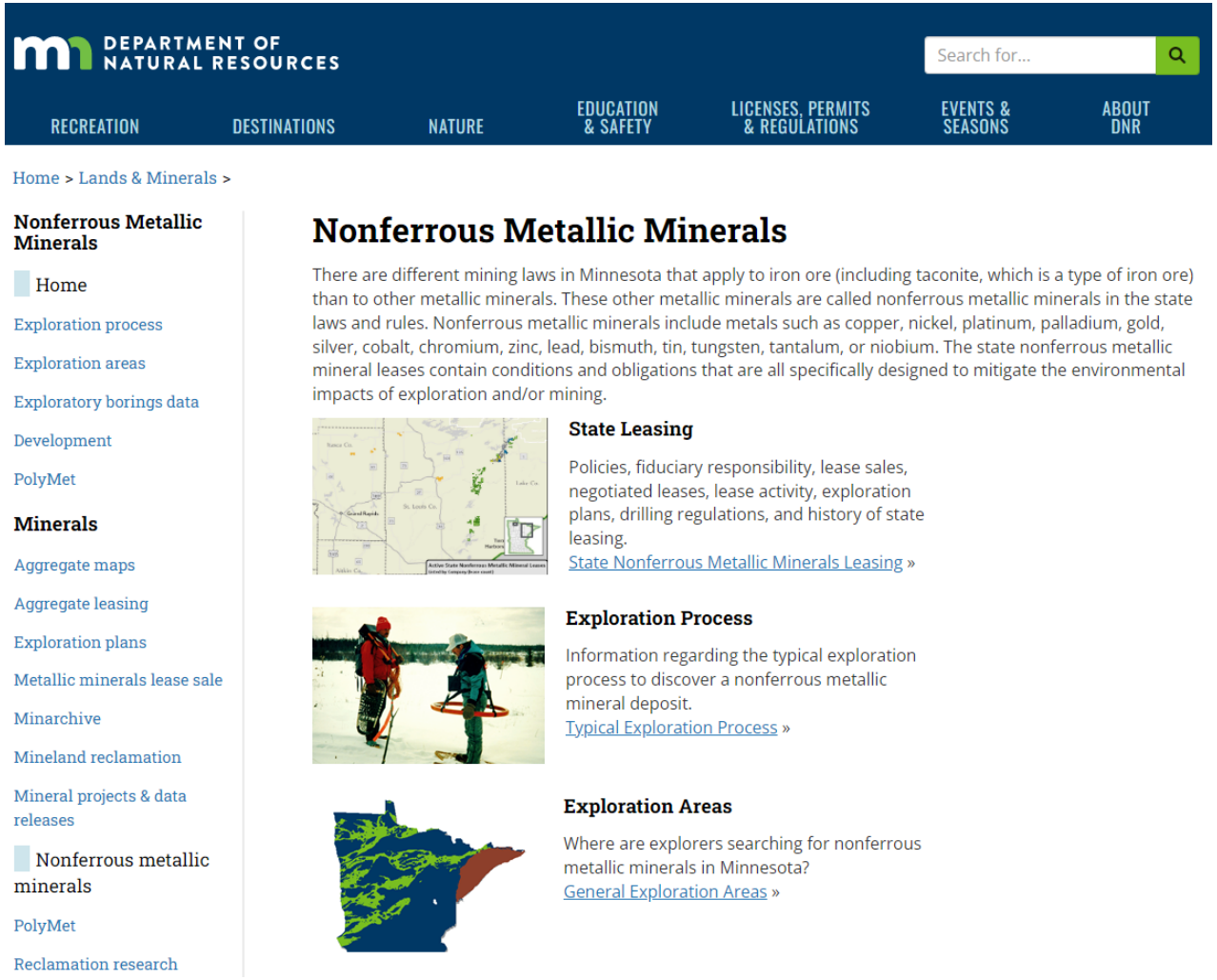
State Oversight of Nonferrous Mineral Exploration Activities in Minnesota

Division of Lands and Minerals

This slideshow presents an overview of the topic, and is not intended to be exhaustive or definitive.

