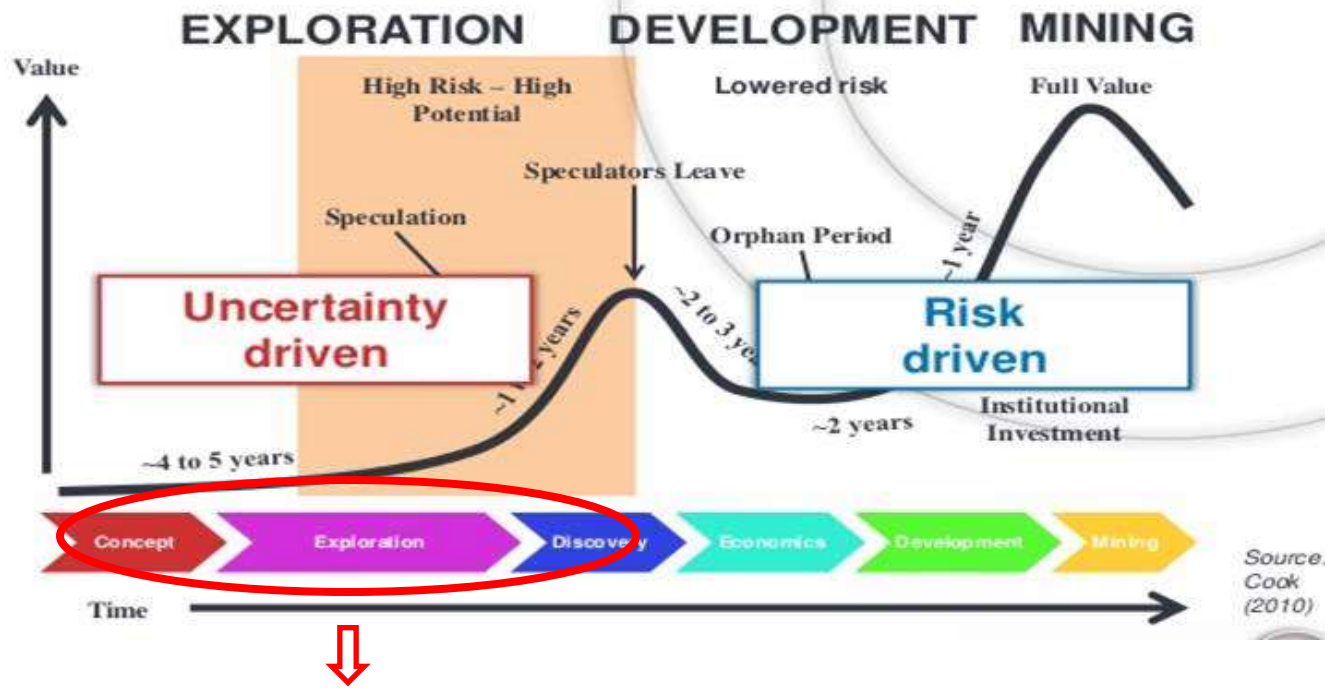
1. Introduction
2. Mineral Industry Overview
3. Commodities
4. Area Selection
5. **Prospecting**
6. Business Development
7. Success Stories
8. Q&A

Dave Copeland
Paul McNeill

Life-cycle of a mine project



a. **Strategy:** *purpose and intended outcome with timeline*
b. **Sampling and data collection:** *Sample type, size, distribution and purpose of sample, data types.*
c. **Geological, geochemical and geophysical surveys:** *how to determine what is appropriate and what data to collect*
d. **Drilling targets:** *what makes a potential drill target that is marketable*

Strategy: *defining the purpose of prospecting effort and intended outcome with timeline*

Credit Ian Wilms for The New York Times

Strategy:

Questions All Prospector and Geologists Need To Ask

1. What are you looking for? What could be out there?

2. What information is already available?

3. What is the access to prospective areas and how does it affect my timeline to reach my goals?

4. How large is it? What is its surface expression? Does it have a surface expression? What will it look like?

5. How to find it? Which techniques should I use?

Resources

- Government: DNR and MIGA
- Google
- Company Reports and Websites
- SEDAR

Strategy:

