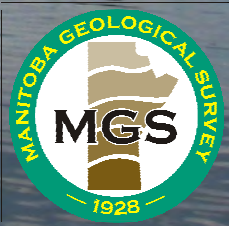
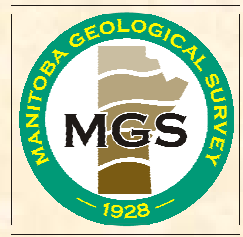


Re-assessment of Bird River greenstone belt stratigraphy

**Paul Gilbert
Manitoba Geological Survey**



Location of Bird River Belt

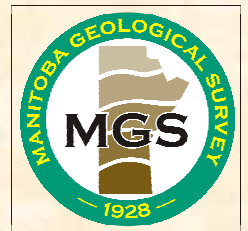


Bird River Belt projects initiated in 2005

Paul Gilbert (**Manitoba Geological Survey**) ~
1: 20 000 scale mapping

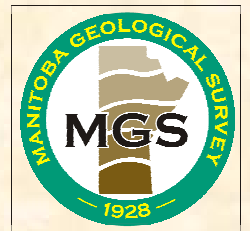
Manuel Duguet (**Post doctoral student, Univ. of Waterloo**) ~
Regional mapping (1: 50 000 scale) with focus on structural geology

Paul Kremer (**MGS**), Caroline Mealin ~
Economic geology theses (**MSc Univ. of Waterloo**)
TANCO pegmatite, Bird River Sill

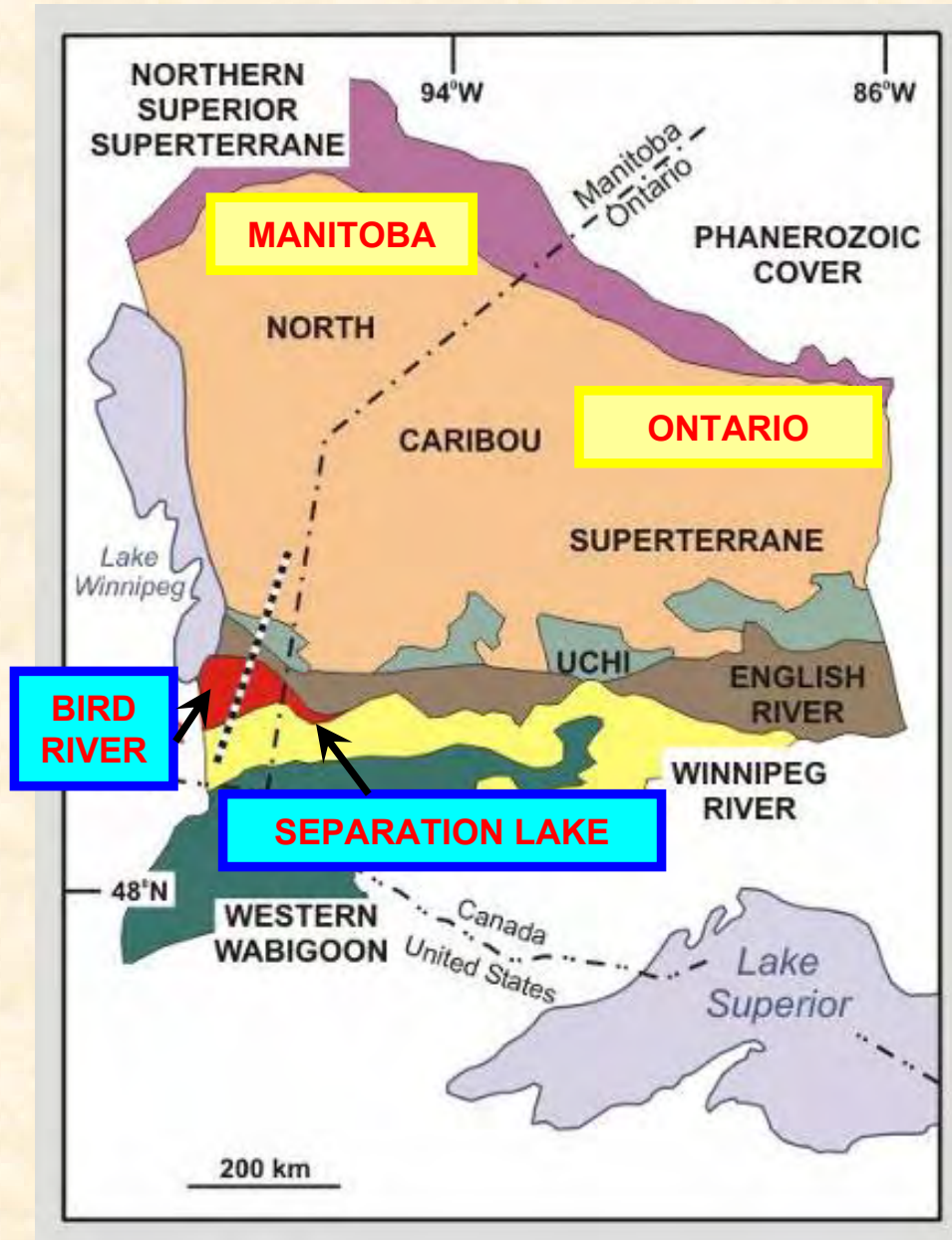


Outline of presentation

1. Regional setting and stratigraphy of BRB
2. Volcanic geochemistry
3. Economic implications
4. Summary

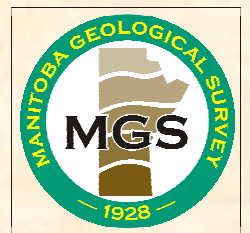


Bird River Belt regional setting

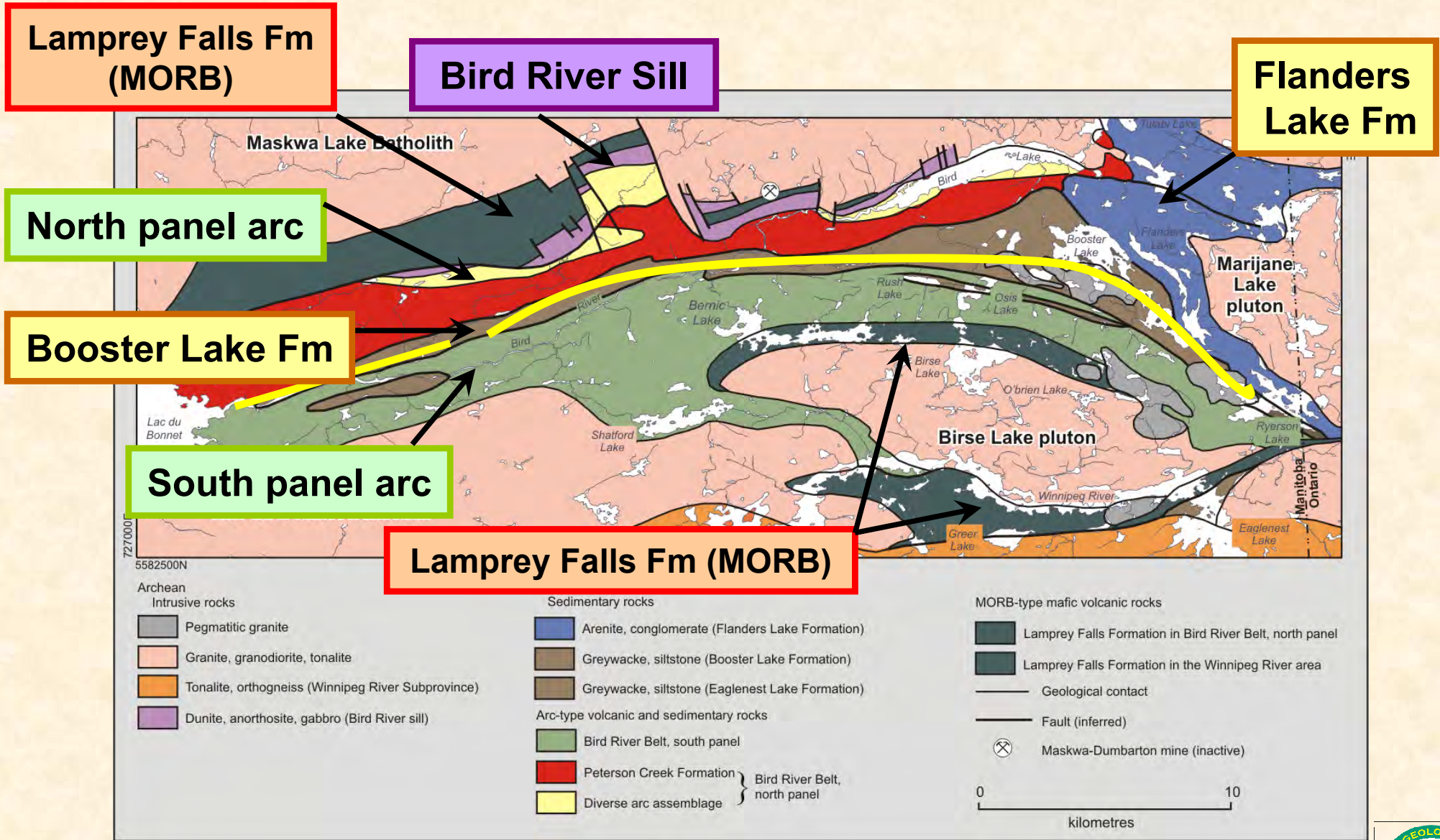


Bird River Belt stratigraphy

- 1. MORB-type volcanic rocks**
- 2. Continental arc-type sequence**
- 3. Younger sedimentary rocks**

