

# Exploration for Metallic Mineral Resources in Minnesota

## Copper, Nickel, and Platinum Group Metals

### The DULUTH COMPLEX

Hosting World Class Copper, Nickel, and Platinum Group Metal Resources

Exploring since 1948

There are many deposits of copper, nickel, and Platinum Group Metal (PGM) resources in the bedrock along approximately 40 miles of the edge of the Duluth Complex near Babbitt, Minnesota. This map shows the locations of the deposits, state metallic mineral leases, and federal hardrock leases and prospecting permits.

There is another discovery of copper, nickel, and PGM at Tamarack (shown in the Tamarack Map below), which is located along the west flank of the Midcontinent Rift approximately 100 miles south-west of the Babbitt area deposits. The discovery is contained within an intrusion that is associated with the Midcontinent Rift.

#### Exploration Leases and Permits

- Active state nonferrous metallic mineral leases  
See company label codes below for map labels. State leases have no number appended to the label.
- Active federal hardrock mineral leases  
Beaver Bay Joint Venture (B2) is the only company with federal mineral leases.
- Active federal hardrock prospecting permits  
The map labels add a '3' after a company's label code where they have a federal prospecting permit to help differentiate them from other leases.

**Company labeled codes**  
Twin Metals Minnesota and its Ownership Interest:  
A - Agate Lake Resources  
D - DMC (USA) LLC  
E - Encampment Minerals  
F - Franconia Minerals  
L - Lehmann Exploration  
P3 - Prime Meridian Resources  
TA - Tech American Inc.  
T - Twin Metals Minnesota  
The number '3' is appended to the label code for Federal Prospecting Permits.

**Tamarack Inset Map Only:**  
HTX - HTX Minerals K - Kennecott Exploration Co.

**Terminated state nonferrous metallic mineral leases (1967-March 2017)**

Private mineral leases are not shown.

#### Mineral Deposits

Deposits of Copper, Nickel, PGM and/or Titanium

Deposit Name Minerals Company \*NI 43-101

\*National Instrument NI 43-101 is a national instrument for the Standards of Disclosure for Mineral Projects within Canada. Mineral deposits on this map with a completed NI 43-101 are: Spruce Road, Maturi, Birch Lake, NorthMet, Longnose, Tamarack, and Tamarack North.

#### PolyMet's NorthMet Project Area

#### Iron Ore Mining Features

- Active taconite mining plant
- Idle taconite pellet plant or pig iron nugget plant
- In closure taconite mining plant
- Biwabik Iron Formation
- Taconite or Natural Iron Ore Pit
- Tailings Basin

#### General Bedrock Geology Terranes

- Duluth Complex
- North Shore Volcanic Group, Beaver Bay Complex, or miscellaneous midcontinent rift intrusions
- Penokean Virginia Formation, Thomson Formation, or Pokegama Quartzite
- Archean Granite or Greenstones of the Superior Province

