

REE MINERALIZATION POTENTIAL OF NORTHERN SASKATCHEWAN II: RESULTS OF THE SUMMER 2010 INVESTIGATIONS IN THE OSHOWY- BUCHANAN LAKES, ENA LAKE, BEAR LAKE, AND ALCES LAKE AREAS

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PART 2 OF MULTIYEAR PROJECT

Objectives:

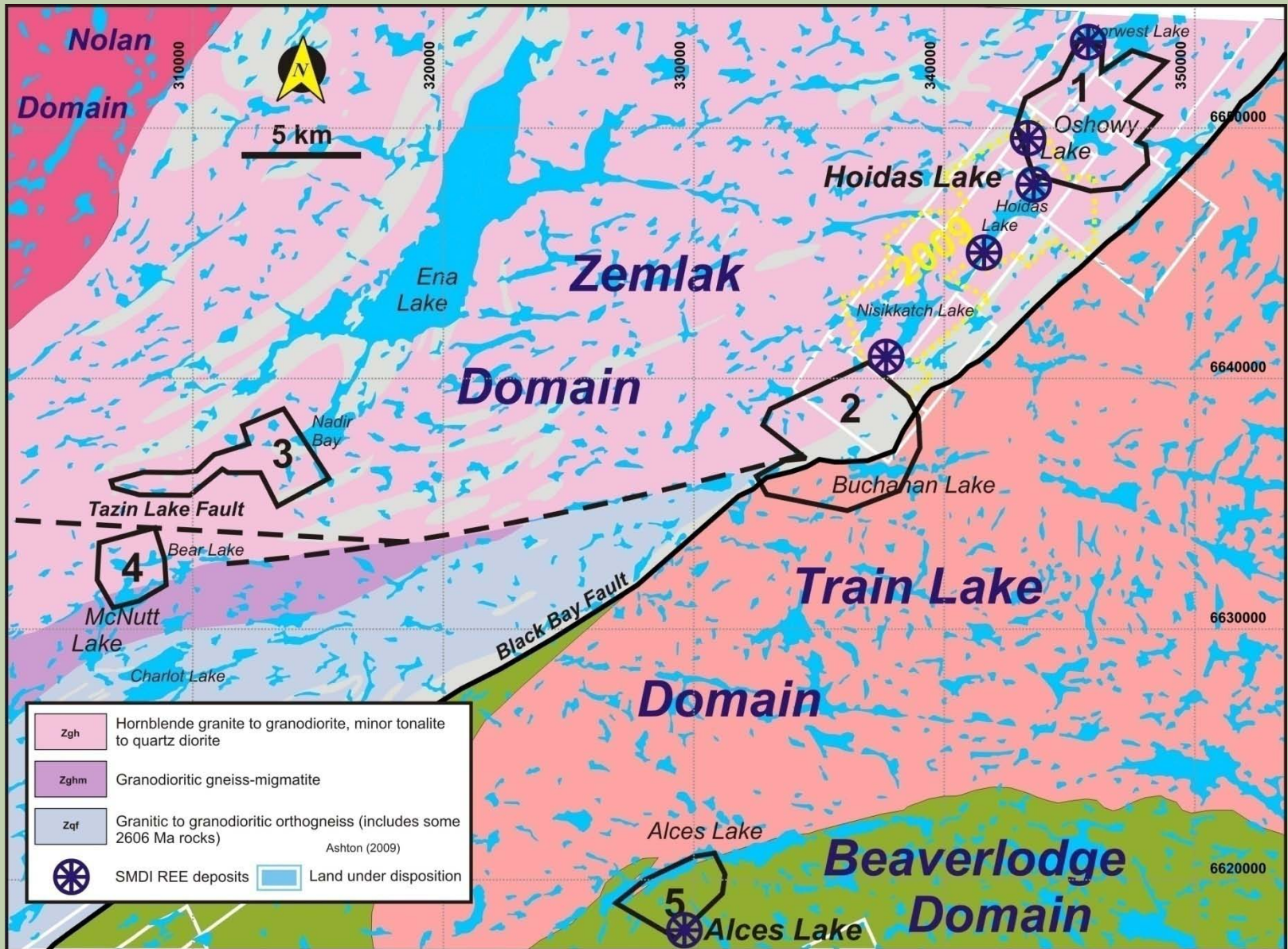
- Understand the nature and geological context of key REE deposits in SK.
- Evaluate their potential.

Motivation:

- China provides 95-97% of world REE.
- Ban on export of HREE ~ 2014-15.

This talk - Focus on mineralization

SUMMER 2010: 5 MAP AREAS



1,2- OSHOWY-BUCHANAN LAKES AREA

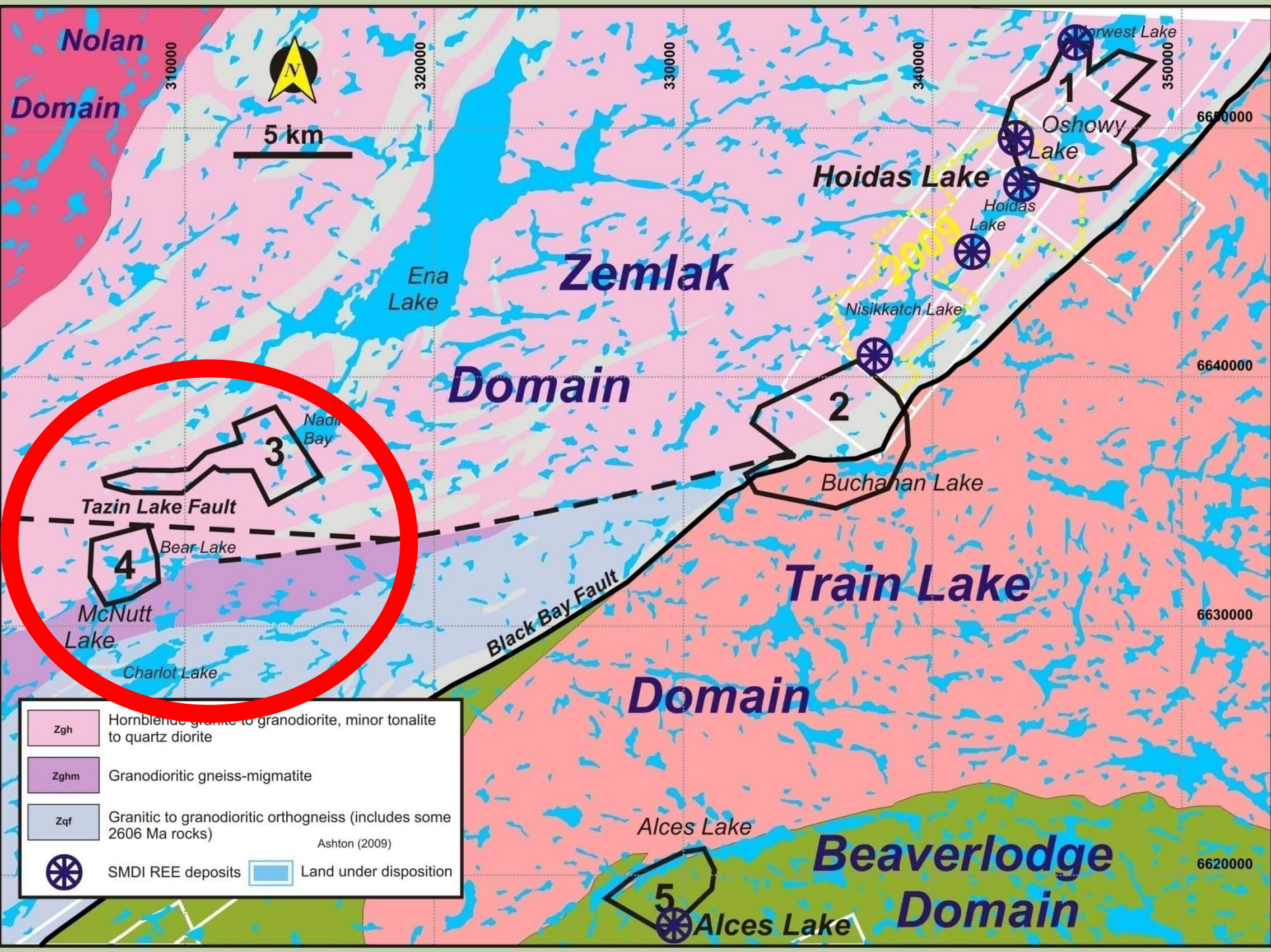
- **Extend 2009 mapping to NE and SW**
- **4 radiometric anomalies were located @ > 1,000 t.c.p.s. using a RS-230 handheld spectrometer**
- **No new REE occurrence found**



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Nolan Domain

310000



5 km

320000

330000

340000

350000

6650000

Oshowy Lake

Hoidas Lake

Hoidas Lake

Zemplak Domain

Ena Lake

Nisikkatch Lake

6640000

Domain

Nadir Bay

3

Tazin Lake Fault

Bear Lake

4

Buchahan Lake

Train Lake Domain

6630000

Black Bay Fault

McNutt Lake

Charlott Lake

Domain

Alces Lake

Beaverlodge Domain

6620000

Alces Lake

5

Zgh	Hornblende granite to granodiorite, minor tonalite to quartz diorite
Zghm	Granodioritic gneiss-migmatite
Zqf	Granitic to granodioritic orthogneiss (includes some 2606 Ma rocks)
	SMDI REE deposits
	Land under disposition

Ashton (2009)

3,4- ENA (NADIR BAY)-BEAR LAKES AREA

Work objectives:

- Verify REE mineralization potential in cluster of 6 lakes with anomalous lake-bottom TREE
- Verify the reported occurrence of allanite veins at Bear Lake (de Zoysa, 1974)



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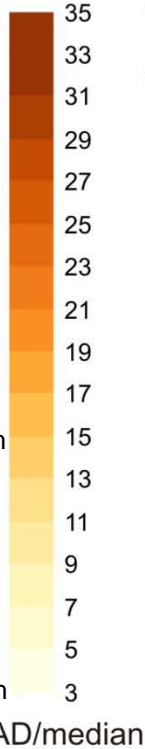
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Cluster of 6 lake-bottom sediment TREE anomalies

Identified using data (N=414) from National Geochemical Reconnaissance lake sediment database of the Geological Survey of Canada (Friske et al., 1994a,b). TREE includes La, Ce, Sm, Eu, Tb, Yb and Lu.