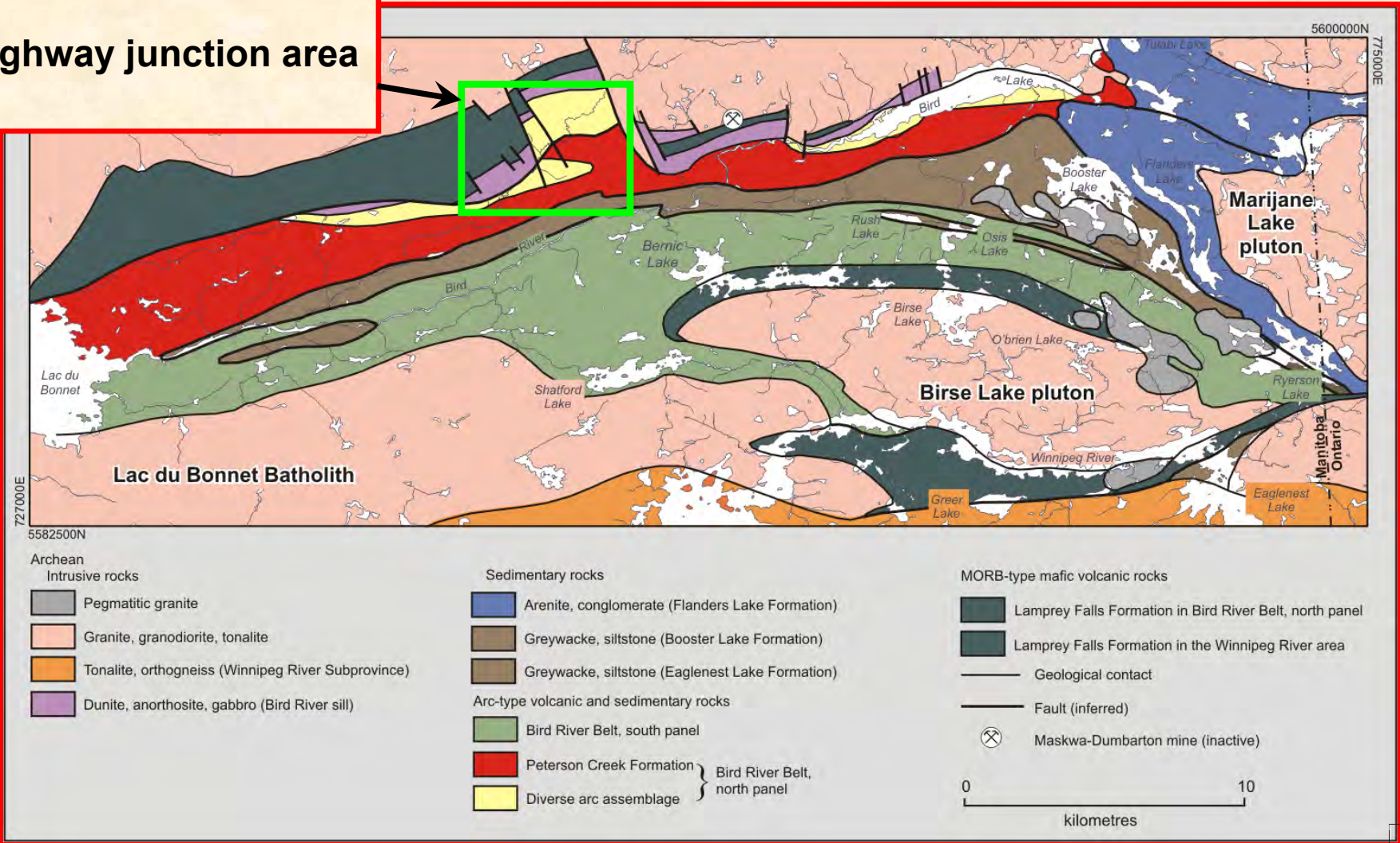


Bird River Belt stratigraphy

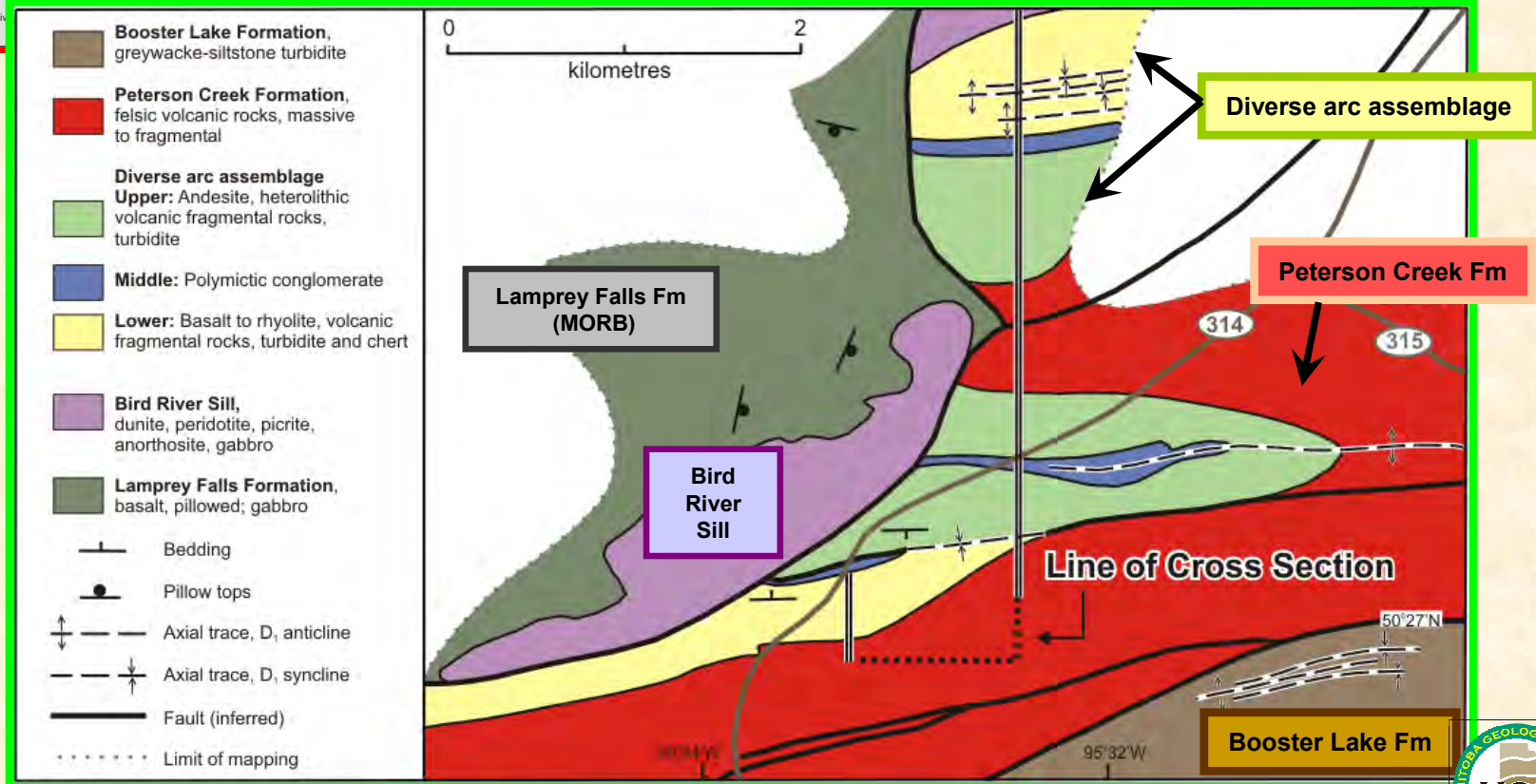
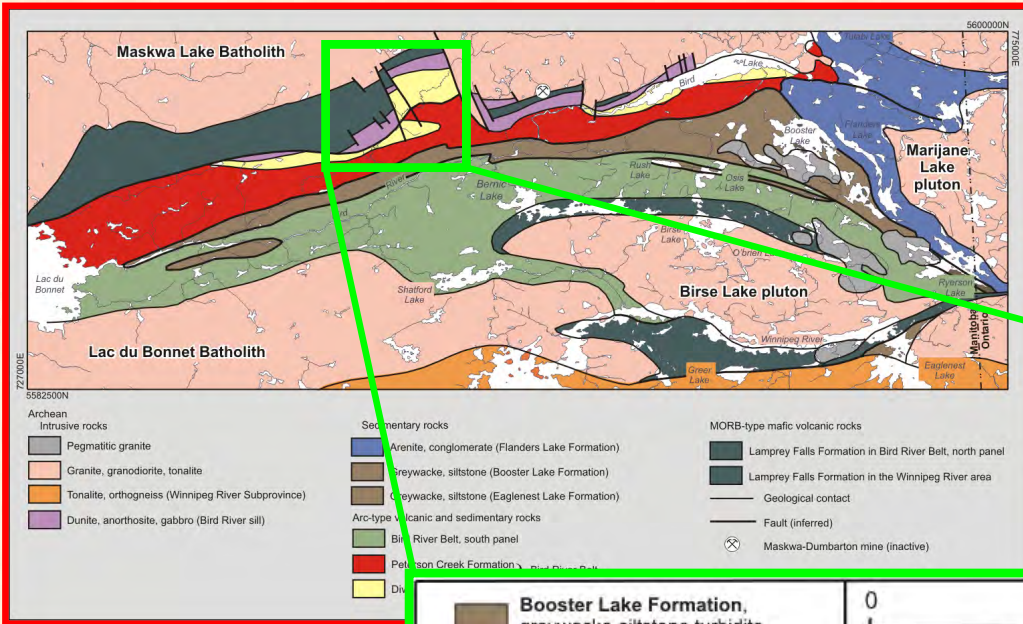