MN DNR Webpages on Nonferrous Metallic Minerals

- Nonferrous metallic minerals
- Exploration process
- Exploration areas
- Exploratory borings data
- Development
- Exploration plans
- Metallic minerals lease sale
- Mineral projects & data releases
- State nonferrous metallic mineral leasing



May 2023 | https://www.dnr.state.mn.us/lands_minerals/metallic_nf/index.html

Typical Mineral Exploration Program in Minnesota

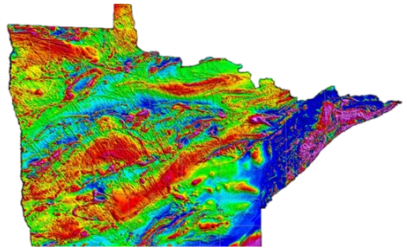
A metallic mineral exploration program in Minnesota can be described as a four-step process that may take anywhere from 1 to 20+ years to complete

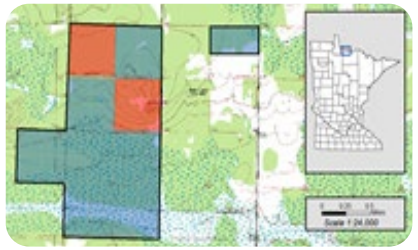
Business Plan & Financing [1-5 years]

Land Package [1-5 years]

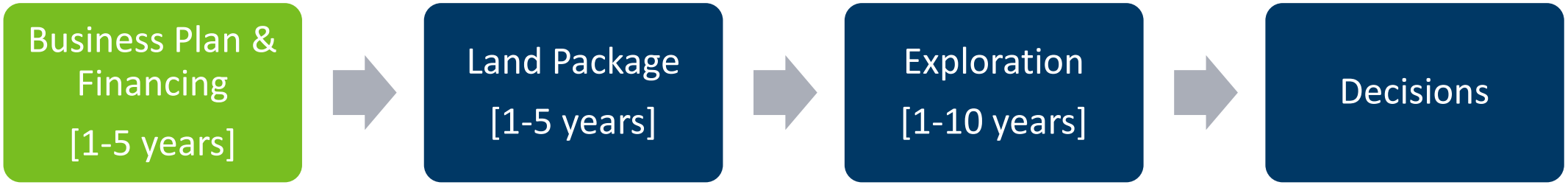
Exploration [1-10 years]

Decisions



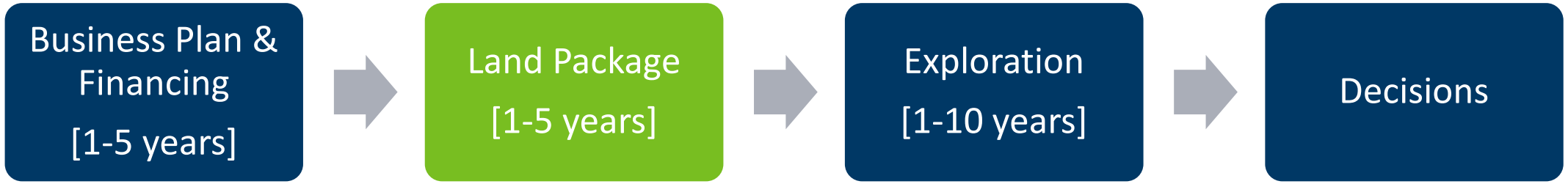


Develop a Business Plan



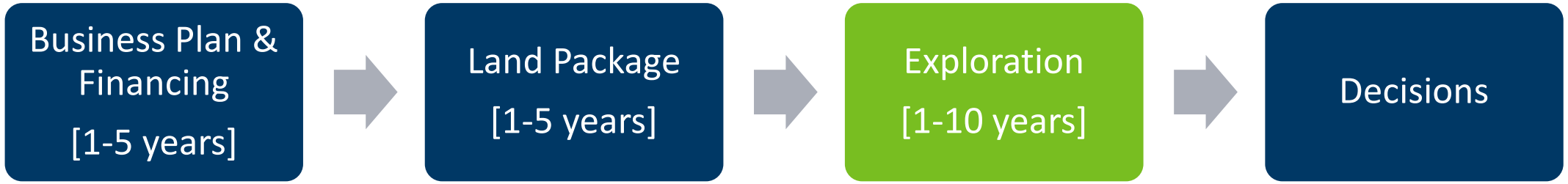
The explorer develops a business plan and raises funds to implement it. With this funding, the explorer selects a geological target to evaluate and makes plans to acquire the rights to explore the land over the target location.