TREE



Hornblende granite to granodiorite, minor tonalite to quartz diorite

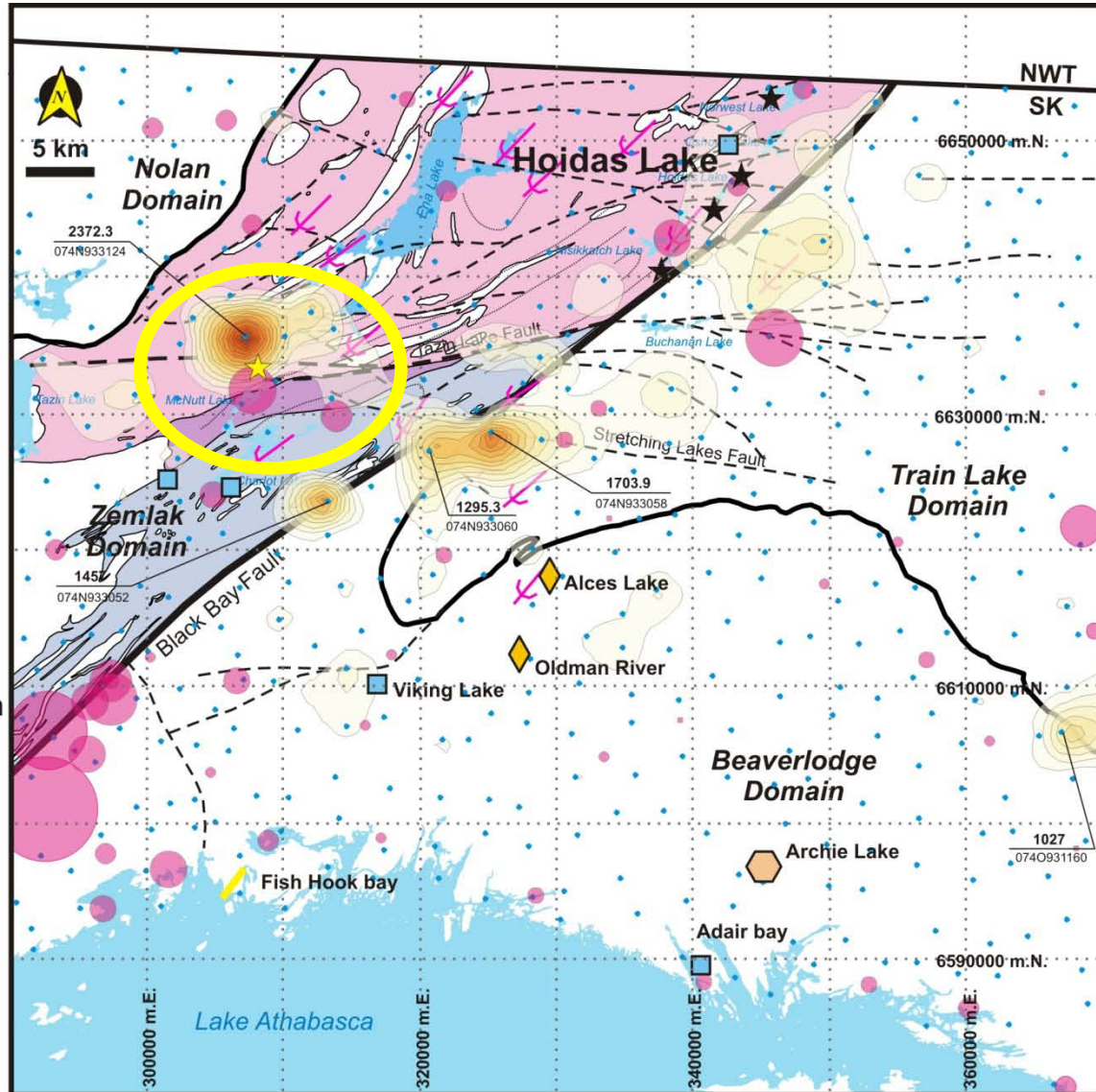
Granodioritic gneiss-migmatite

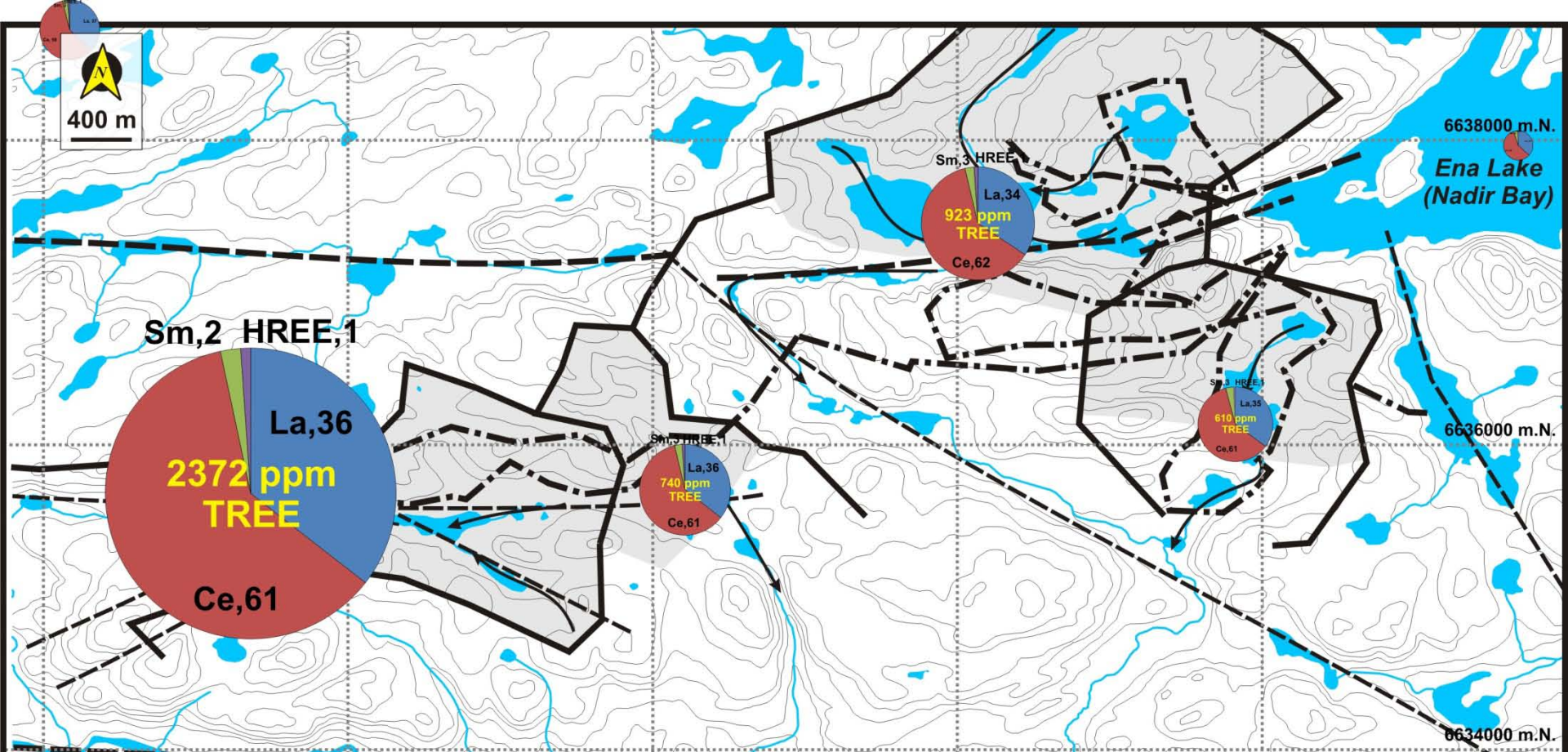
Granitic to granodioritic orthogneiss (includes some 2606 Ma rocks)

Median : 209 ppm
MAD: 63 ppm

Till TREE

- Hoidas Lake-type allanite-apatite alkaline veins
- Allanite veins
- Granitic pegmatites (various metal associations)
- Shear zone (LREE)
- Paleoplacer monazite (LREE)
- Unconformity/vein U (H-LREE)





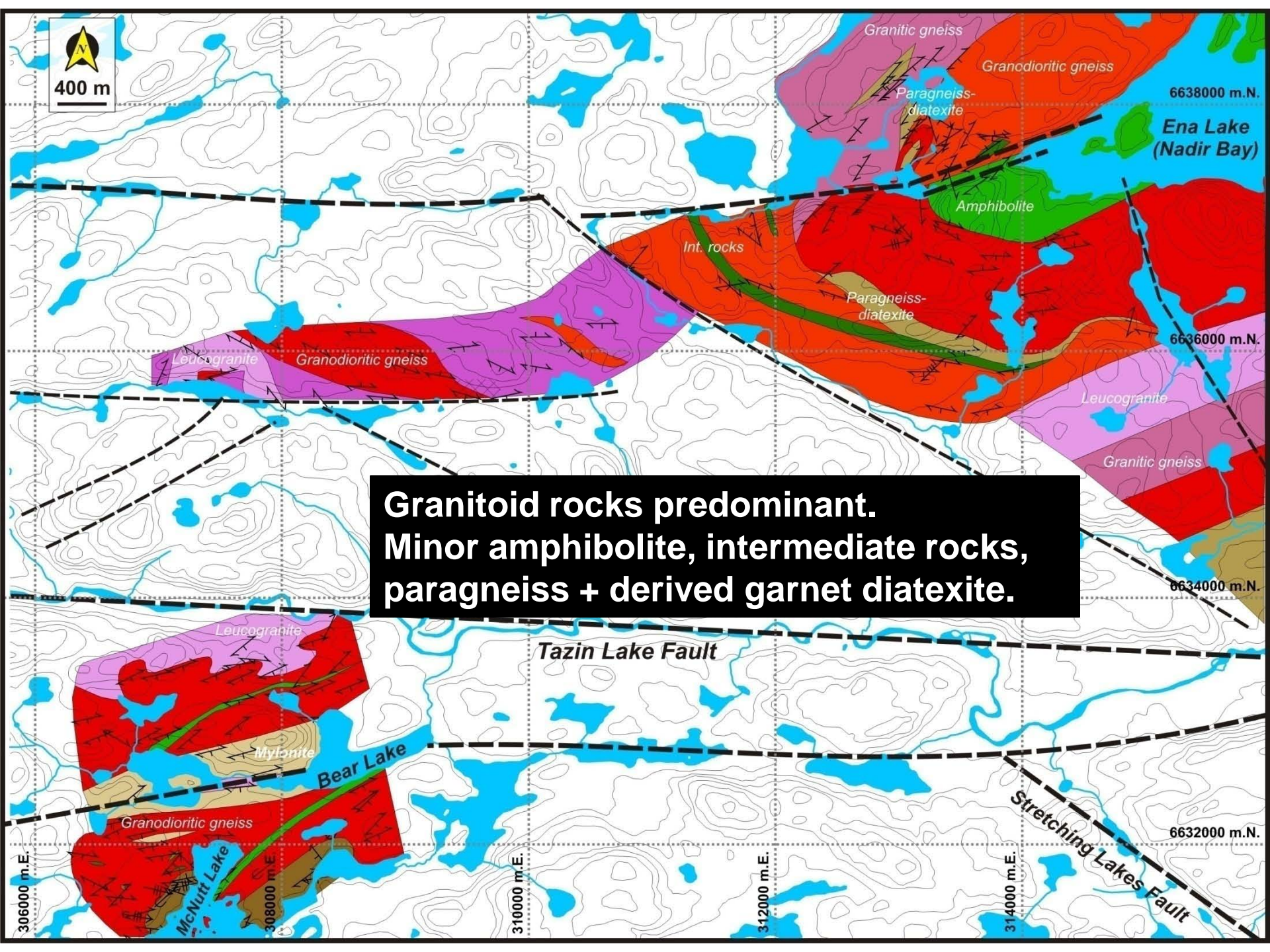
Traverses done within drainage area and upstream of 4 lakes with anomalous TREE