Bird River Belt stratigraphy

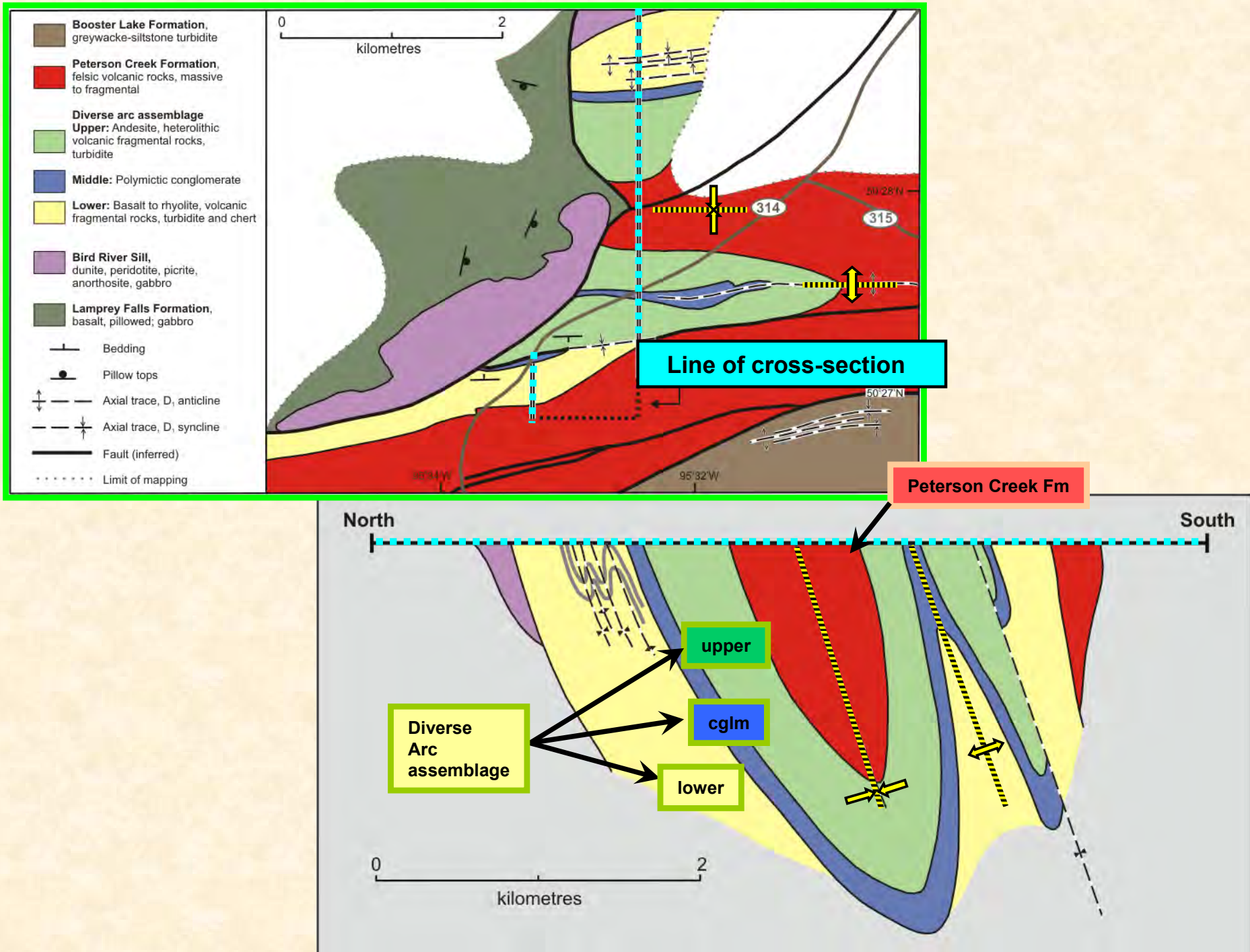
Highway junction area



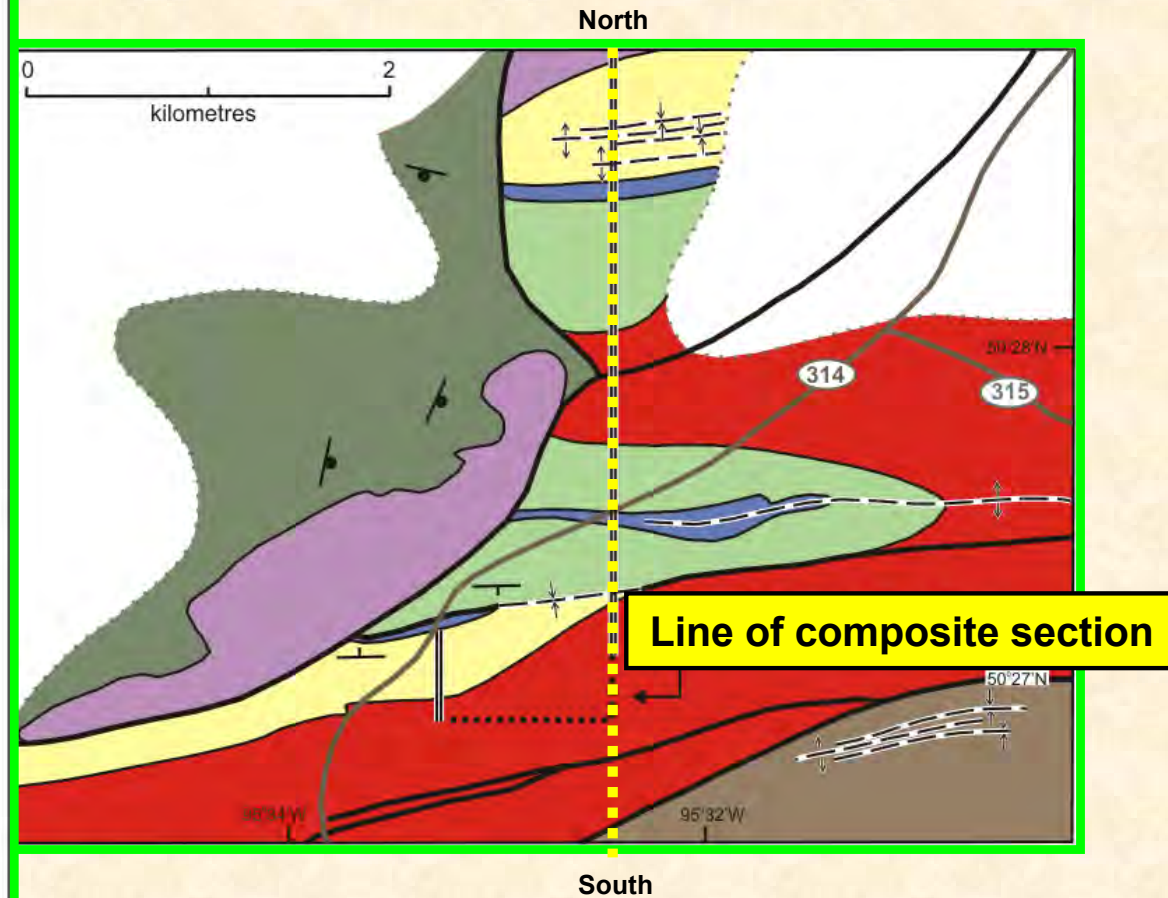
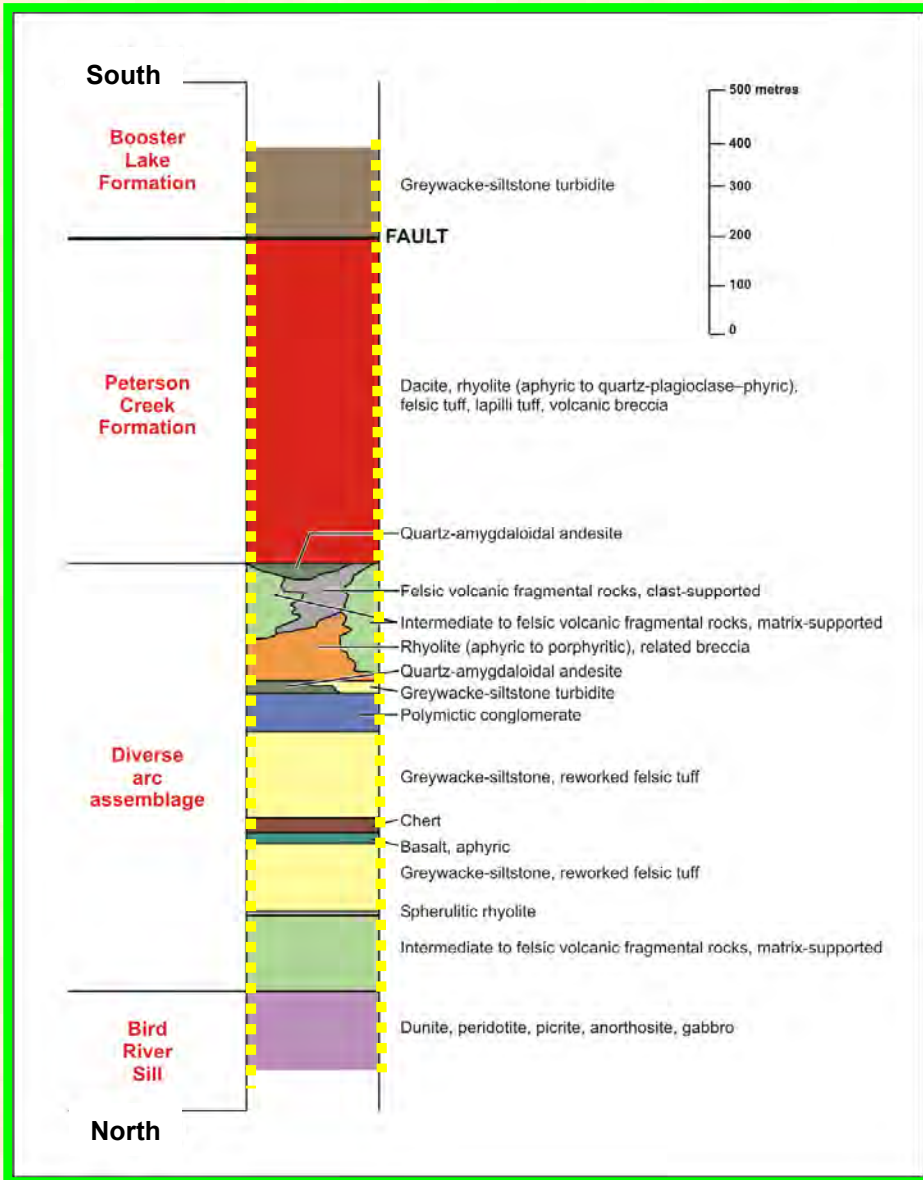
BRB north panel – highway junction area



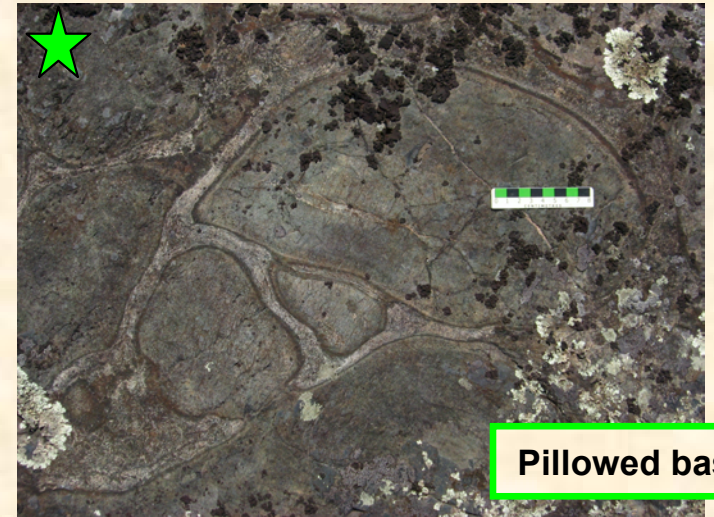
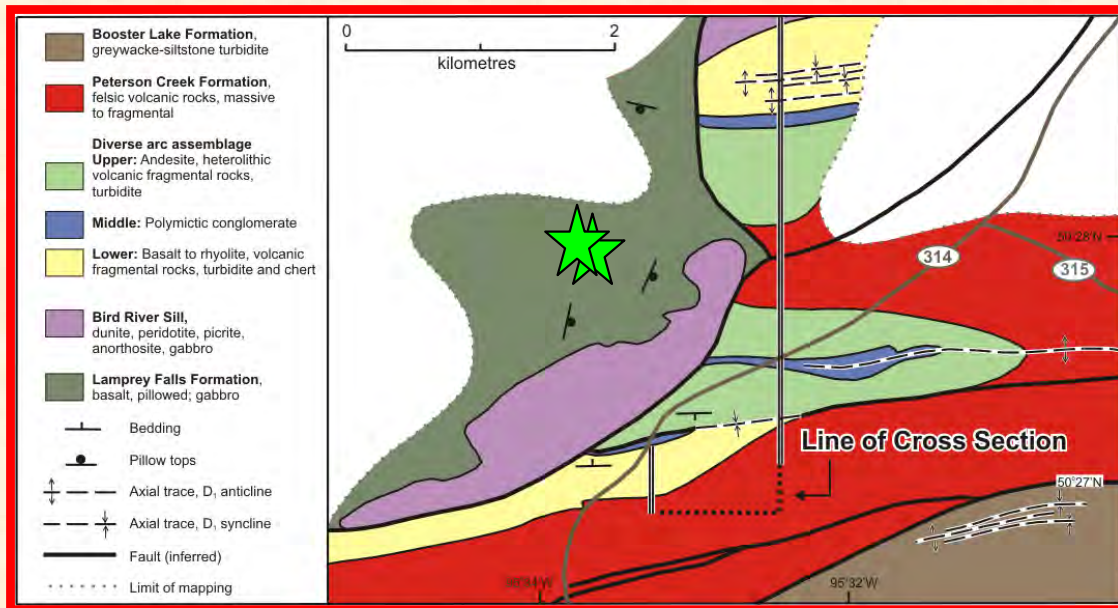
BRB north panel – cross-section