Acquire a Land Package



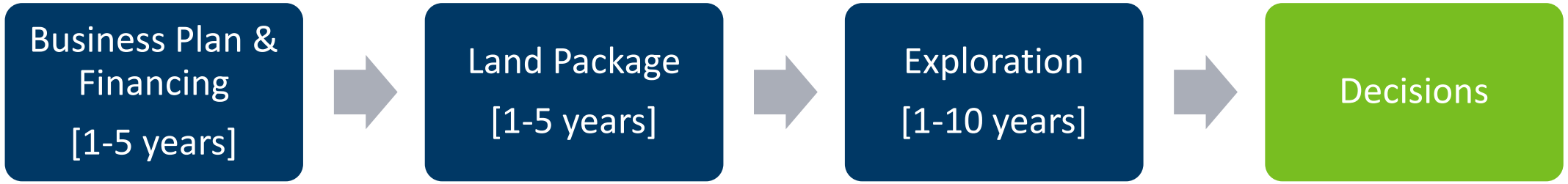
The explorer secures the rights to explore for minerals over the geological target. This may include state mineral leases, private mineral leases, or federal prospecting permits. Land packages may grow or shrink over time as exploration progresses.

Explore



An explorer begins exploring the target area. The exploration process varies from site to site and is based on a particular target mineral. The explorer's goal is to discover an economically viable mineral deposit sufficient enough to develop a mine.

Make Decisions



Based on exploration results, the explorer assesses the target area's economic value. If the projected value fits the business plan then the project can continue. If not, then the leases can be terminated and the explorer can move on to another target area.

Exploration Methods:
Bedrock Outcrop Mapping and Sampling

If bedrock outcrop exposure allows, mineral exploration companies commonly conduct geologic mapping. The area of bedrock exposed at the surface may only be a small percent. Consequently, bedrock geologic maps often incorporate geophysical data and are largely interpretive. This process may also include hand sample collection.

Exploration Methods: Geophysical Surveys

Geophysical surveys are ideally suited for areas like Minnesota where most of the bedrock surface is buried. The explorer maps the variable physical properties of rock formations, such as magnetism, electrical conductivity, and density to narrow down the target area. While geophysical maps show the geophysical attributes of the bedrock, they do not identify specific rocks and minerals.

Exploration Methods: Geochemical Surveys

Geochemical surveys measure concentrations of chemical elements in a sample of rock, soil, vegetation, water, or sediment. Interpreting geochemical data requires knowledge of the chemistry of the mineral deposits being explored as well as the way these deposits are affected by surficial processes.

Exploration Methods:
Drilling Exploratory Borings

After completing geologic mapping and geophysical and geochemical surveys, identified targets with potential for mineralization may be drilled. Drill core is extracted and examined for geophysical properties and chemical composition. If signs of mineralization are favorable, further drilling will likely follow to evaluate the extent and grade of mineralization.