Highest value 2372 ppm TREE - 6th most elevated value amongst 35,842 analyses in GSC database for the whole of Canada.

RS-230 on continuously.



400 m



**Granitoid rocks predominant.
Minor amphibolite, intermediate rocks,
paragneiss + derived garnet diatexite.**

Granitic gneiss

Granodioritic gneiss

Paragneiss-diatexite

Amphibolite

Int. rocks

Paragneiss-diatexite

Leucogranite

Granodioritic gneiss

Leucogranite

Granitic gneiss

Leucogranite

Mylonite

Granodioritic gneiss

6638000 m.N.

Ena Lake
(Nadir Bay)

6636000 m.N.

6634000 m.N.

Tazin Lake Fault

Bear Lake

Stretching Lakes Fault

306000 m.E.

308000 m.E.

310000 m.E.

312000 m.E.

314000 m.E.

McNutt Lake



400 m

1,000 t.c.p.s.

8,500 t.c.p.s.

Granitic gneiss

Granodioritic gneiss

6638000 m.N.

Ena Lake
(Nadir Bay)

Paragneiss-
diatexite

Amphibolite

Int. rocks

Paragneiss-
diatexite

6636000 m.N.

Leucogranite

Granodioritic gneiss

Leucogranite

Granitic gneiss

6634000 m.N.

14 radiometric anomalies

Tazin Lake Fault

Leucogranite

Mylonite

Bear Lake

Granodioritic gneiss

6632000 m.N.



McNutt Lake

308000 m.E.

310000 m.E.

314000 m.E.

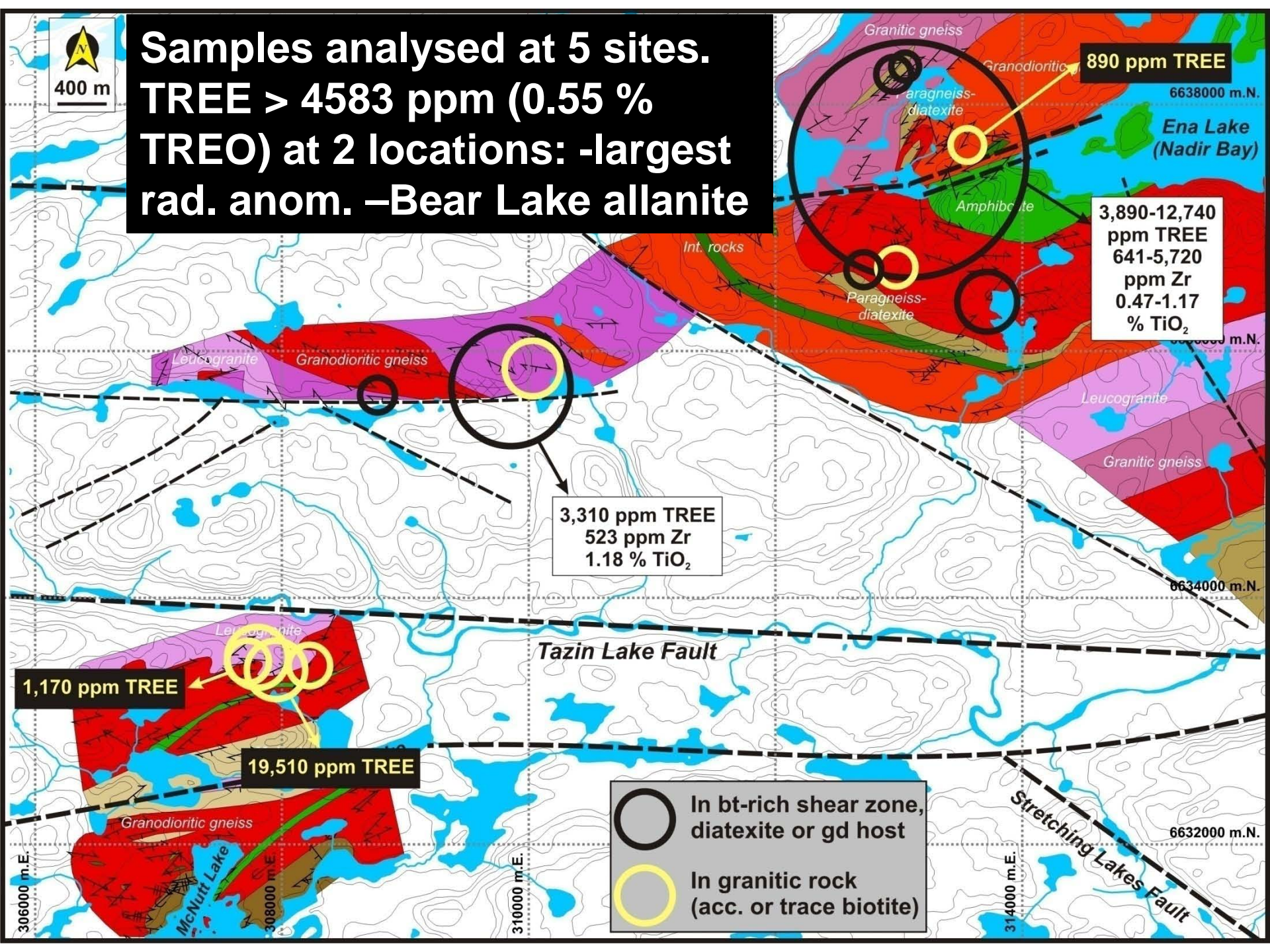
Stretching Lakes Fault

-  In bt-rich shear zone, diatexite or gd host
-  In granitic rock (acc. or trace biotite)

306000 m.E.



Samples analysed at 5 sites.
TREE > 4583 ppm (0.55 %
TREO) at 2 locations: -largest
rad. anom. –Bear Lake allanite