BRB north panel – composite stratigraphic section



Lamprey Fall Formation basalt

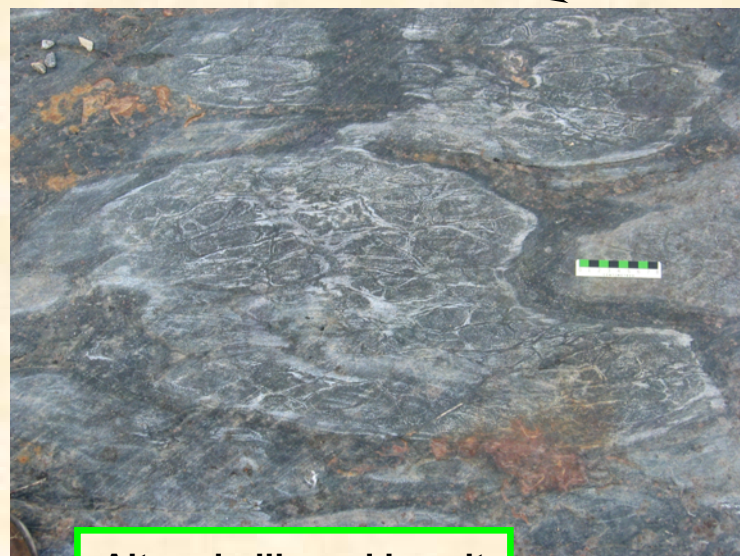


Pillowed basalt

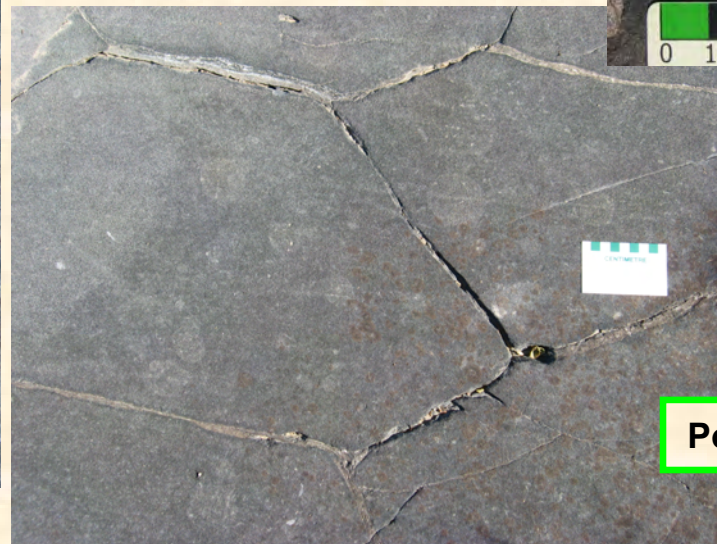


Megaphyric basalt

Lamprey Fall Formation at Winnipeg River

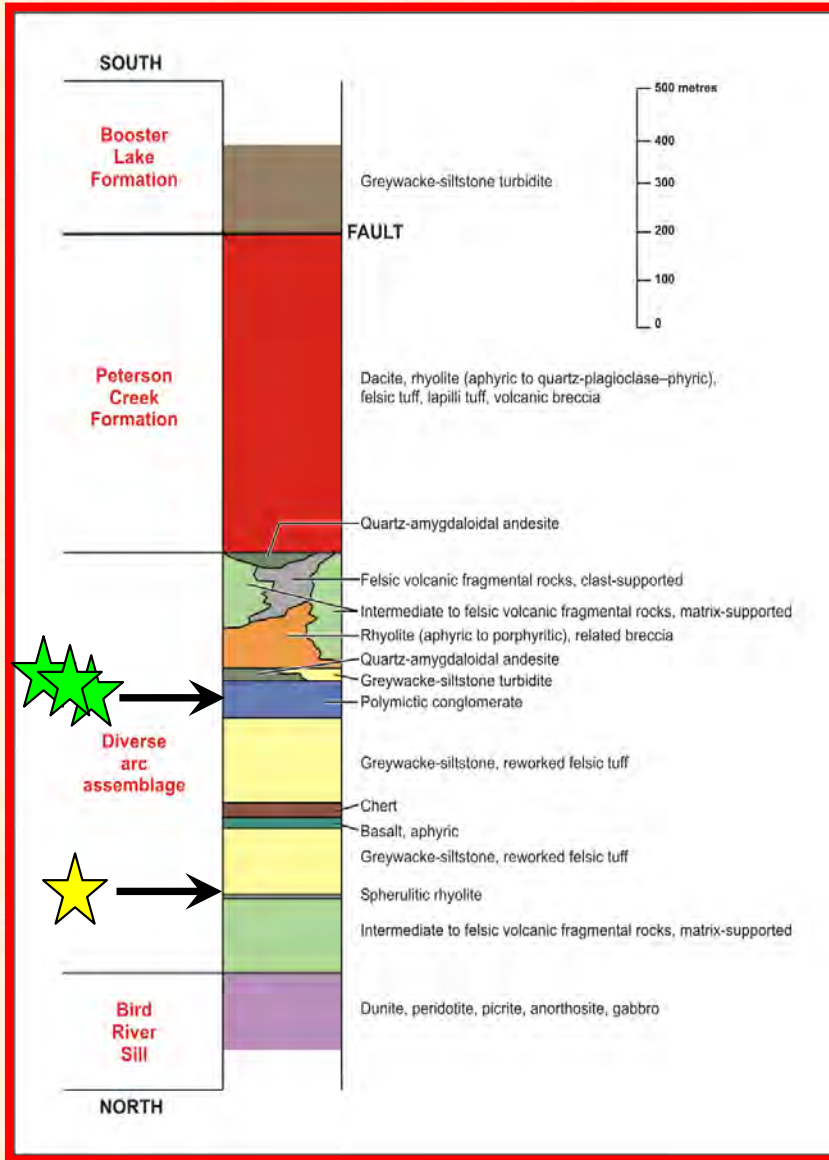


Altered pillowed basalt



Polygonal jointing

Stratigraphic column - highway junction area

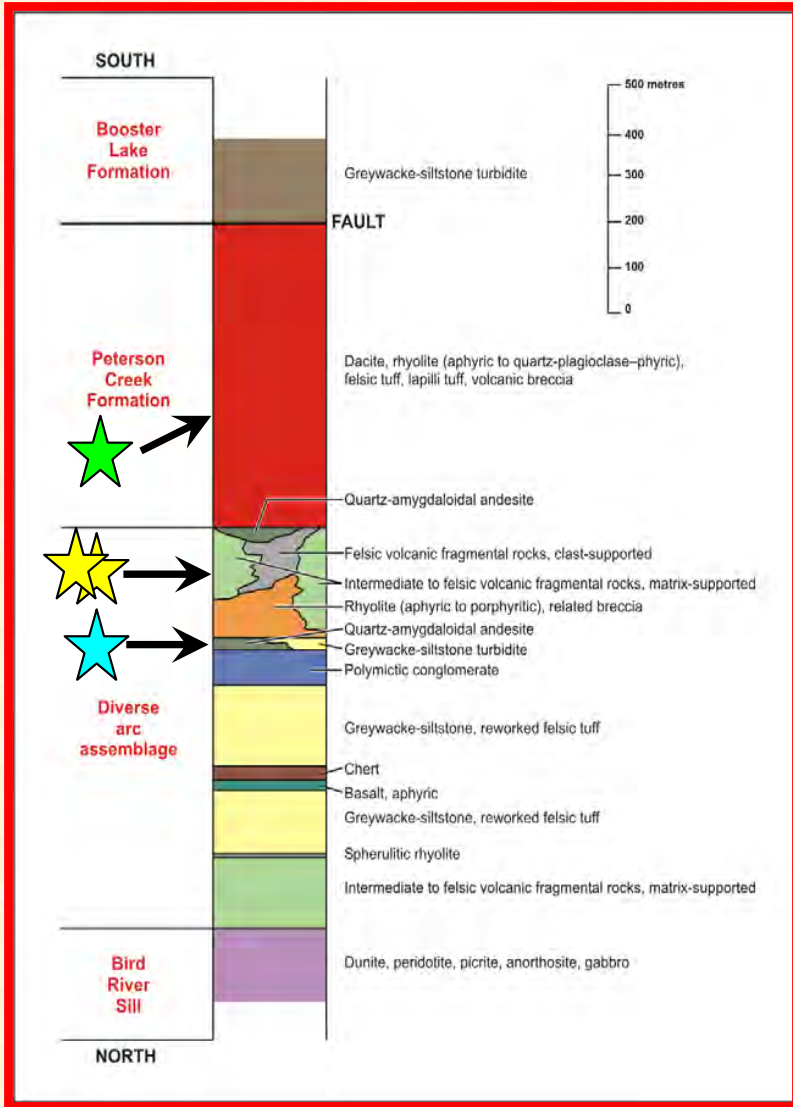


Polymictic conglomerate



Spherulitic rhyolite

Stratigraphic column - highway junction area



**In-situ breccia,
flow lamination**



**Heterolithic
volcanic breccia**

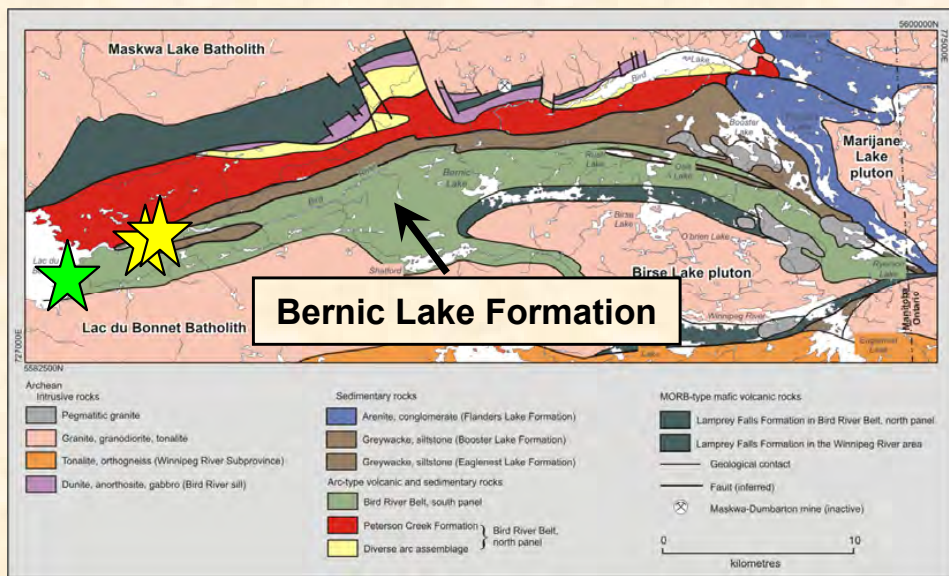


**Volcaniclastic
mass-flow**



Turbidite

Bird River Belt south panel ~ Bernic Lake Formation



Carbonate-facies iron formation



Aphyric pillowed basalt



Mass-flow volcanoclastic deposit

Bird River Belt geochemistry

1. MORB-type volcanic rocks
2. Continental arc-type sequence ~
 - (a) North panel calcalkaline
 - (b) South panel tholeiitic



Bird River Belt stratigraphy

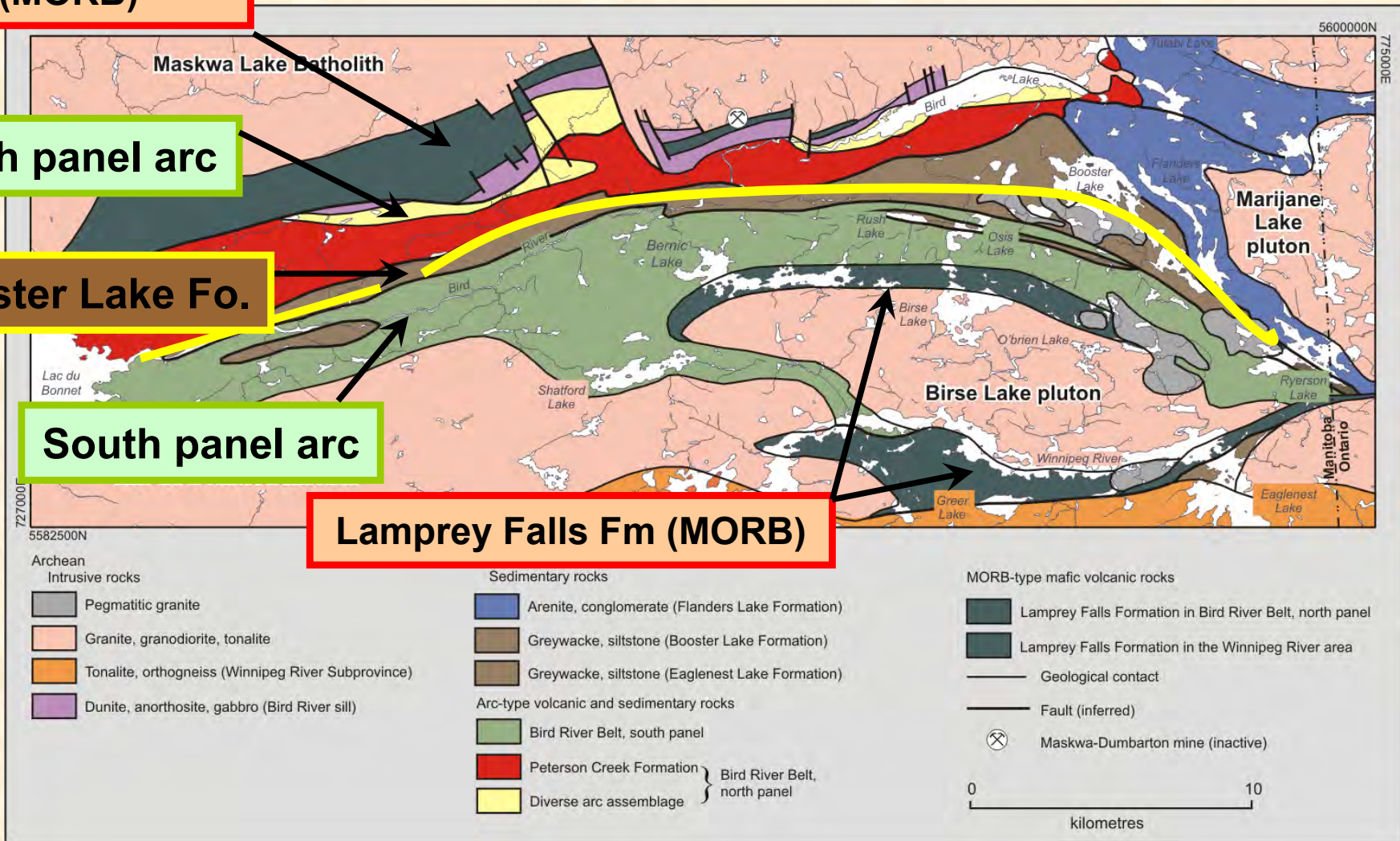
Lamprey Falls Fm (MORB)

North panel arc

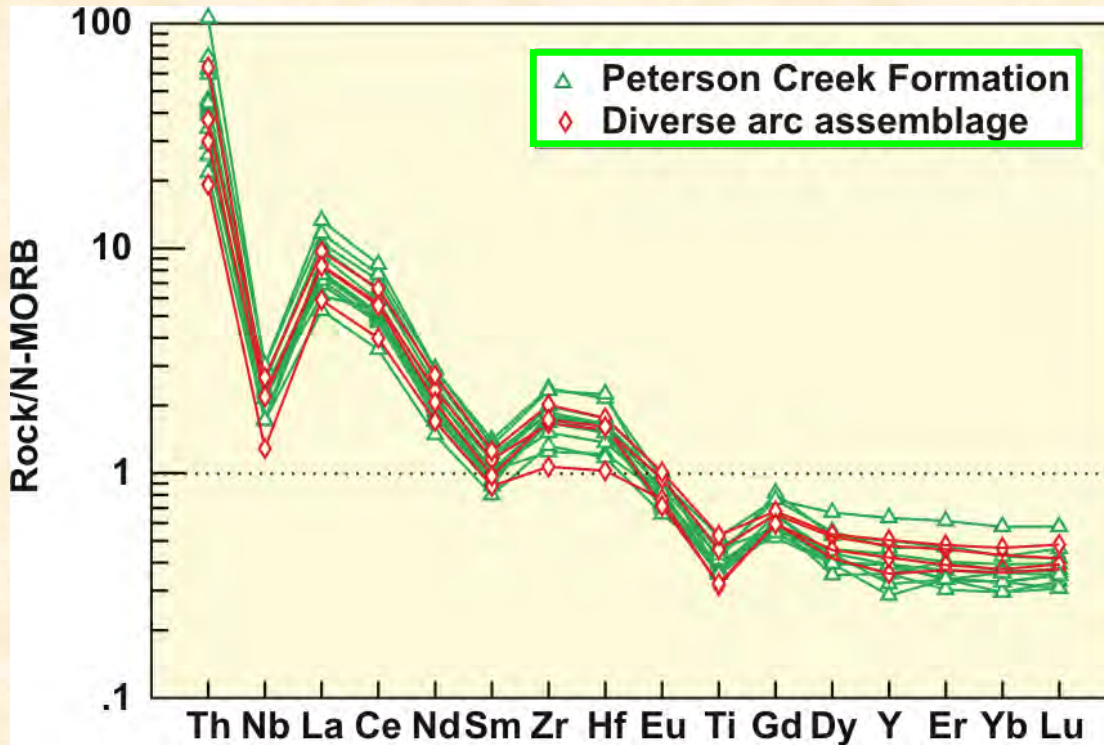
Booster Lake Fo.