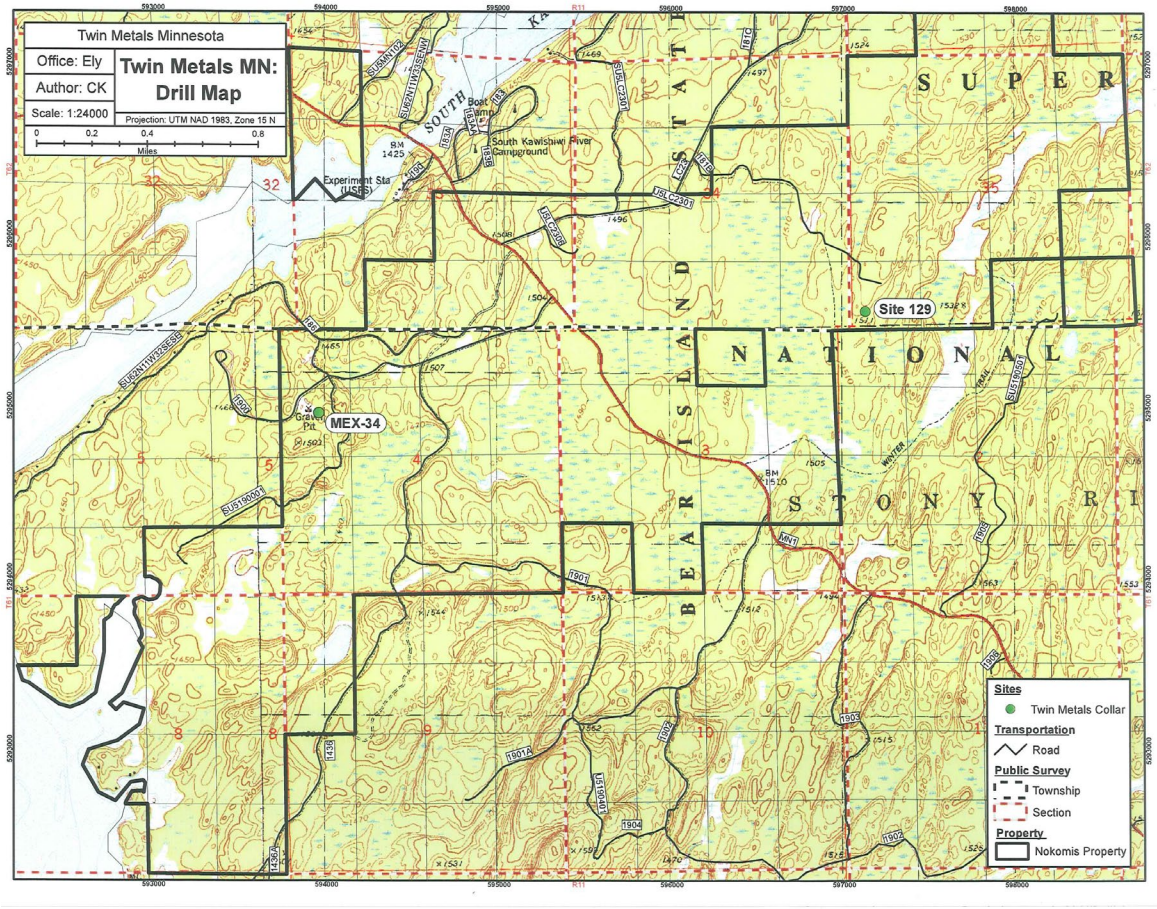
Required Registrations for Exploration

- Secretary of State
  - Registration as a Business in Minnesota
- Department of Health (MDH)
  - Explorer's license [MS 103I.601 Subd. 2] [MR 4727.0500]
  - Responsible Individual Certification [MS 103I.601 Subd. 2] [MR 4727.0600]
  - Drilling Machine Registration [MS 103I.545 Subd. 1][MR 4727.0850]
  - Drilling Company Registration [MS 103I.501]
- Department of Natural Resources (DNR)
  - Explorer Engaged in Exploratory Boring Registration [MS 103I.601 Subd. 3] [MR 4727.0400]

Notification of Exploratory Boring

- The explorer must notify MDH and DNR at least 10 days prior to drilling an exploratory boring. The notification is valid for 180 days. [MS 103I.601 Subd. 4] [MR 4727.0910]

- The notification must include:
  - A MNDOT county road or USGS topographic map showing the boring locations
  - MDH unique number for each boring
  - Name and license number of the explorer
  - Name of the certified responsible individual
  - Name and address of the property owner