890 ppm TREE

3,890-12,740 ppm TREE
641-5,720 ppm Zr
0.47-1.17 % TiO₂

3,310 ppm TREE
523 ppm Zr
1.18 % TiO₂

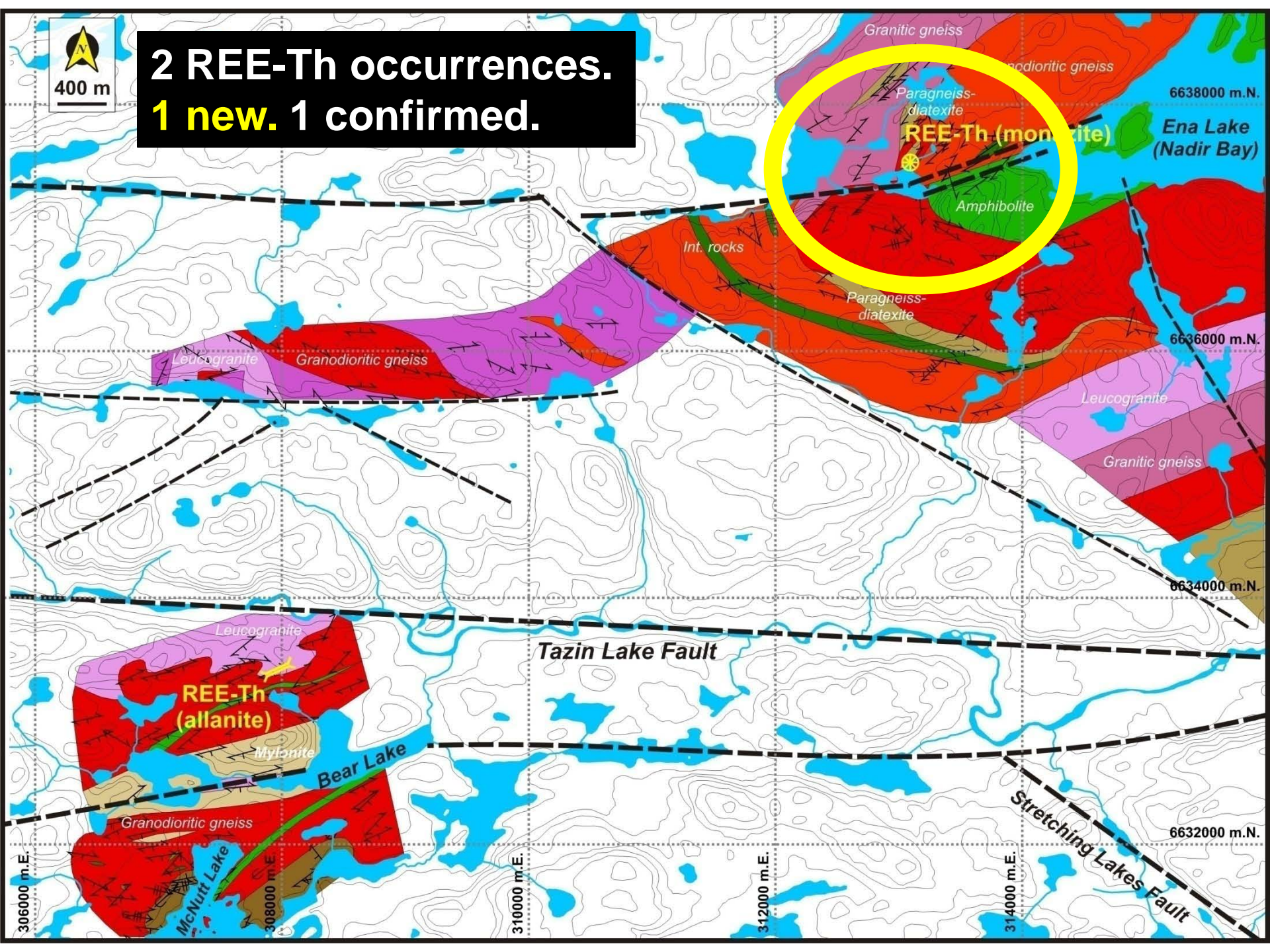
1,170 ppm TREE

19,510 ppm TREE

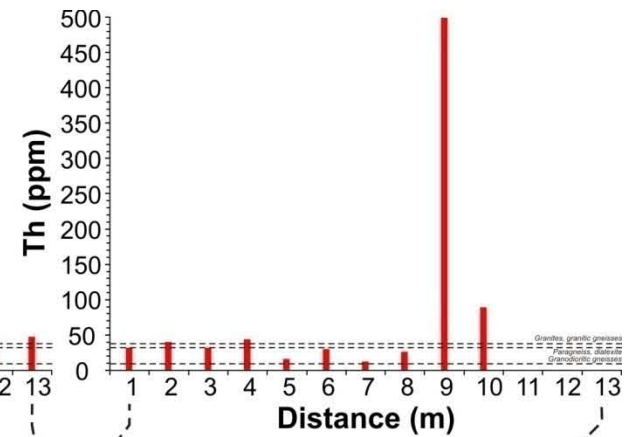
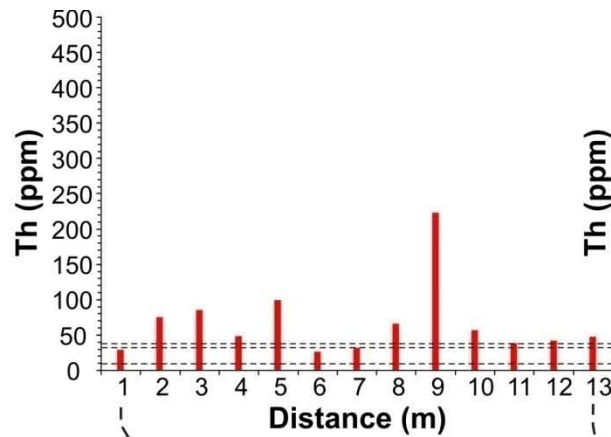
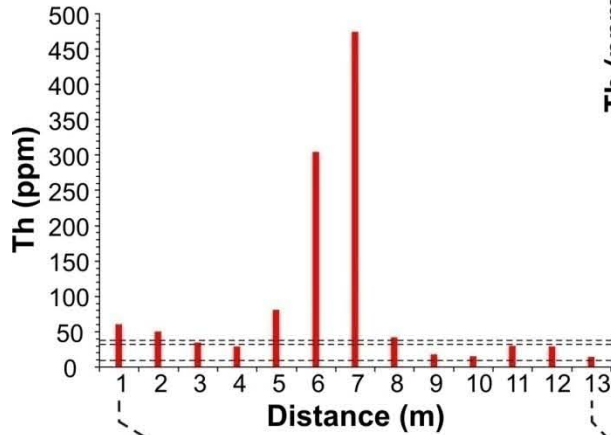
-  In bt-rich shear zone, diatexite or gd host
-  In granitic rock (acc. or trace biotite)










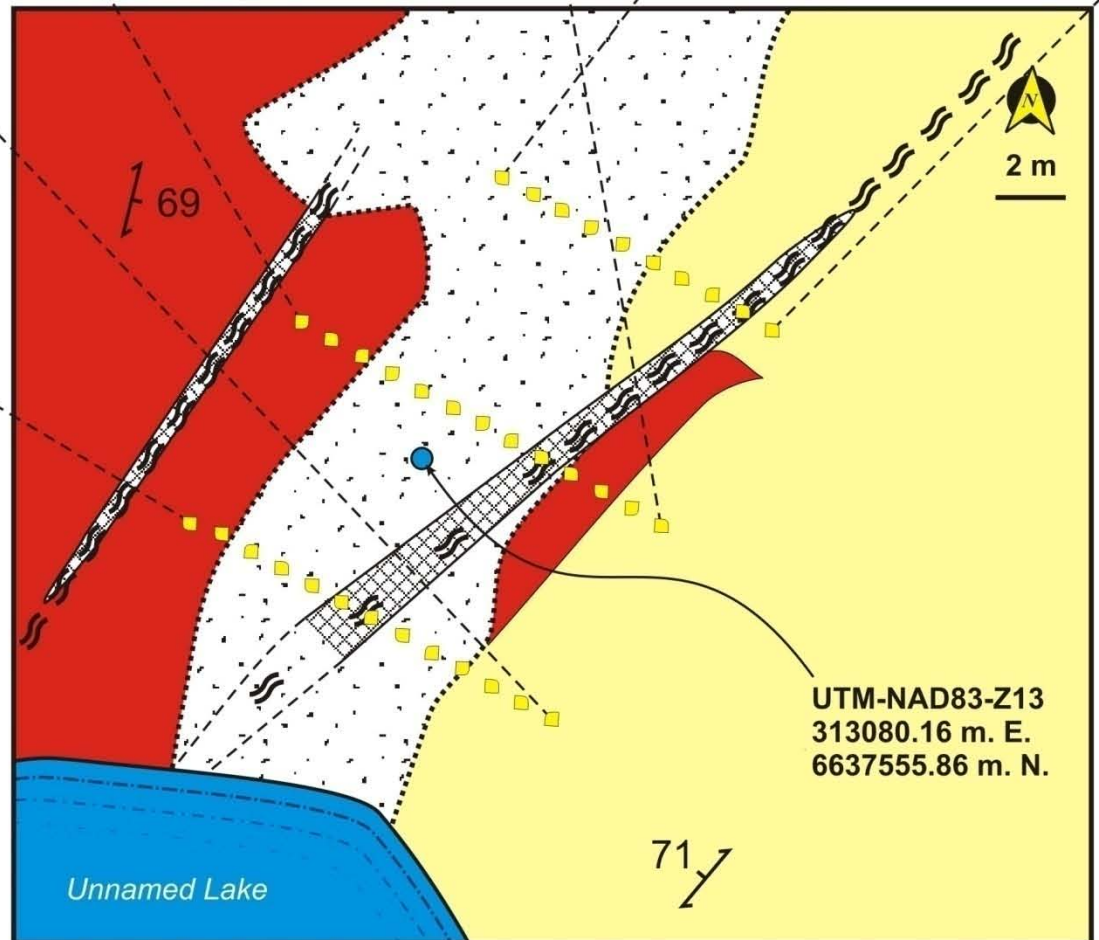
2 REE-Th occurrences.
1 new. 1 confirmed.



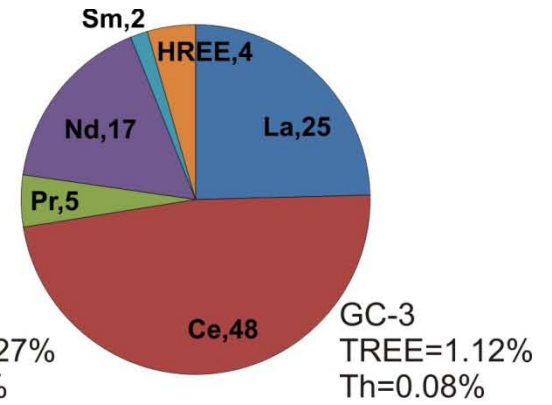
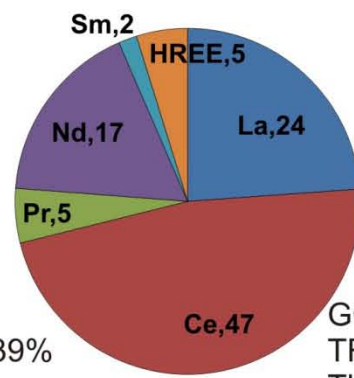
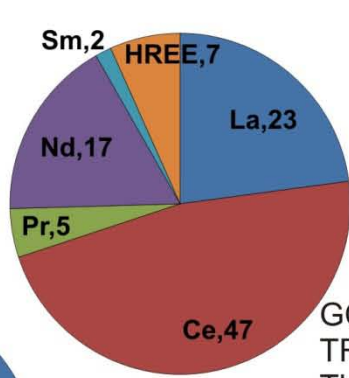
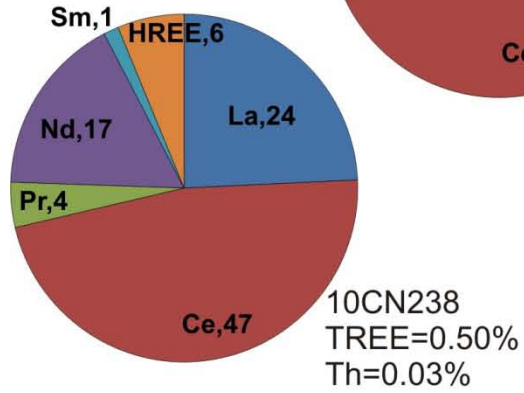
New REE-Th occurrence