South panel arc

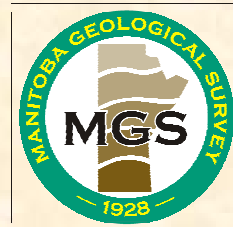
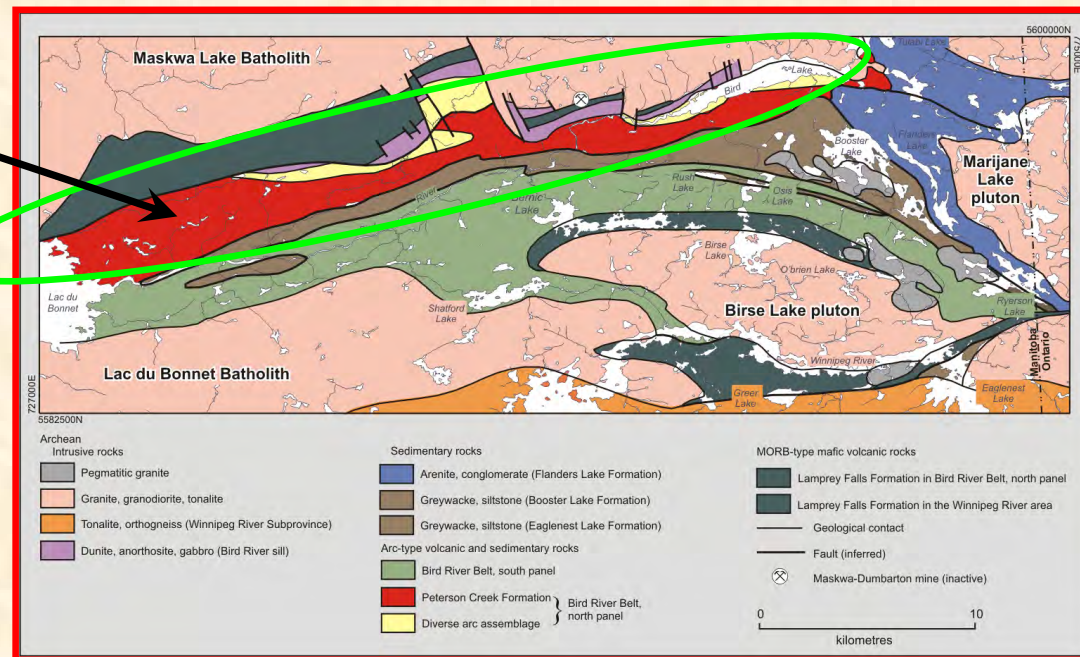
Lamprey Falls Fm (MORB)



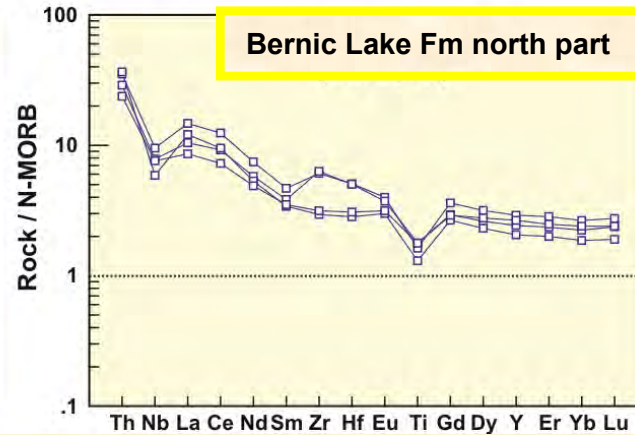
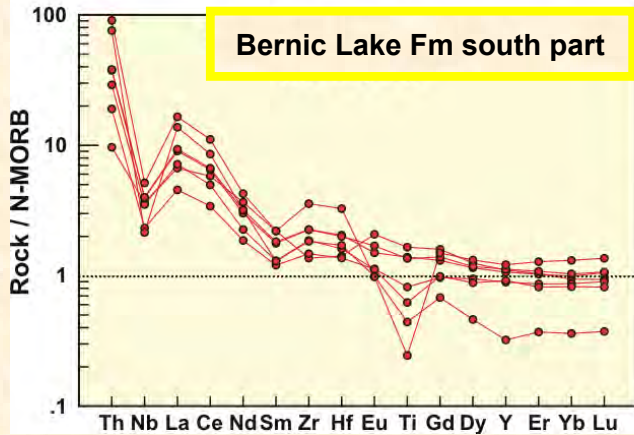
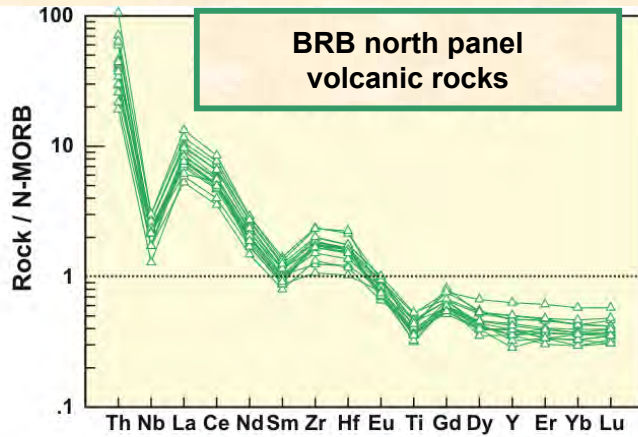
Bird River Belt north panel mafic to intermediate volcanic rocks



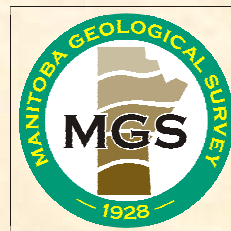
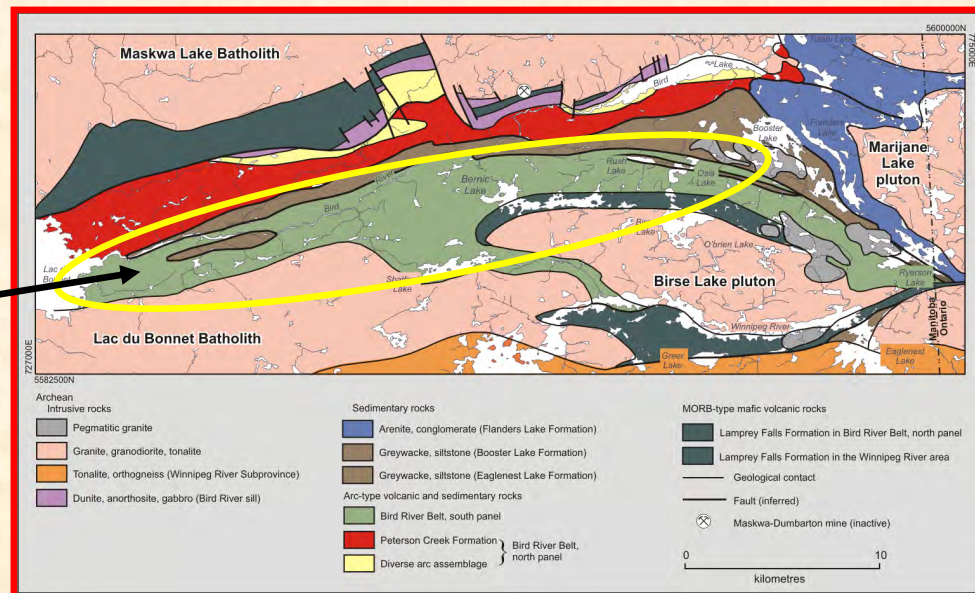
Mafic to intermediate
volcanic rocks
BRB North panel



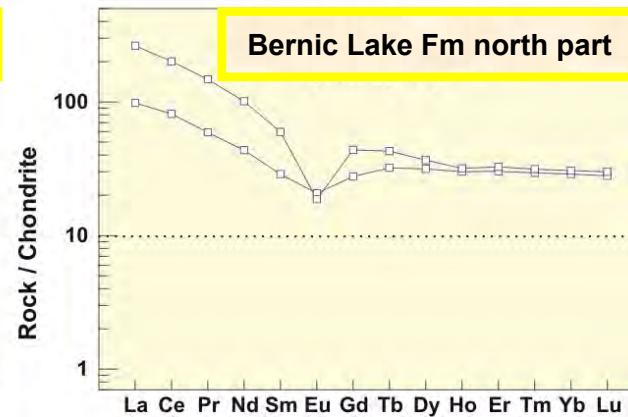
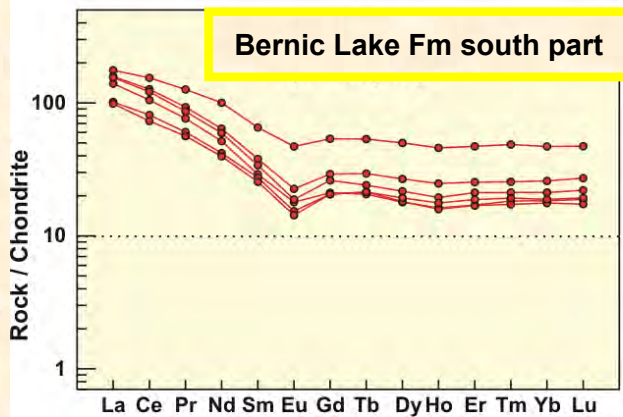
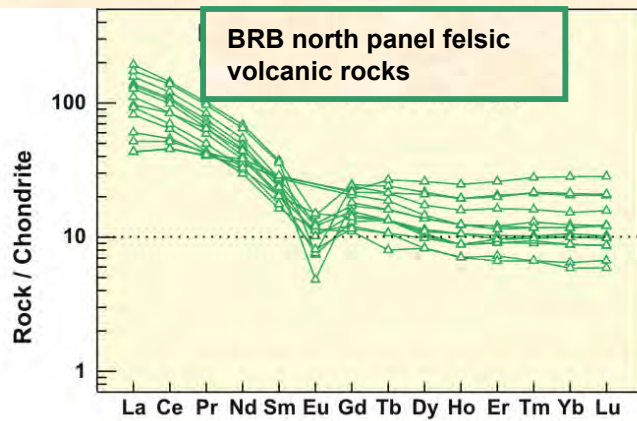
Bird River Belt mafic to intermediate volcanic rocks



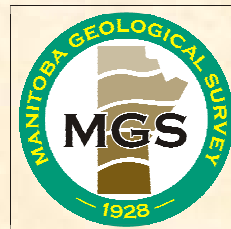
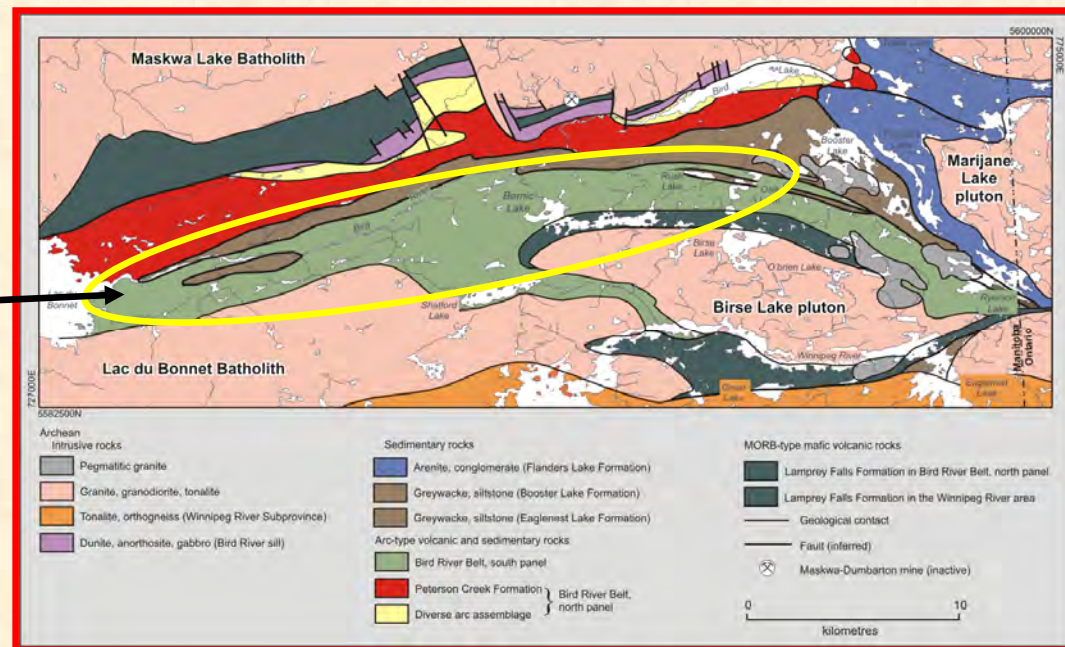
**Mafic to intermediate volcanic rocks,
Bernic Lake Fm.**