DNR Exploratory Boring Inspections

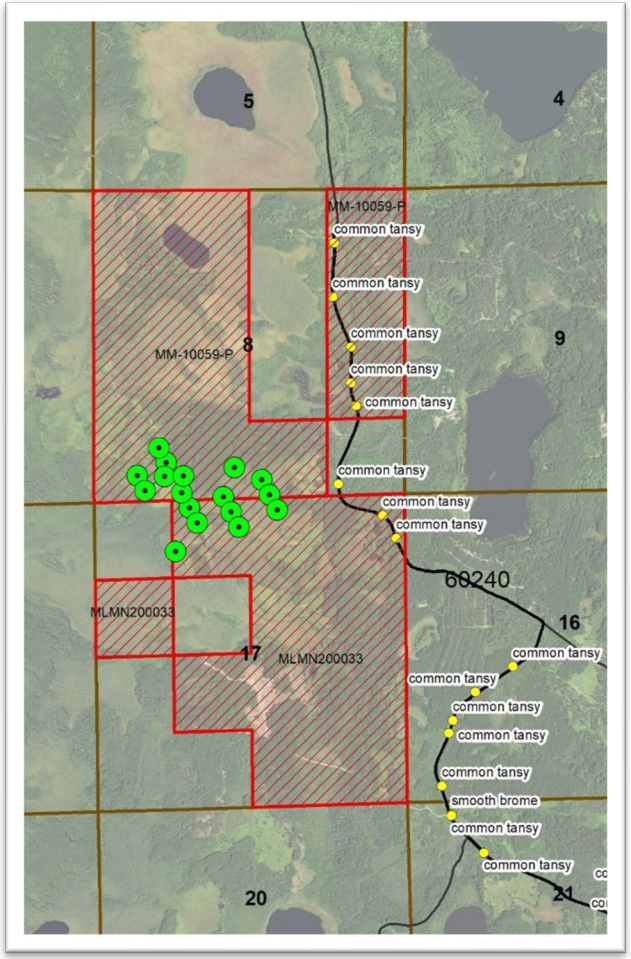
- DNR has the authority to inspect exploratory borings on all lands, regardless of ownership [MS 103I.601 Subd. 5]. All exploratory borings are inspected after drilling is completed and many are inspected during drilling.
- At each drill site, DNR collects a GPS location, a photo, and notes on compliance with all applicable laws and rules including: MS 103I and MR 4727.
- Additionally, on state lands, DNR monitors compliance with all exploration plan conditions and ensures that the drill site is reclaimed to the satisfaction of the land administrator.


May 2021


June 2021

Exploration on State Leases: Exploration Plans

- Before exploration activity can occur on state nonferrous metallic mineral leases, the explorer must submit an exploration plan to DNR [State Metallic Minerals Lease, term 26].
- After submission, DNR has up to 20 calendar days to complete review of the plan. If the plan is approved, DNR sends the explorer an authorization letter containing conditions and recommendations.
- Conditions and recommendations may include stipulations such as:
  - Minimizing the spread of invasive species
  - Following all applicable laws and rules
  - Using secondary containment



Exploratory Boring Sealing

- Exploratory borings must be temporarily or permanently sealed within 30 days after drilling is complete [MR 4727.1000]
- The explorer must submit a sealing report to the MDH within 30 days of sealing [MS 103I.601 Subd. 9]. These forms are made available online by MDH through the Minnesota Well Index.
- Exploratory borings may be temporarily sealed for up to 10 years [MR 4727.1100]. Temporary sealing methods minimize the impact to the surface by allowing the explorer to reuse existing borings for future wedge drilling, geophysical surveys or other downhole testing.

Submission of Data and Samples

- Regardless of mineral ownership, explorers must reserve a one quarter portion of all exploratory boring samples, including drill core, for submission to DNR upon termination of their exploration agreement [MS 103I.605]. An exploration agreement may be a state lease, a federal prospecting permit, or a private lease. Explorers can apply to DNR for a waiver to this requirement. DNR may grant a waiver to submit samples, but a waiver does not apply to the requirement to submit exploratory boring data.

- Drill Core is available for viewing by the public at the Drill Core Library in Hibbing. Drill core samples are often reused several times in exploration programs, academic research, and engineering projects. This means the library is limiting the need for additional drilling disturbances in the future.