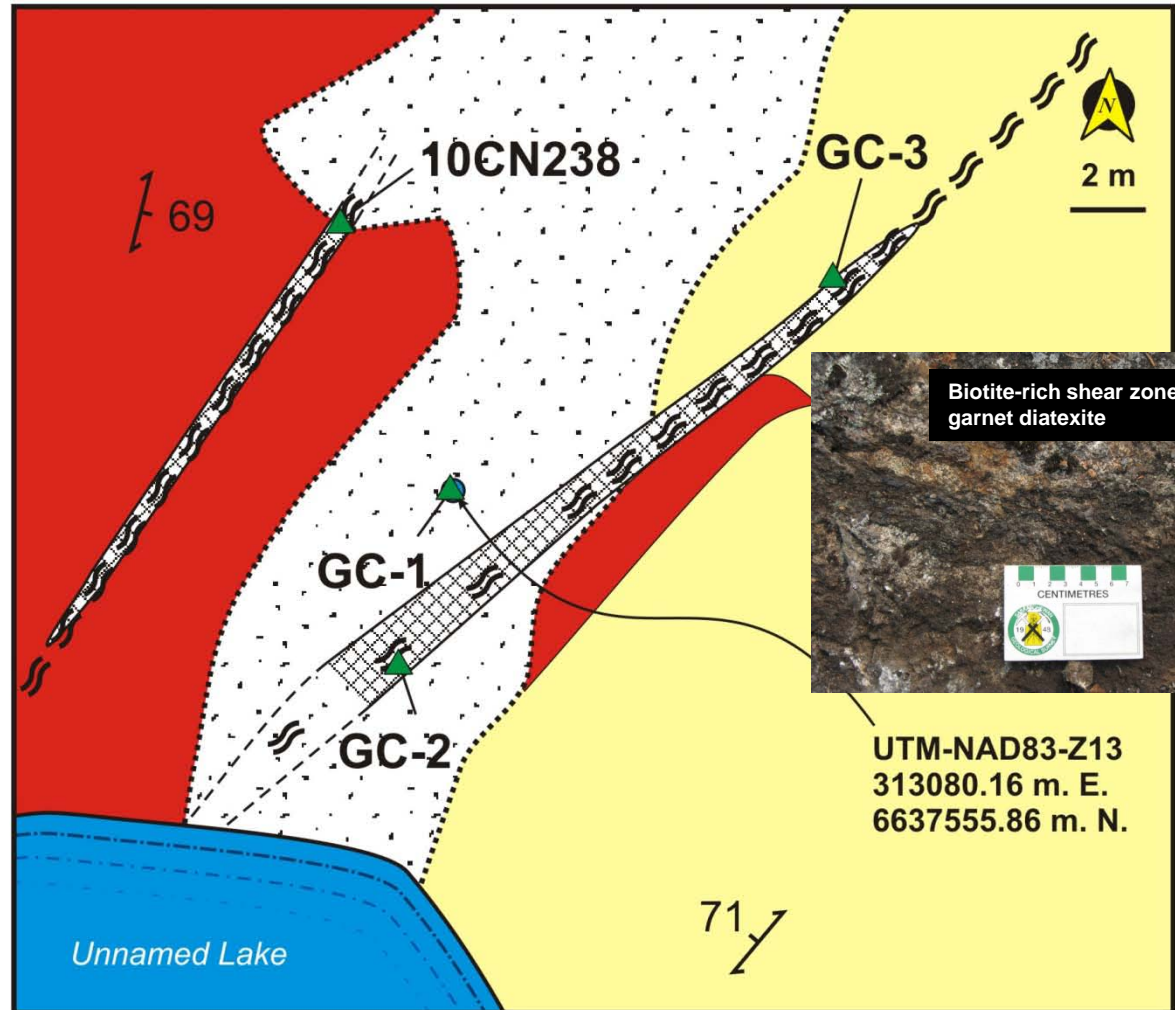
-  Paragneiss and derived diatexites
-  Granodioritic and granitic gneisses
-  Overburden
-  Shear zone
-  First generation foliation
-  Spectrometer measurement location
-  Zone with > 1,000 t.c.p.s.



New REE-Th occurrence

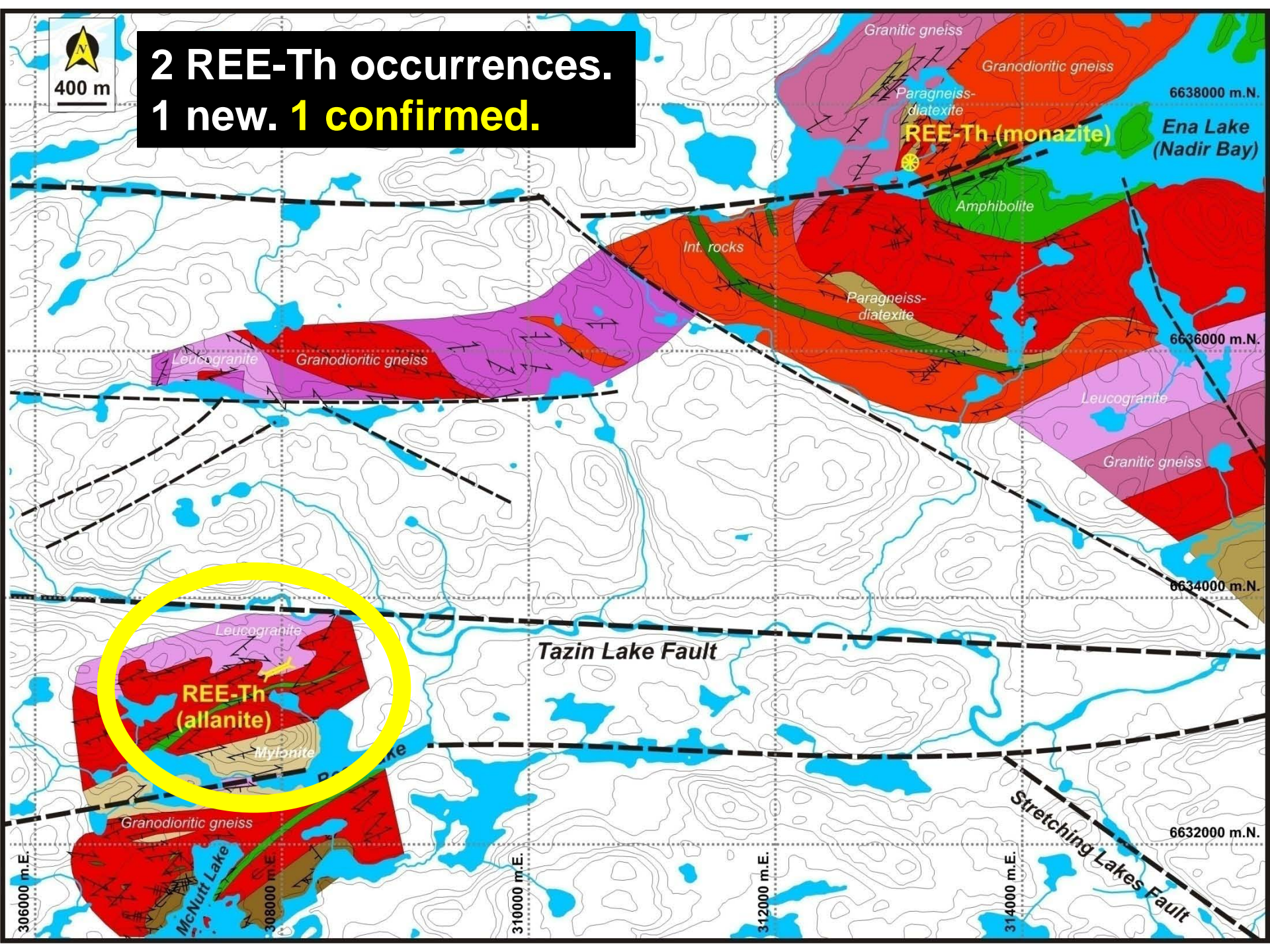


- Paragneiss and derived diatexites
- Granodioritic and granitic gneisses
- Overburden
- Shear zone
- First generation foliation
- Spectrometer measurement location
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2 REE-Th occurrences.
1 new. 1 confirmed.



Granitic gneiss
Granodioritic gneiss
Paragneiss-diatexite
REE-Th (monazite)
Amphibolite
6638000 m.N.
Ena Lake (Nadir Bay)

Leucogranite
Granodioritic gneiss

Int. rocks
Paragneiss-diatexite

Leucogranite
Granitic gneiss
6636000 m.N.
6634000 m.N.

Leucogranite
REE-Th (allanite)
Mylonite
Granodioritic gneiss

Tazin Lake Fault



Stretching Lakes Fault

306000 m.E.
308000 m.E.
310000 m.E.
312000 m.E.
314000 m.E.
McNutt Lake
6632000 m.N.

Bear Lake REE-Th occurrence


Trenched by Dog River Mines, 1949 (SGS Ass. Rept. 74N-16-SW-0002)