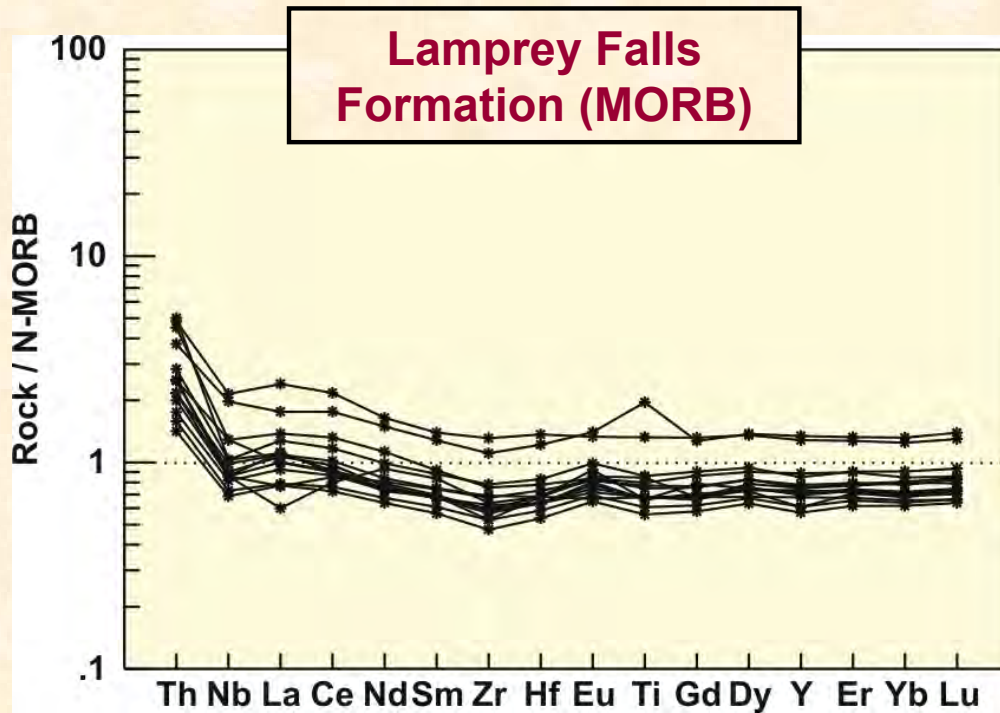


Bird River Belt felsic volcanic rocks

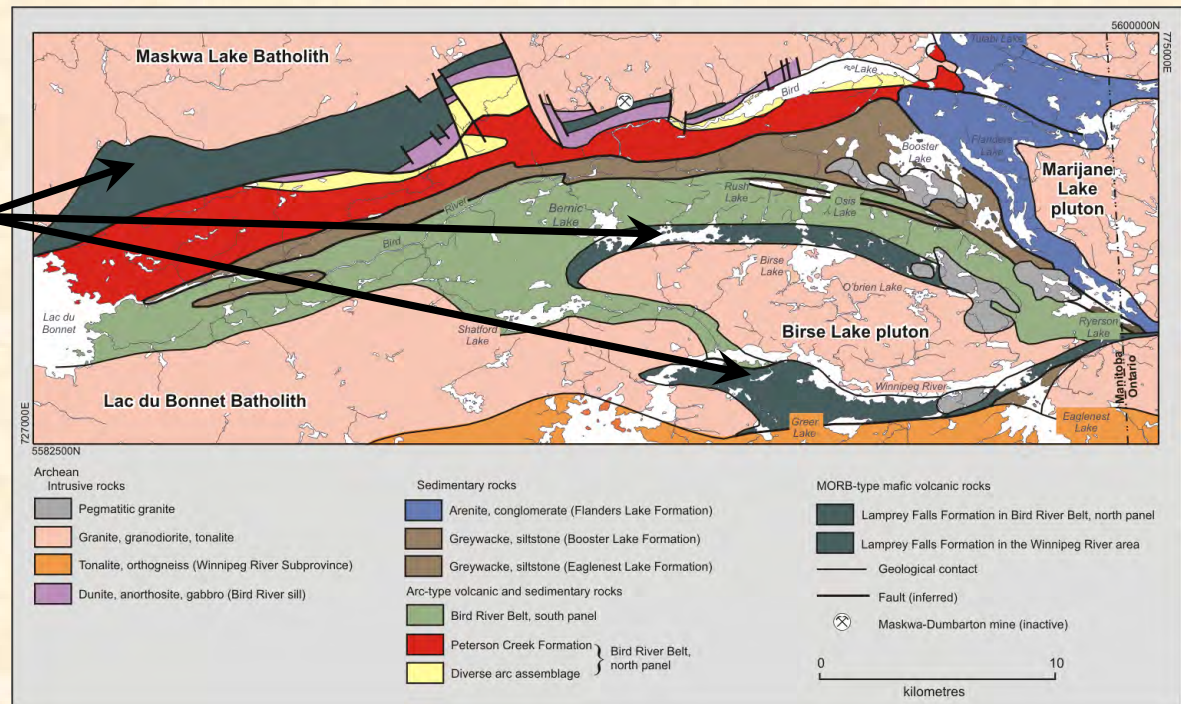


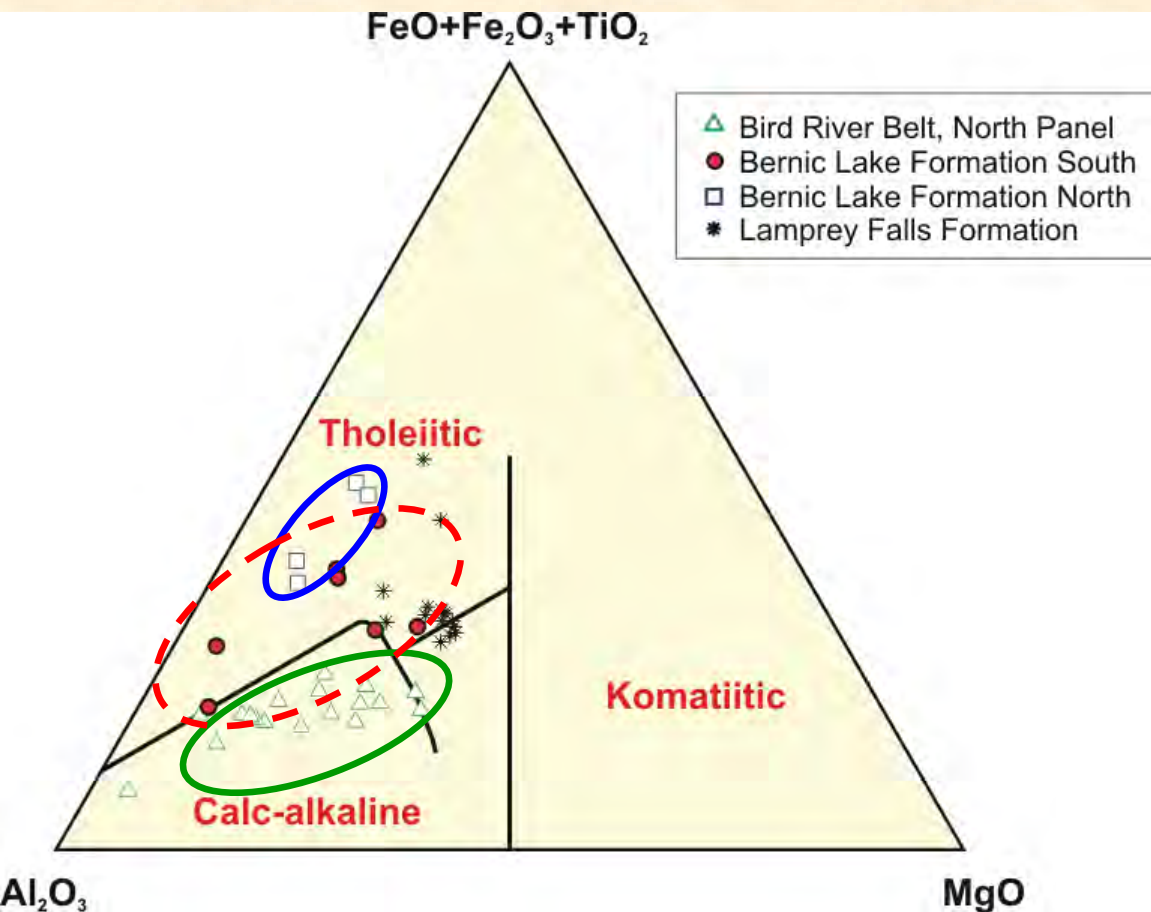
Felsic volcanic rocks, Bernic Lake Fm.





Lamprey Falls Formation





Jensen cation plot

Colour key

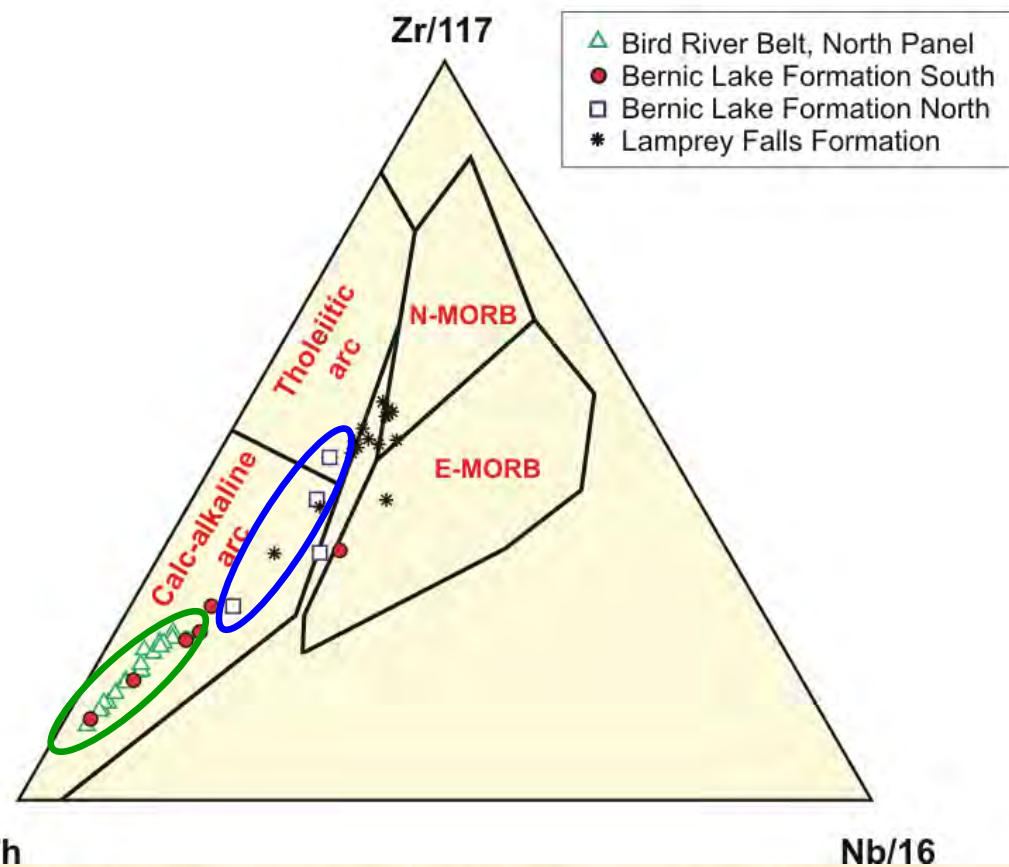
NORTH PANEL

BERNIC LK FM NORTH

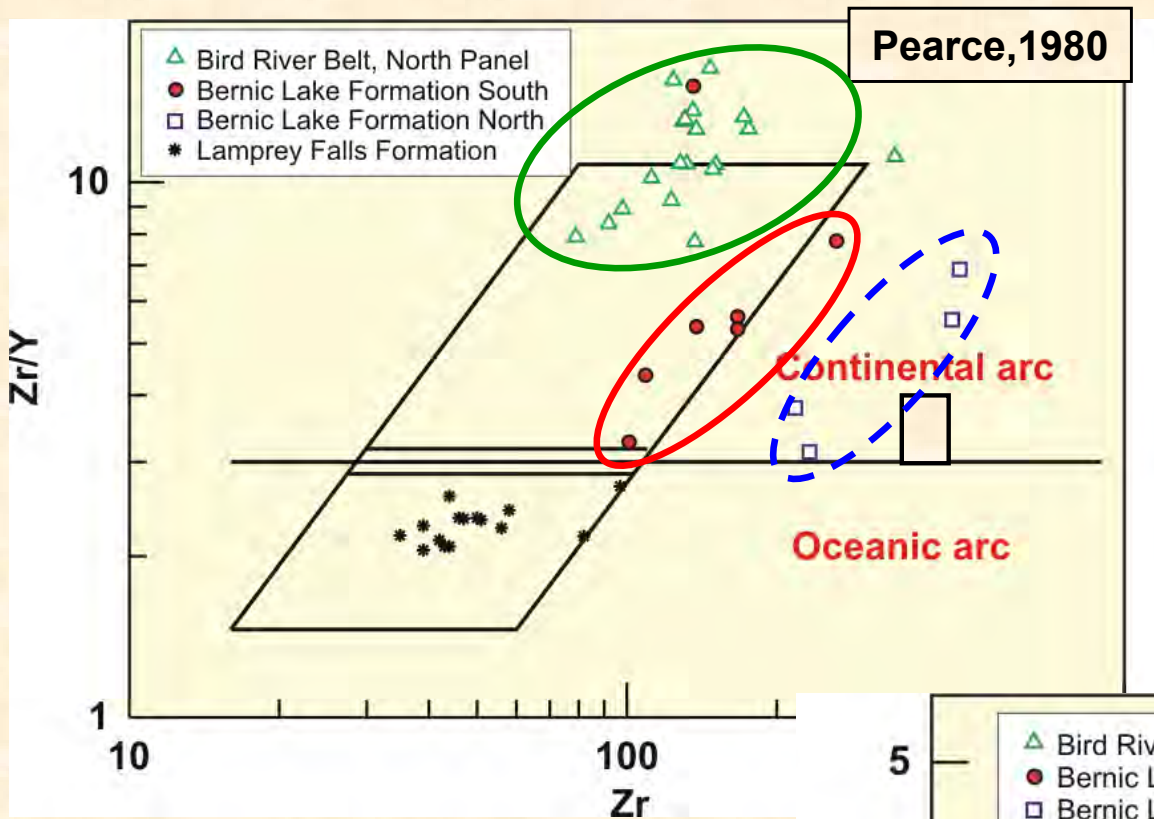
BERNIC LK FM SOUTH

*** LAMPREY FALLS FM**

Th-Zr-Nb ternary (Wood, 1980)

