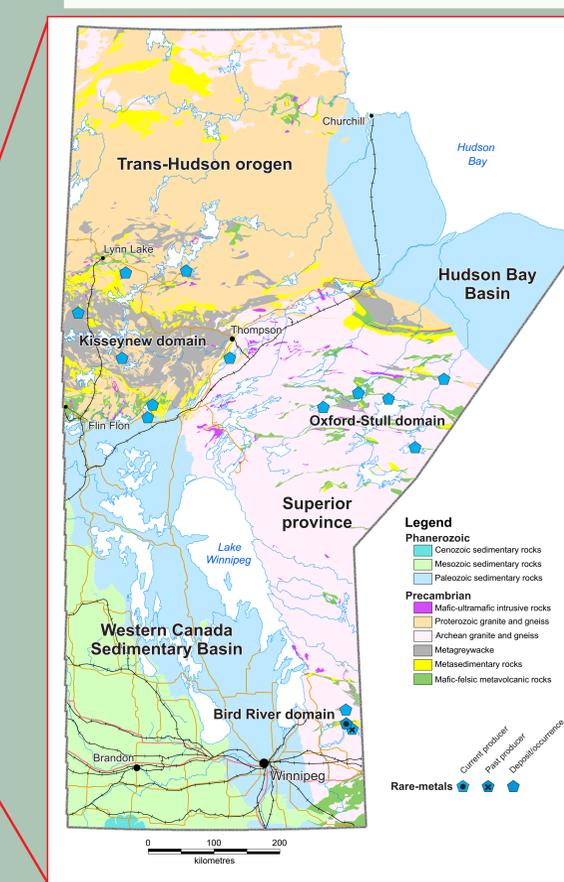
**Fluorite (Fl)-bearing quartz-syenite**

The Burntwood Lake alkali-feldspar syenite is located in the northwest arm of Burntwood Lake and is hosted by Burntwood Group metasedimentary rocks of the Kisseynew Domain and peraluminous granite.

The syenite forms a heterogeneous intrusion that is modally and texturally diverse. The heterogeneity appears to be the result of a combination of crystal fractionation, metasomatism, and possibly contamination. A recessively weathered Th-enriched vein was located along with discontinuous bands of massive apatite which are enriched in both rare-earth elements and Th. The rocks of the Burntwood Lake alkali-feldspar syenite bear many mineralogical, textural, and geochemical similarities to the carbonatite-hosting syenite complex at Eden Lake, a target of rare-earth element exploration.

## Introduction page of the rare metals website

The screenshot shows the website interface with a search bar, navigation tabs for 'Mineral Resources', and a list of rare metal occurrences including Burntwood Lake, Brezden Lake, Cinder Lake, Eden Lake, and South Bay. A map of Manitoba highlights these locations.



## Examples of documents that can be downloaded for each rare metal occurrence

## Brezden Lake syenite

**Laye pegmatite, cutting metasyenite**

**Metasomatic phase of the syenite with carbonate**

**Medium-grained biotite syenite with concentration of mafic minerals in cm-size clots**

**Syenite with m-scale concentration of mafic minerals**

The Brezden Lake intrusive complex is a heterogeneous multi-phase intrusive body, identified as having the potential to host rare metals and rare-earth-elements. It is located southwest of Lynn Lake where it is hosted by Burntwood Group metasediments and peraluminous granitoids of the Kisseynew Domain.

Localized metasomatism led to enrichment in rare-earth-elements. Carbonate was identified associated with the metasomatized phases. Petrographic study revealed granoblastic calcite and calcite replacing other mineral phases. Granoblastic calcite suggests equilibrium and could be derived from a carbonate fluid, whereas interstitial and replacing calcite suggests non-equilibrium and possible remobilization of the carbonate. No carbonatite was found associated with the Brezden Lake intrusive complex but many aspects including mineralogy, textures and geochemistry are similar to the syenite that hosts the carbonatite at Eden Lake.

This document provides a detailed geological and geochemical study of the Brezden Lake intrusive complex. It includes a map of the complex and discusses the mineralization and geochemistry of the syenite.

This document focuses on the geochemistry of the South Bay pegmatites. It includes trace element diagrams and discusses the mineralization and geochemistry of the pegmatites.