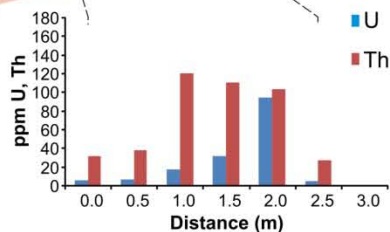
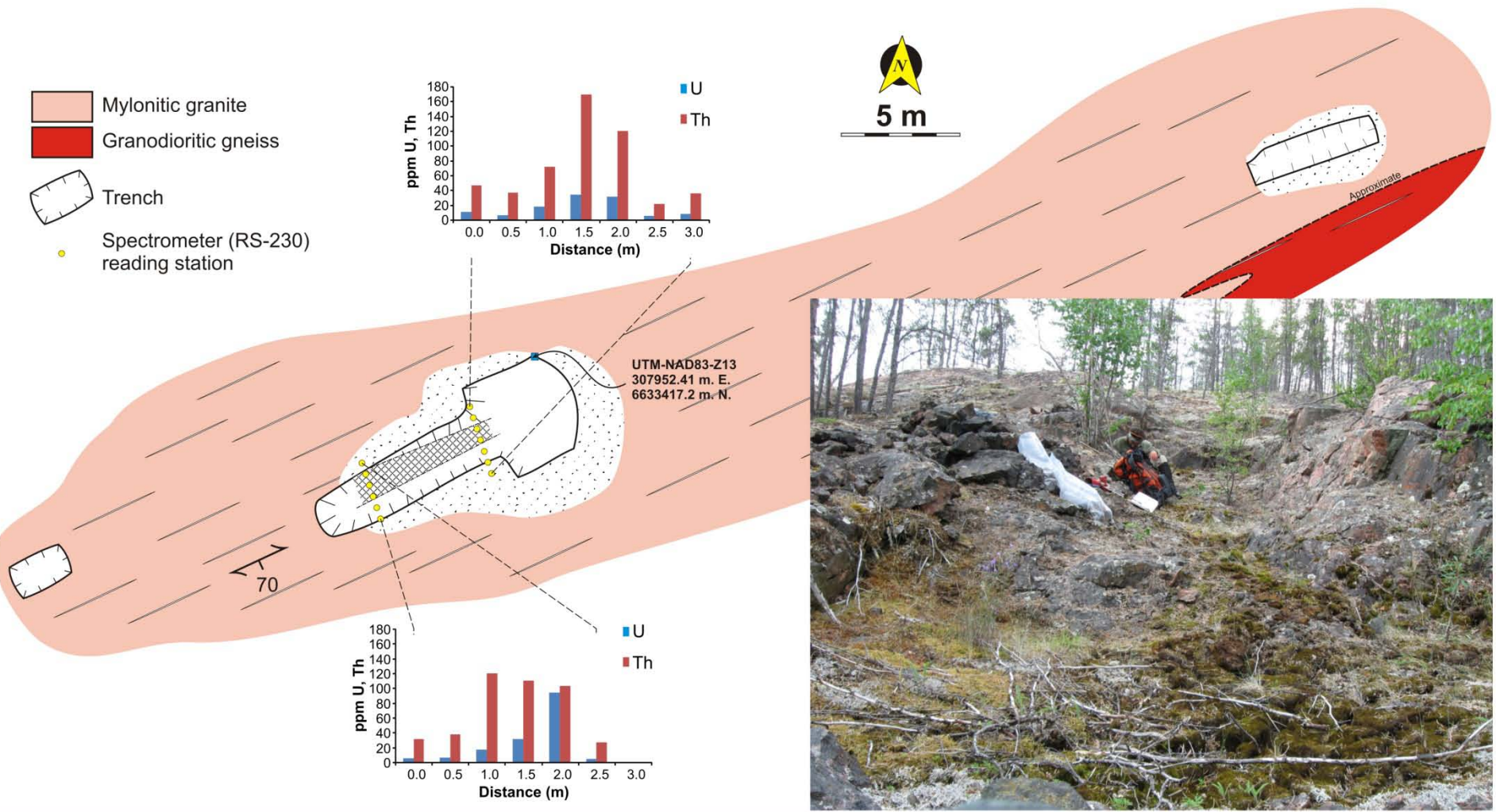
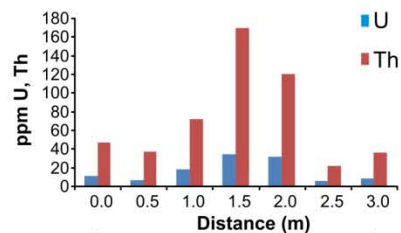
Allanite first reported by de Zoysa (1974)

-  Mylonitic granite
-  Granodioritic gneiss



Trench

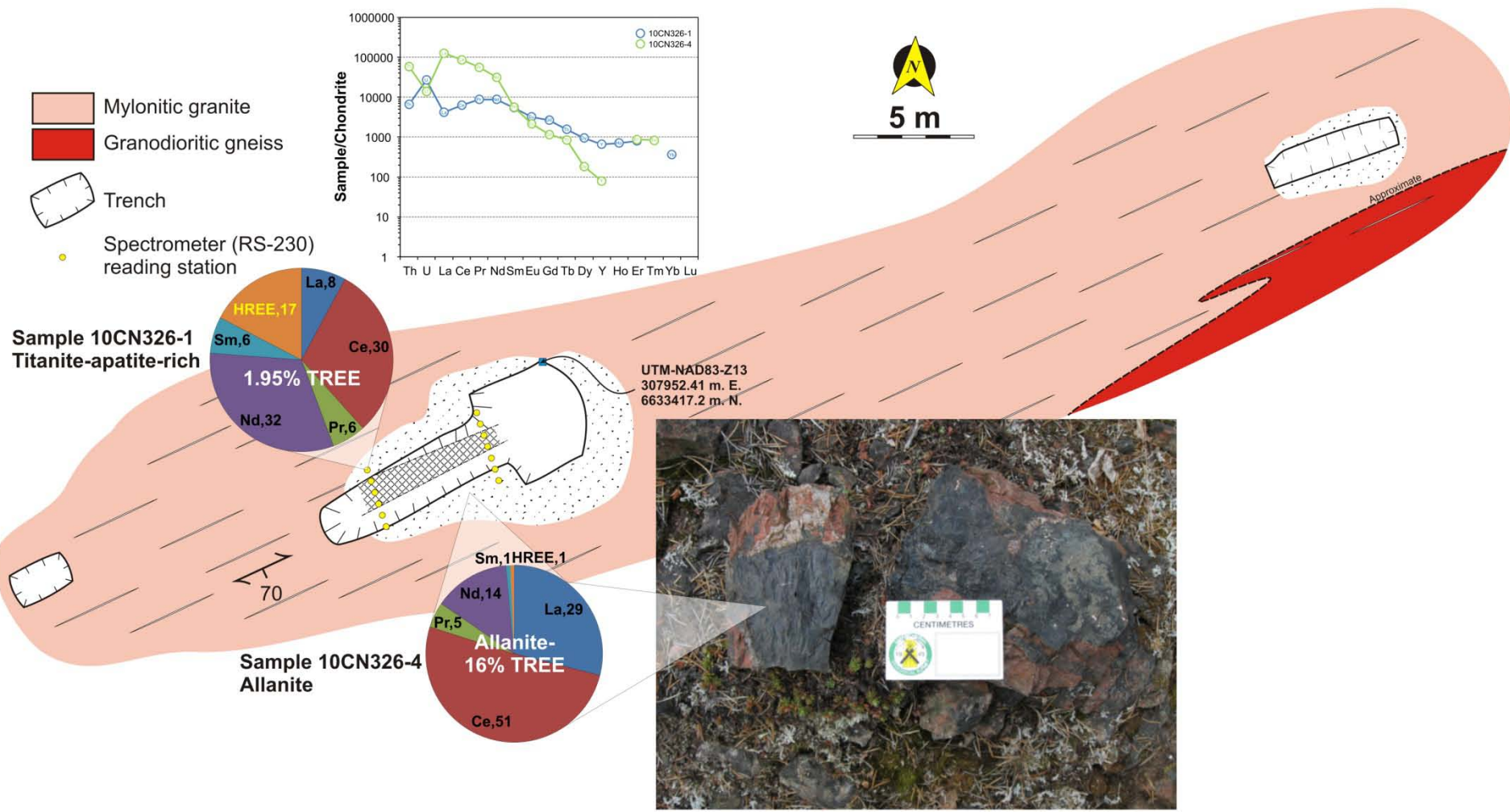
-  Spectrometer (RS-230) reading station

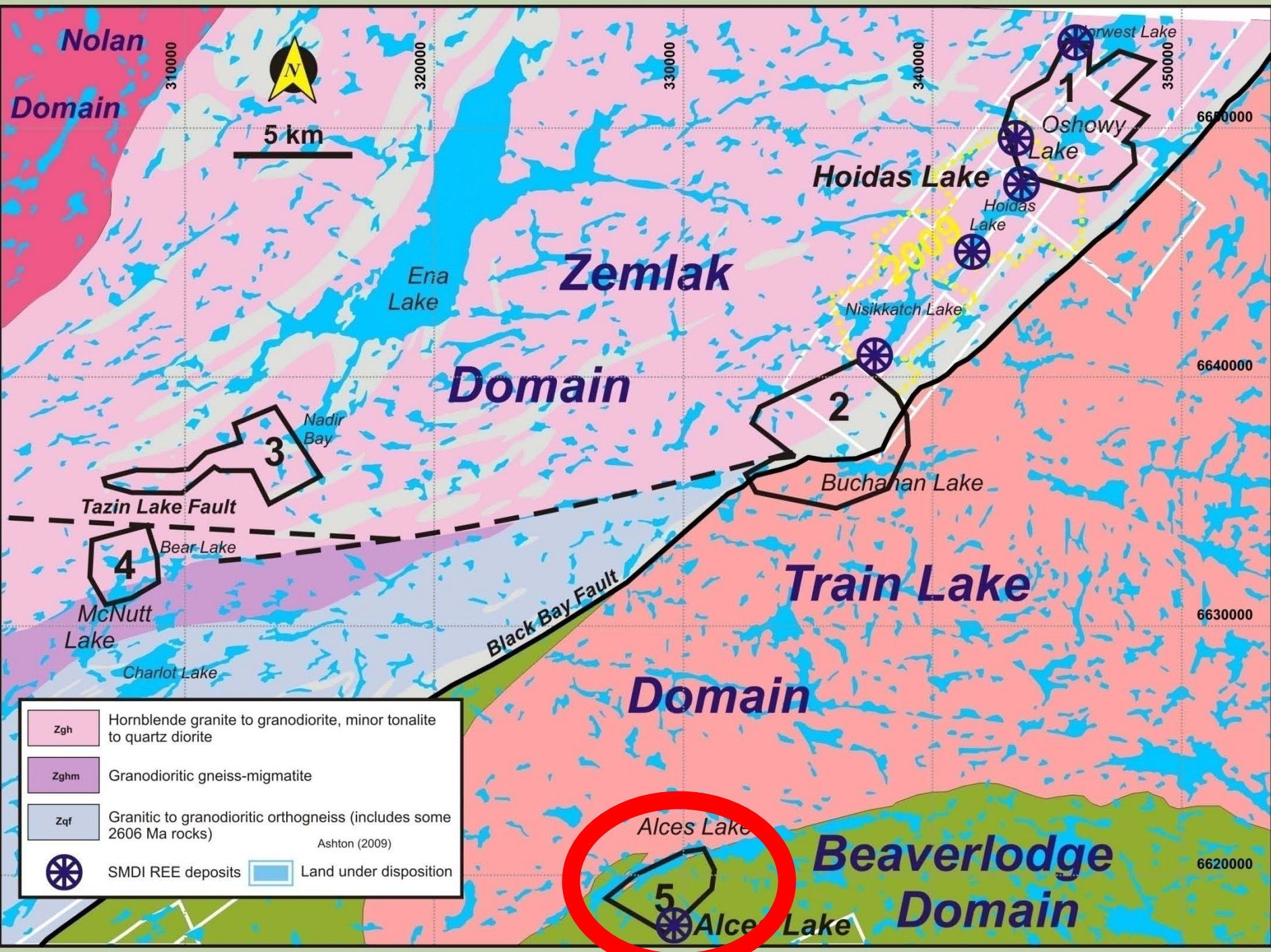


Bear Lake REE-Th occurrence

Trenched by Dog River Mines, 1949 (SGS Ass. Rept. 74N-16-SW-0002)