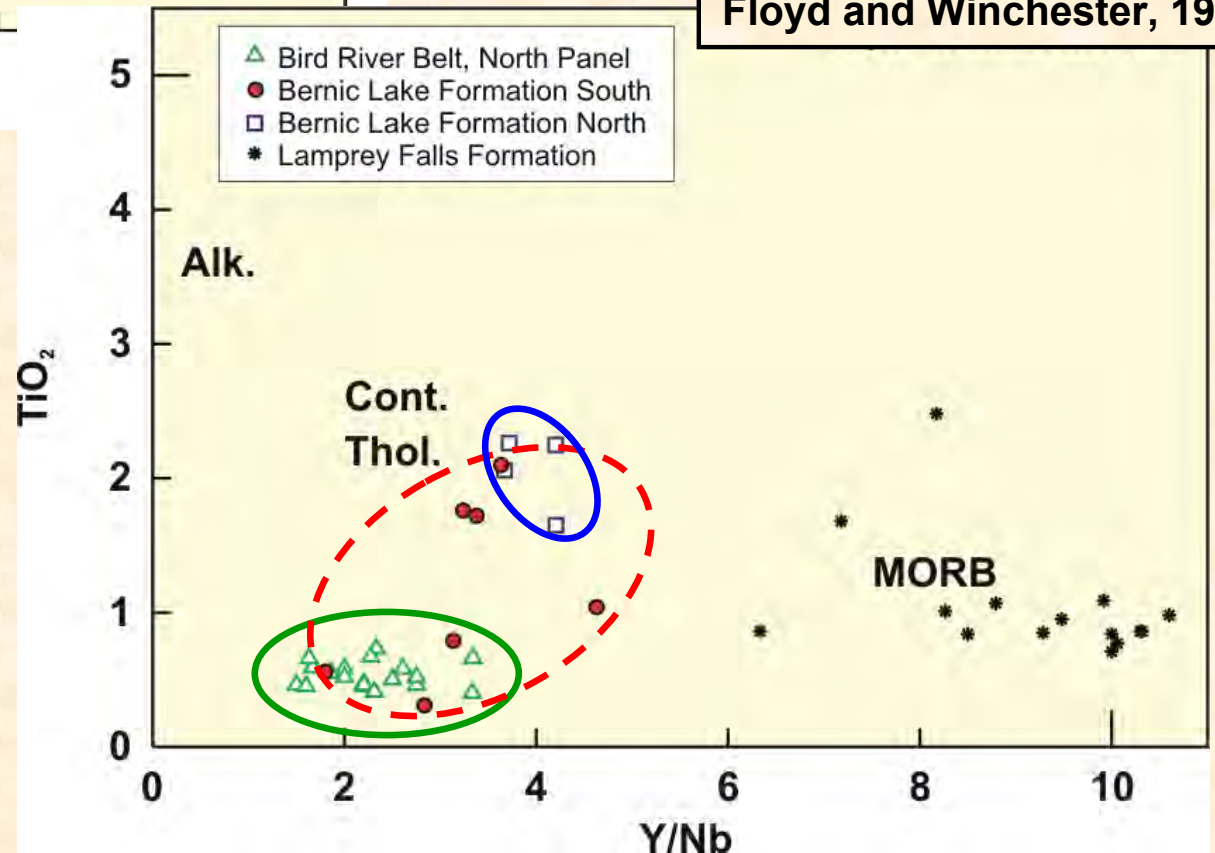


**Bird River Belt
all volcanic rocks**



Bird River Belt tectono-stratigraphic setting

Floyd and Winchester, 1975

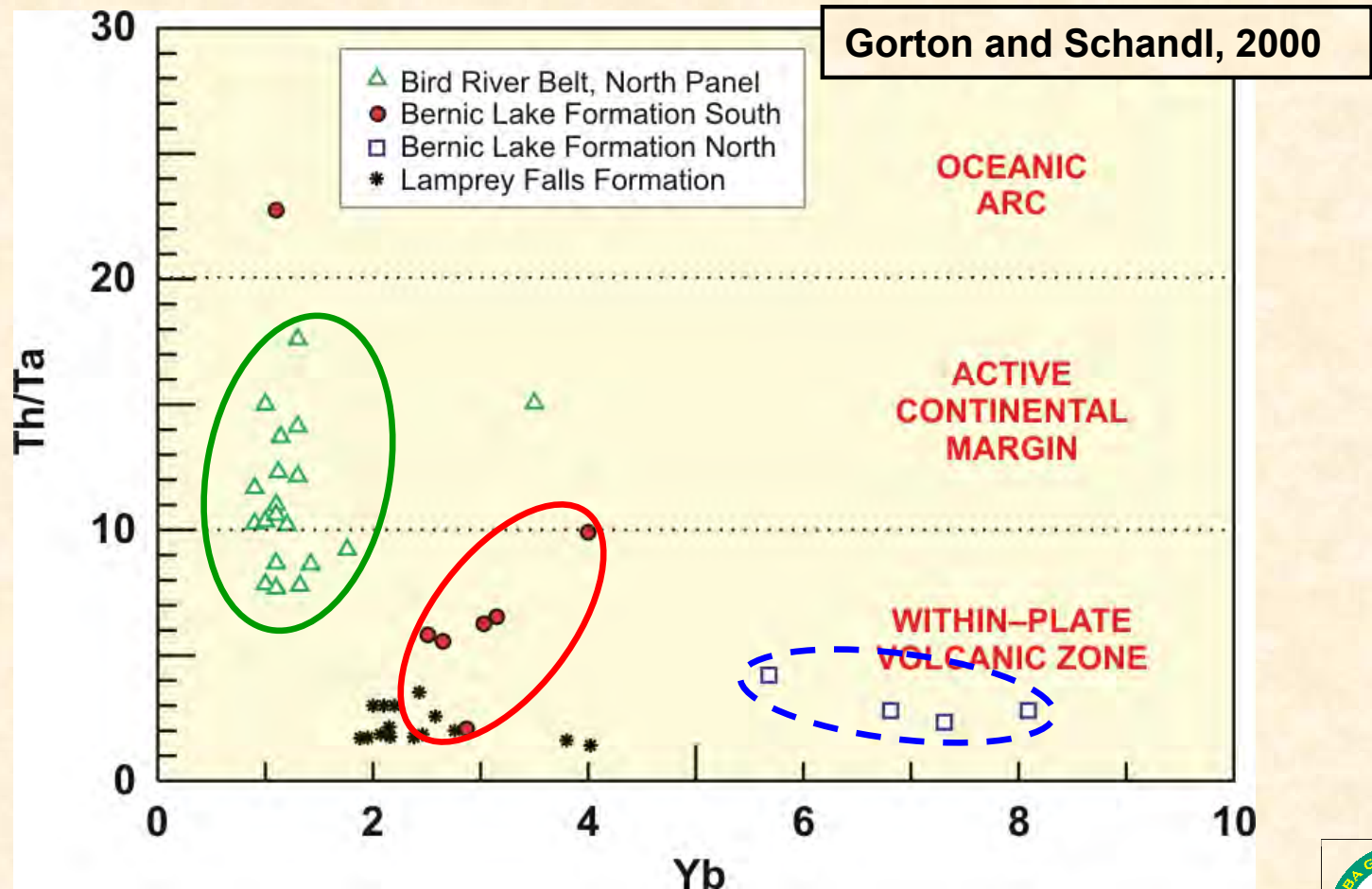


Colour key

- NORTH PANEL**
- BERNIC LK FM NORTH**
- BERNIC LK FM SOUTH**
- * LAMPREY FALLS FM**



Bird River Belt tectono-stratigraphic setting



Colour key

NORTH PANEL

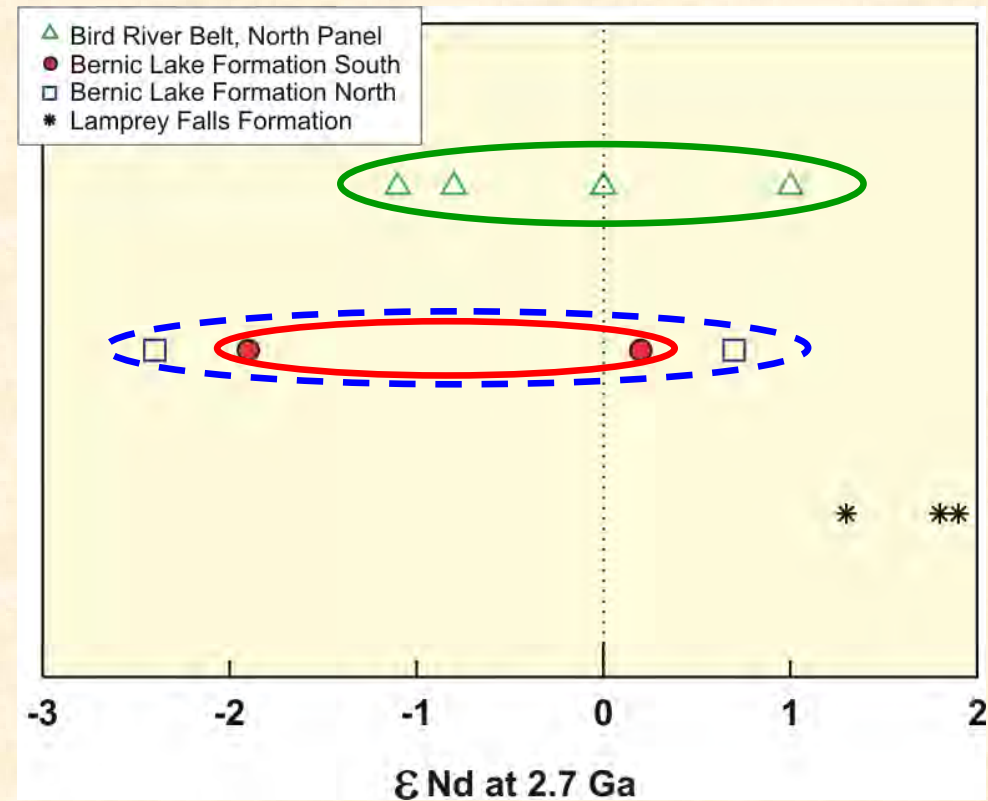
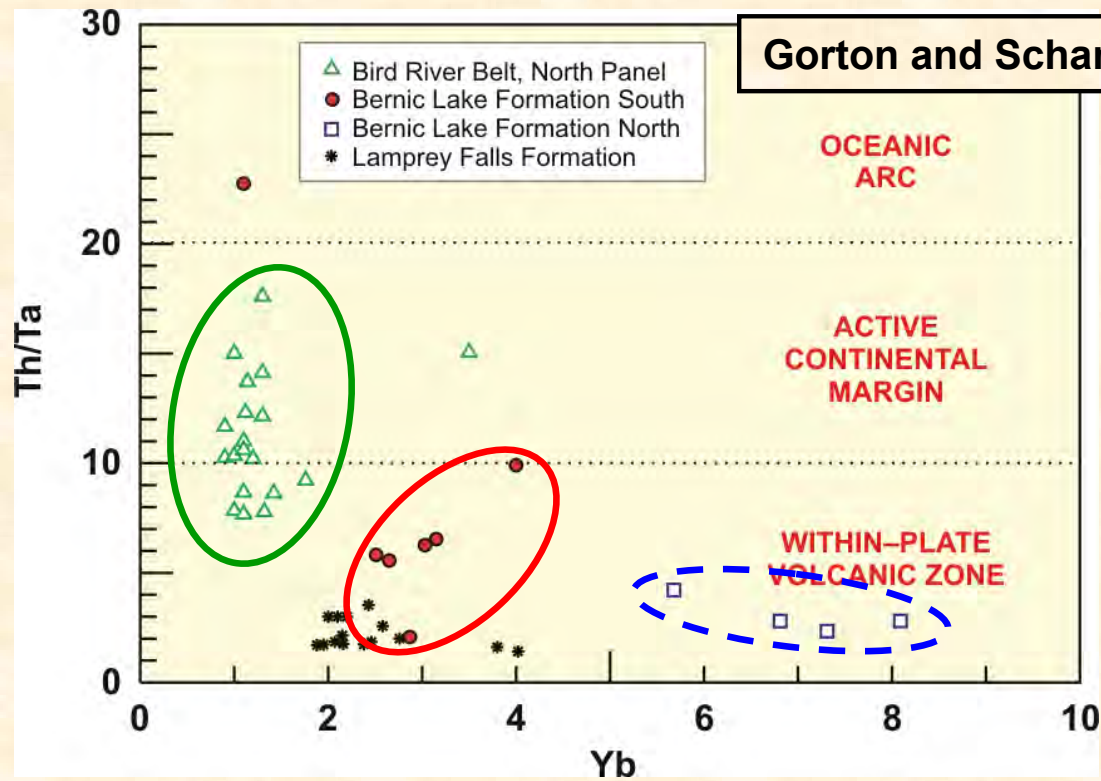
BERNIC LK FM NORTH