Map Scale is 1:10,000

#### Disclaimer

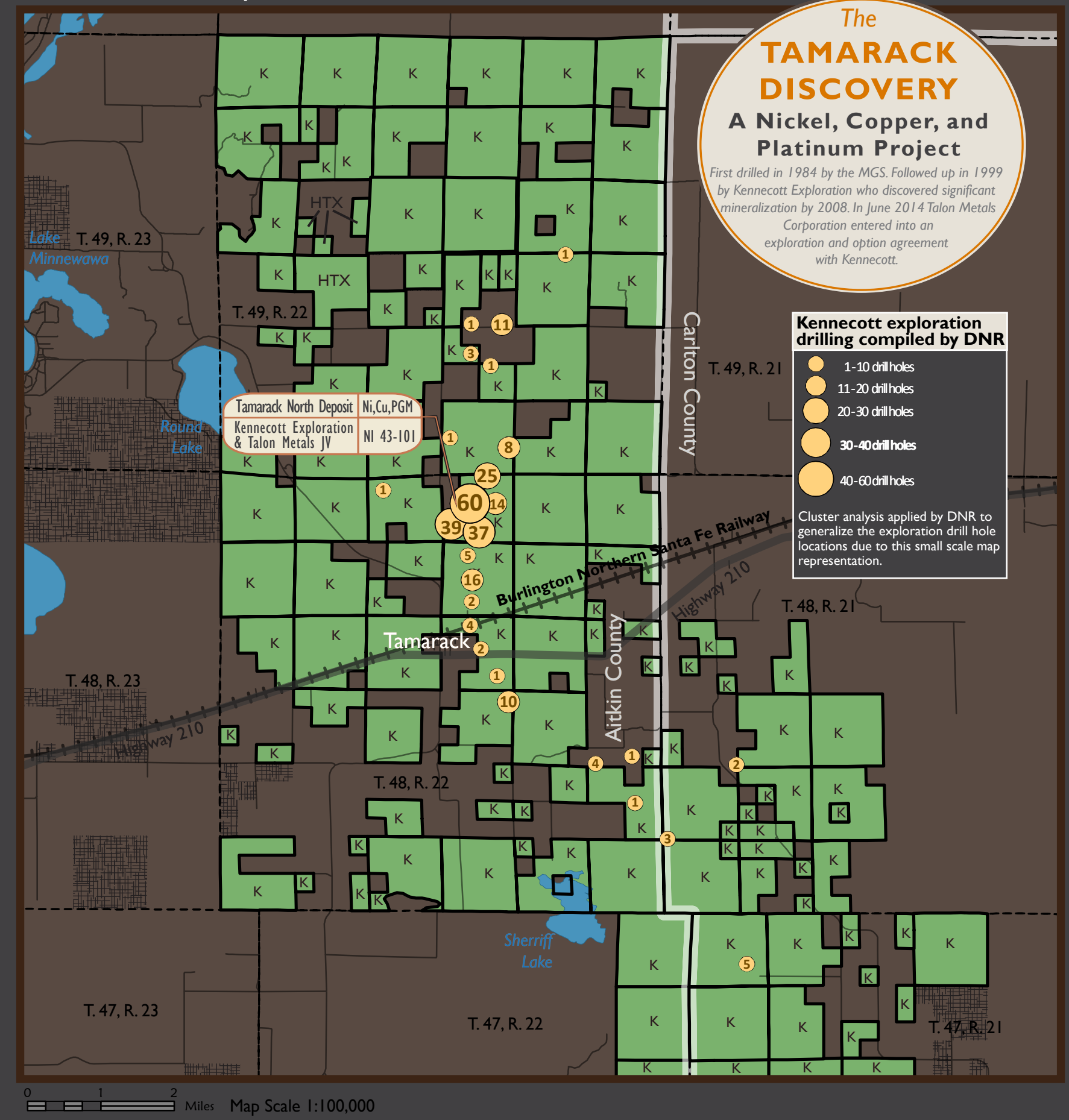
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DEPARTMENT OF NATURAL RESOURCES

#### Map Locations



#### Tamarack Area Inset Map



#### About this map and data

Map was updated by Kevin Hanson in February of 2016 at the Minnesota Department of Natural Resources, Division of Lands and Minerals.

Iron Mining Plant Status (1/17), Iron Mining Features (1/15), Known Metallic Mineral Deposits (02/14), Exploration Drilling for Kennecott Exploration (12/16), and Active State Metallic Mineral Leases (02/28/17) from the DNR's Division of Lands and Minerals. Federal Hardrock Leasing and Prospecting Permits from USDA Forest Service (1/15). No changes to this data since January of 2015 through August of 2016. Bedrock Geology features were generated from the MGS S-3.1 (2011) version (1:500,000). Roads and Railroads from MnDOT. County Boundaries, State Parks, SNAs, BWCAW, Public Land Survey features, and Cities from the DNR. Lakes shown are greater than 200 acres and were taken from the DNR.