Allanite first reported by de Zoysa (1974)





Nolan Domain

310000



5 km

320000

330000

340000

350000

6650000

6640000

6630000

6620000

Ena Lake

Zemplak Domain

Domain

Nadir Bay

3

Tazin Lake Fault

Bear Lake

4

McNutt Lake

Charlot Lake

Black Bay Fault

Hoidas Lake

Oshowy Lake

Hoidas Lake

Nisikkatch Lake

Buchanan Lake






Train Lake Domain

Domain

Alces Lake

Beaverlodge Domain

Alces Lake

	Zgh	Hornblende granite to granodiorite, minor tonalite to quartz diorite
	Zghm	Granodioritic gneiss-migmatite
	Zqf	Granitic to granodioritic orthogneiss (includes some 2606 Ma rocks)
	SMDI REE deposits	
	Land under disposition	

Ashton (2009)

5- ALCES LAKE AREA

- **Examine SMDI 1283 “*Alces Lake Trenched REE Showing*”**
- **11 radiometric anomalies recorded**
- **2 types of mineralization**
 - **monazite in cataclastic bt-fd zones in quartzite and psammopelite**
 - **monazite in biotite-rich shear zones**





200 m

328000 m.E.

Saint-Louis Fault

Alces Lake

330000 m.E.

Amphibolite

RA2010-27:
1830 t.c.p.s.

RA2010-19:
1550 t.c.p.s.

RA2010-20:
1260 t.c.p.s.

Granite

Mylonite

Amphibolite

Quartzite

Paragneiss

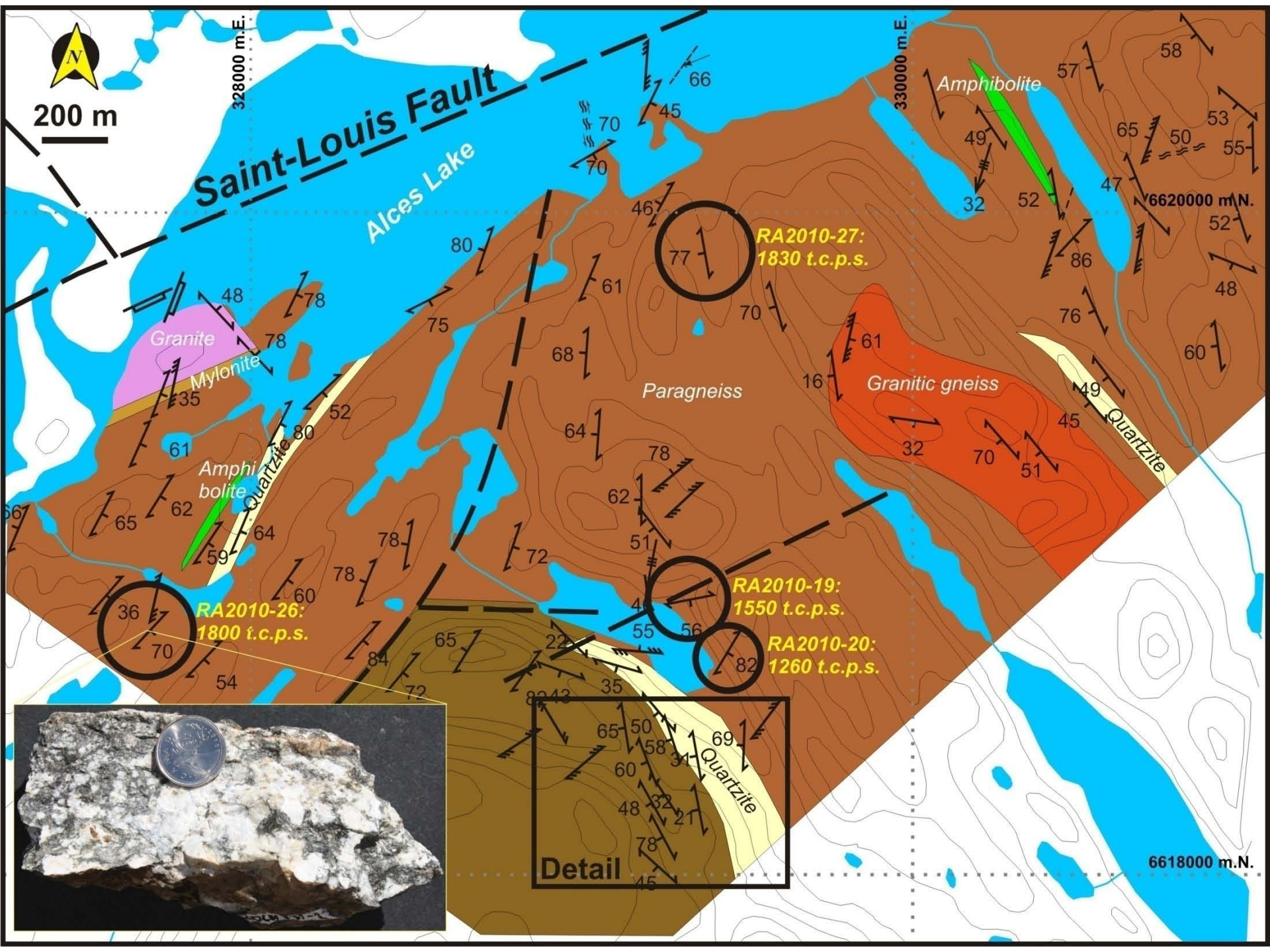
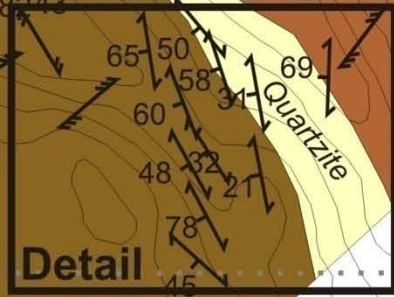
Granitic gneiss

Quartzite

RA2010-26:
1800 t.c.p.s.

Detail

6618000 m.N.