BERNIC LK FM SOUTH

* LAMPREY FALLS FM

Bird River Belt tectono-stratigraphic setting

Gorton and Schandl, 2000



Colour key

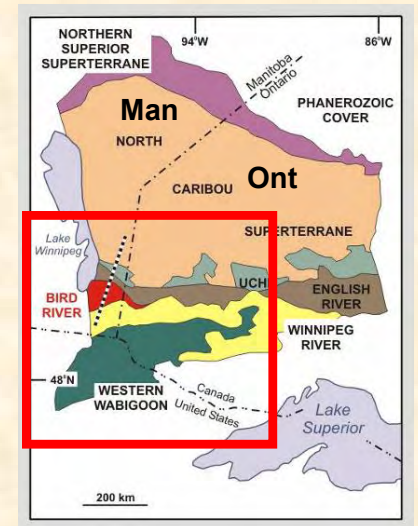
NORTH PANEL

BERNIC LK FM NORTH

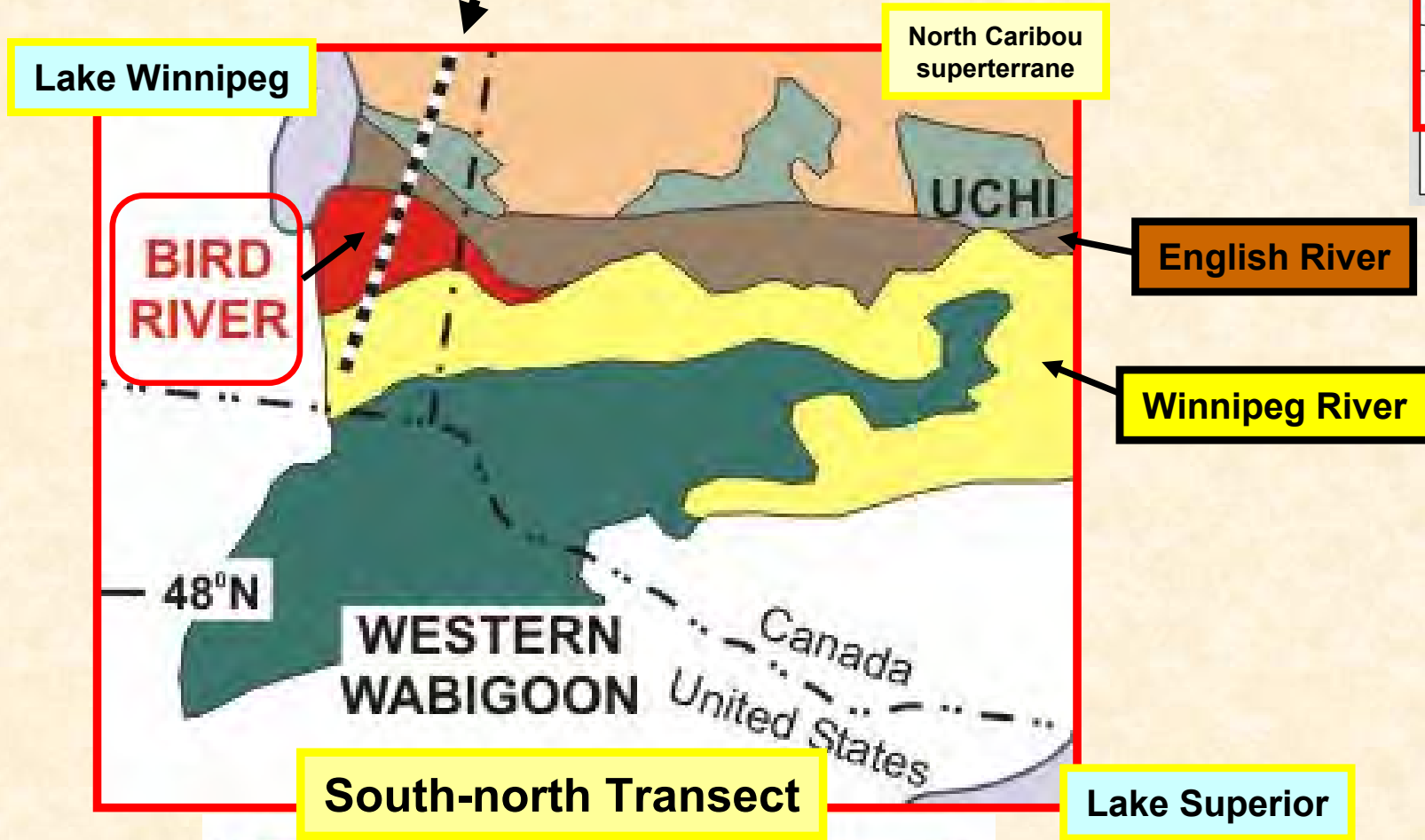
BERNIC LK FM SOUTH

*** LAMPREY FALLS FM**

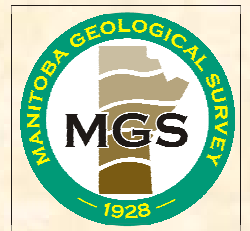
Transect through Bird River Belt (SW Superior Province)



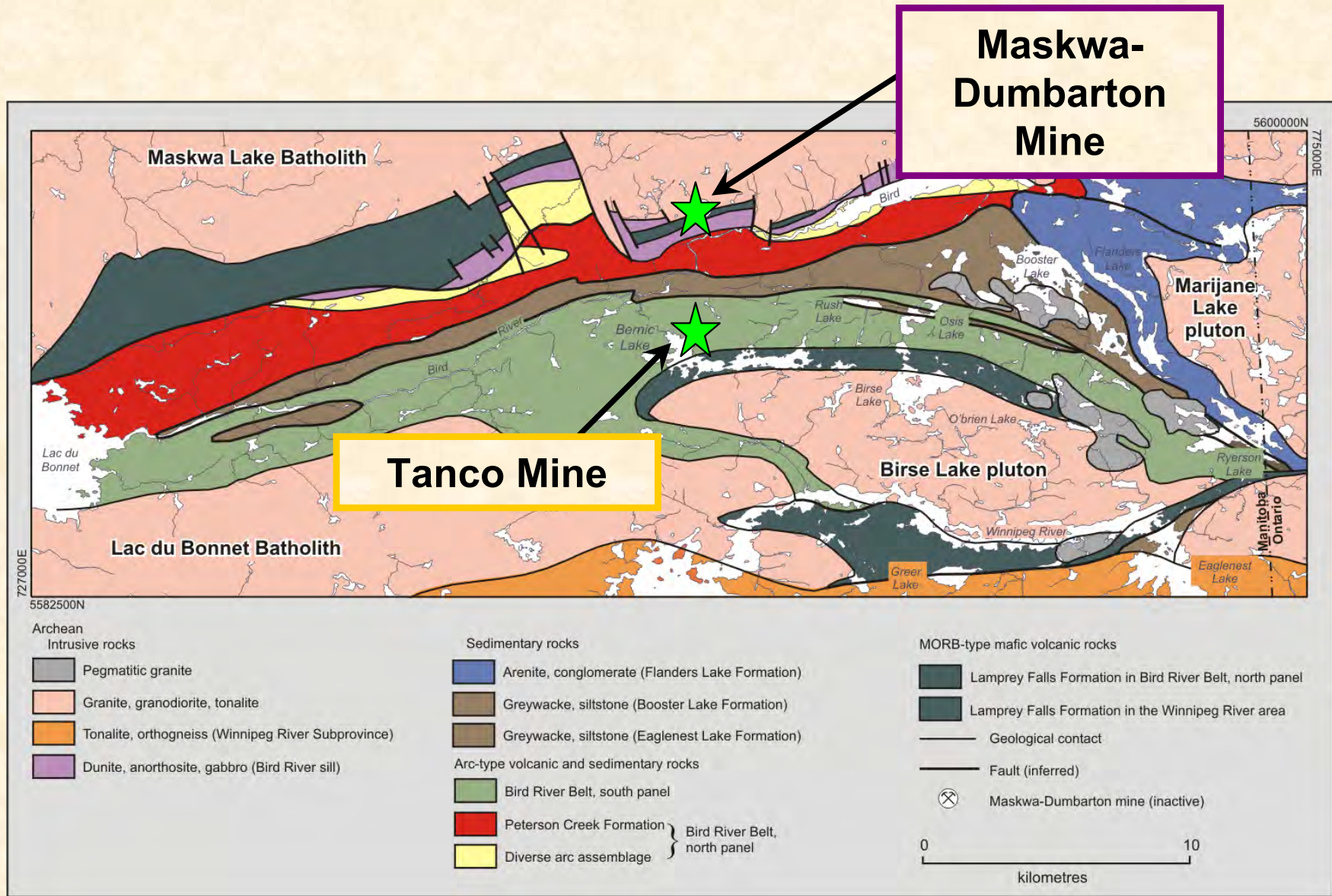
Transect Line



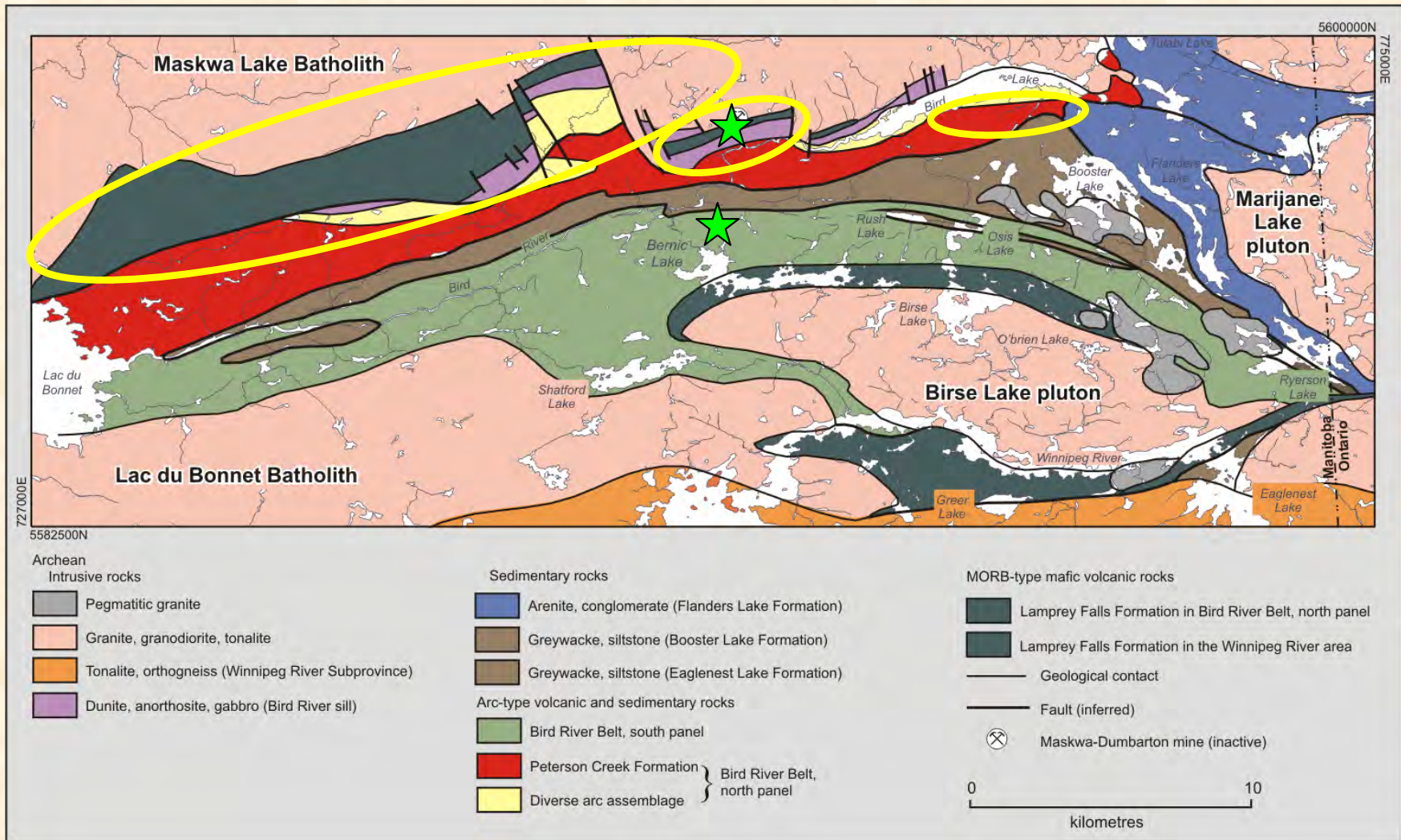
Economic considerations



Bird River Belt economic geology



Bird River Belt ~ current exploration for base metals and PGE



Summary

- ❑ **Neoproterozoic Bird River Belt consists of arc-type rocks that were deposited on the margins of a flanking continental terrane. Arc-type components include tholeiitic, calc-alkaline and MORB-type basalts (arc-rift origin?).**
- ❑ **Tectonic setting is continental arc - BRB rests on continental lithosphere. Volcanic rocks primarily intermediate to felsic (not bimodal type sequence) due to influence of continental lithosphere underplating.**
- ❑ **Current active mineral exploration for base-metals and PGE is focused on Bird River Sill and related intrusions, as well as MORB-type Lamprey Falls Formation.**
- ❑ **New sources for rare element pegmatites akin to Tanco deposit are also being sought.**
- ❑ **Bird River Belt mapping project by MGS is in the final stage of field investigations and a report is under preparation.**