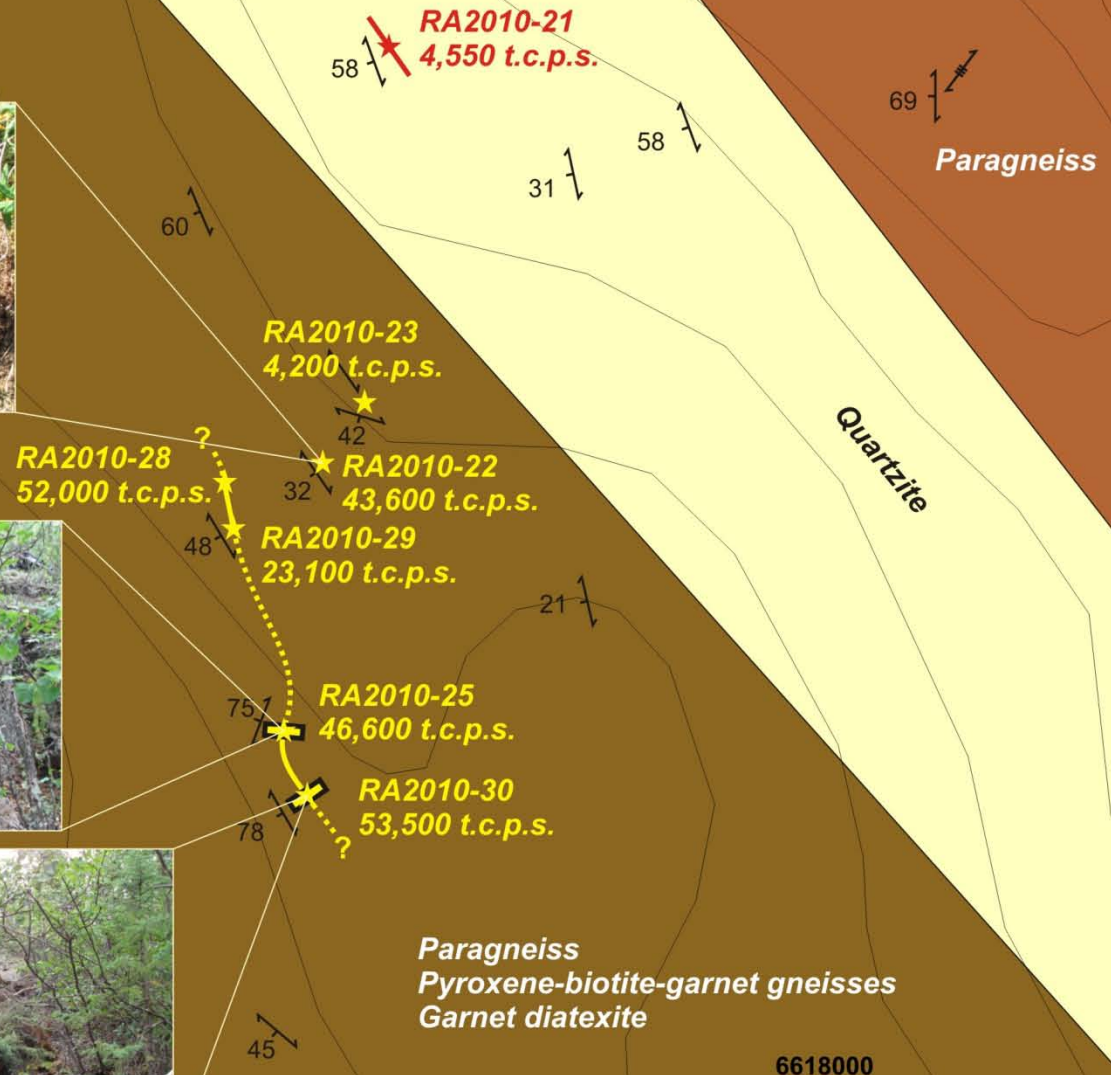


Alces Lake REE-Th-U trenched occurrence

Discovered early 1950's – JH Wilson – 2 trenches
Monazite in 275 x 140 m area



30 m



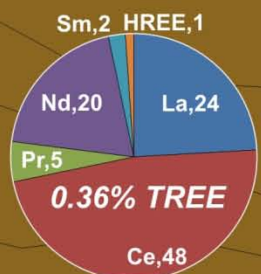
Alces Lake REE-Th-U trenched occurrence



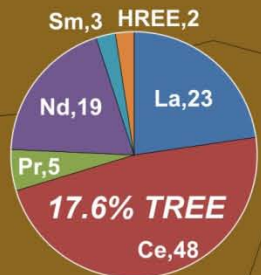
30 m

329000

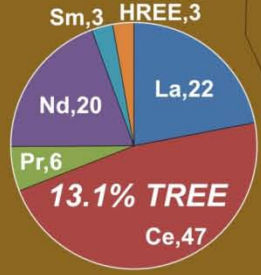
6618000



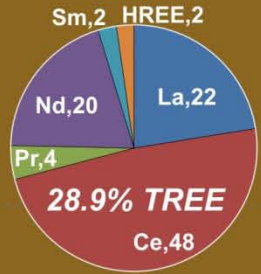
10CN414-1
TREE=0.36%



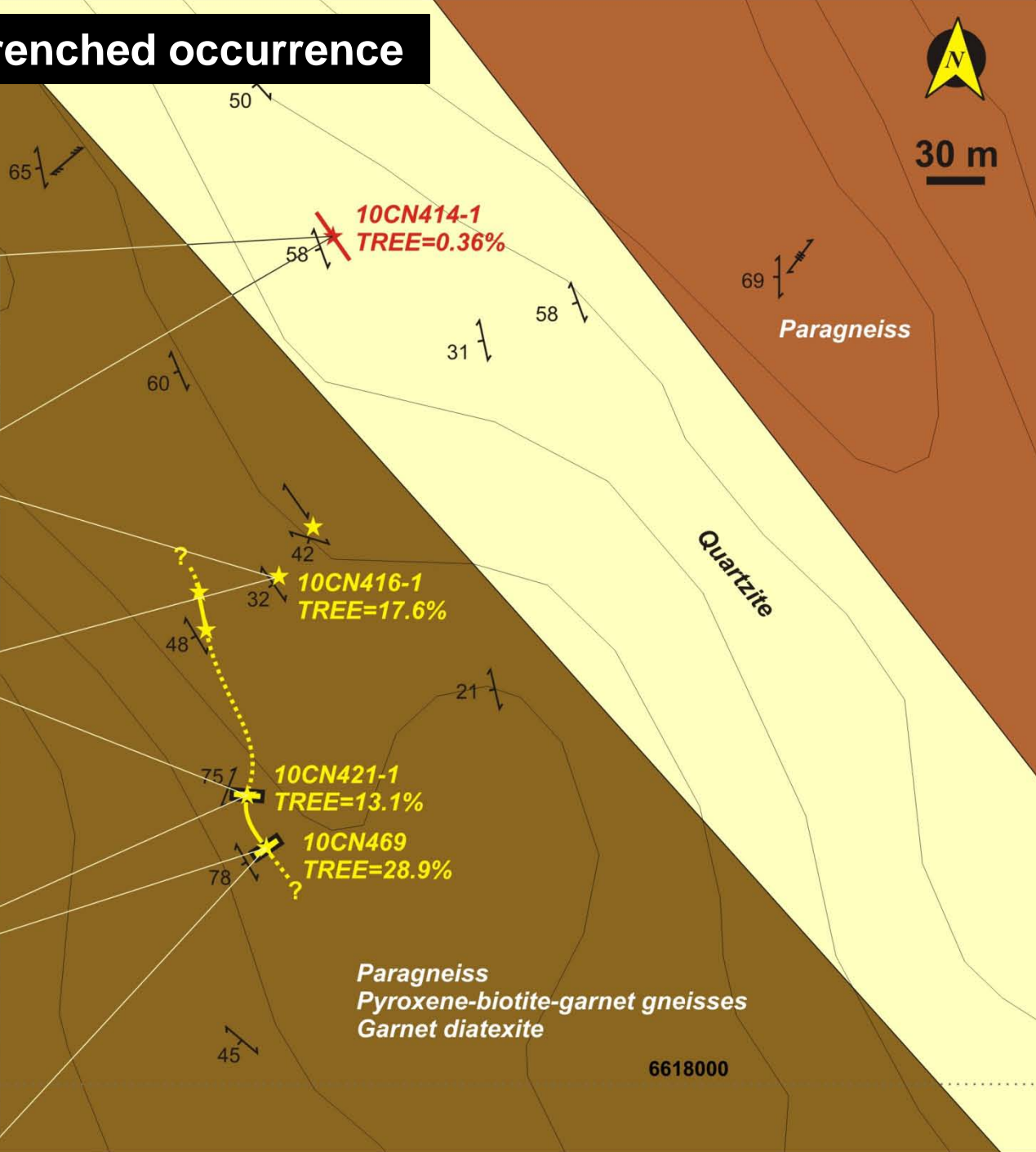
10CN416-1
TREE=17.6%



10CN421-1
TREE=13.1%



10CN469
TREE=28.9%



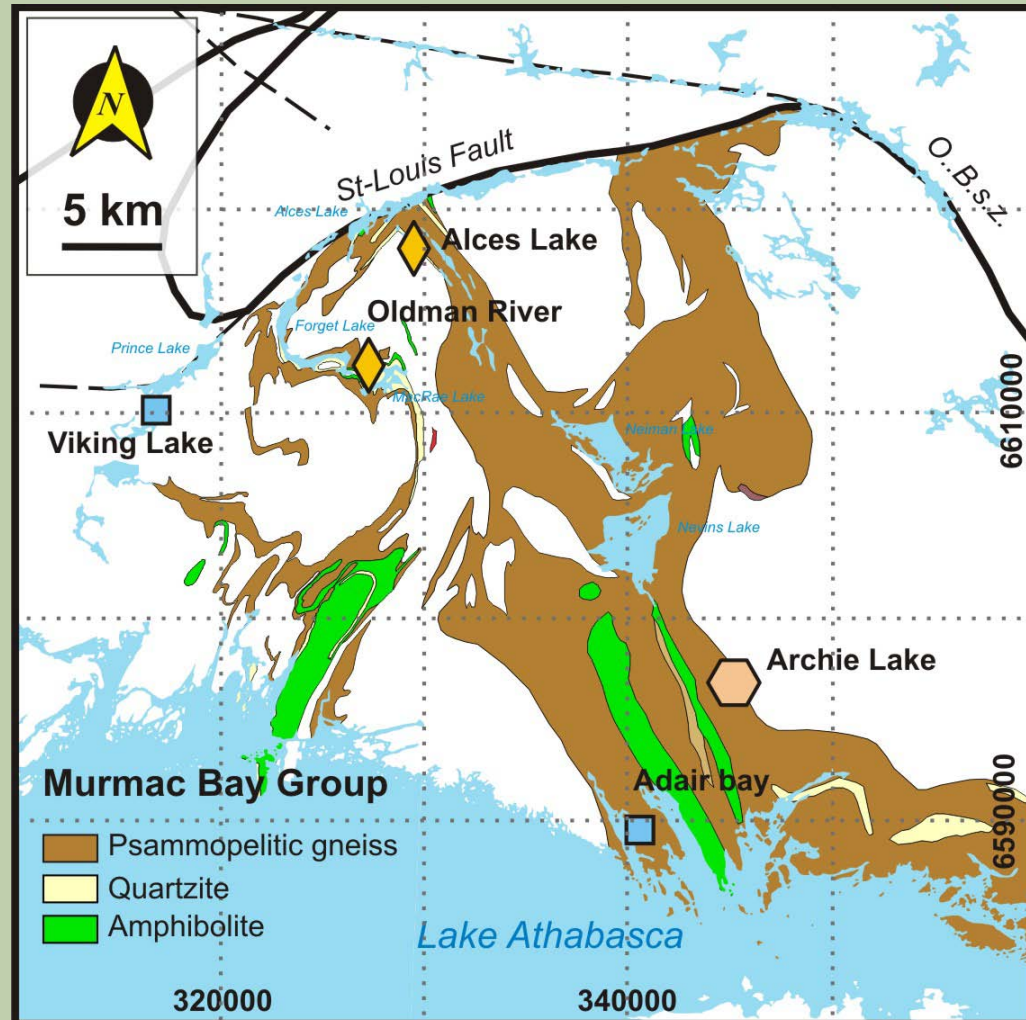
“Oldman River Showing” identical to Alces Lake REE-Th occurrence?

GSC Bulletin 31 (Robinson, 1955):

Sample collected from MICK 4 claim of Nesbitt Labine. Contains 80% biotite and 20% monazite (5.4% Th).

SGS assessment file 74N09-SE-0065 (Traverse Longlac Mines Ltd., 1953) :

MICK 4 claim acquired from Nesbitt Labine. Radioactive mineralization occurs in a biotite-rich shear zone. Strike NE. < 3 feet wide.



ORIGIN OF MONAZITE-RICH MINERALIZATION: PRELIMINARY THOUGHTS

Shared characteristics

- Widely distributed
- All hosted by biotite-rich shear/cataclastic zones
- The more biotite, the more monazite
- Mineralization hosted by paragneiss and associated garnet diatexite (4/7 cases at Ena Lake, all cases at Alces Lake), or granodioritic gneiss hosting diatexite.



Metamorphic/hydrothermal?

- All anomalies occur in biotite-rich shear zones
- ~ modal monazite/modal biotite correlation
- Not all in metasedimentary rocks
- So not paleoplacers
- But source of REE probably metasediments

Magmatic/hydrothermal?

- Samples have high Th, negative Eu anomaly ... not necessarily indicative of magmatic origin at upper amphibolite-granulite
- Not always in diatexite
- When diatexite present, monazite in shear zones that cut it

WHAT NEXT?

In no particular order:

- Monazite-rich deposits in the Murmac Bay Group and associated rocks.
- REE mineralization in lake-bottom sediment REE anomalous areas.
- HREE mineralization in the Athabaska Basin.
- REE in the Wollaston Domain.



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Personnel @ SRC – XRD, Chemical Analyses

And everybody involved in transportation and supplying



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