1. What are you looking for? What could be out there?

For Example:

what you will not find…

- diamonds in Newfoundland
- nickel laterites in Labrador

what you could find…

- gold – anywhere, stick close to the faults
- VMS in central Newfoundland
- uranium in east-central Labrador (plus other areas)
- Iron in Western Labrador
- Nickel in Labrador

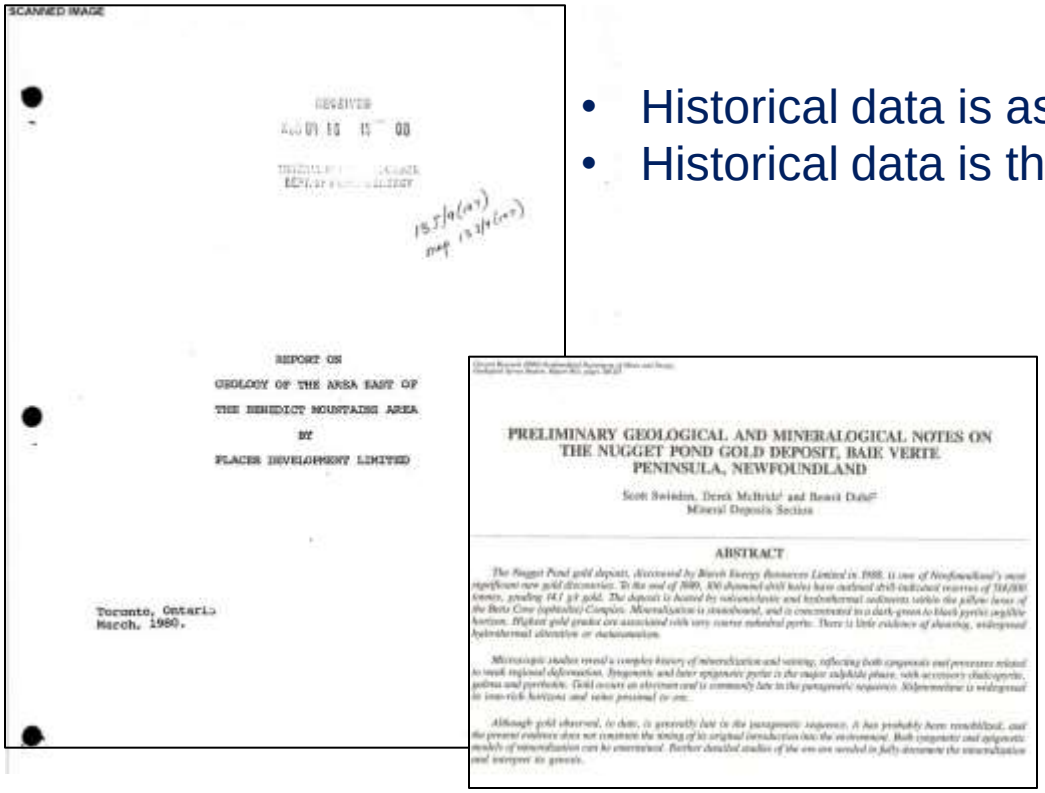
Corp.kitco.com

Strategy:

What information is already available?

Assessment Reports, Open Files, P-Files

Geological/Geophysical/Geophysical Maps, Airphotos


SCANNED IMAGE

RECEIVED

REPORT ON
GEOLOGY OF THE AREA EAST OF
THE BENEDICT MOUNTAINS AREA
BY
PLACER DEVELOPMENT LIMITED

Toronto, Ontario
March, 1980.

PRELIMINARY GEOLOGICAL AND MINERALOGICAL NOTES ON THE NUGGET POND GOLD DEPOSIT, BAIE VERTE PENINSULA, NEWFOUNDLAND

Scott Swinden, Derek McBride and Benoit Dubé
Mineral Deposits Section

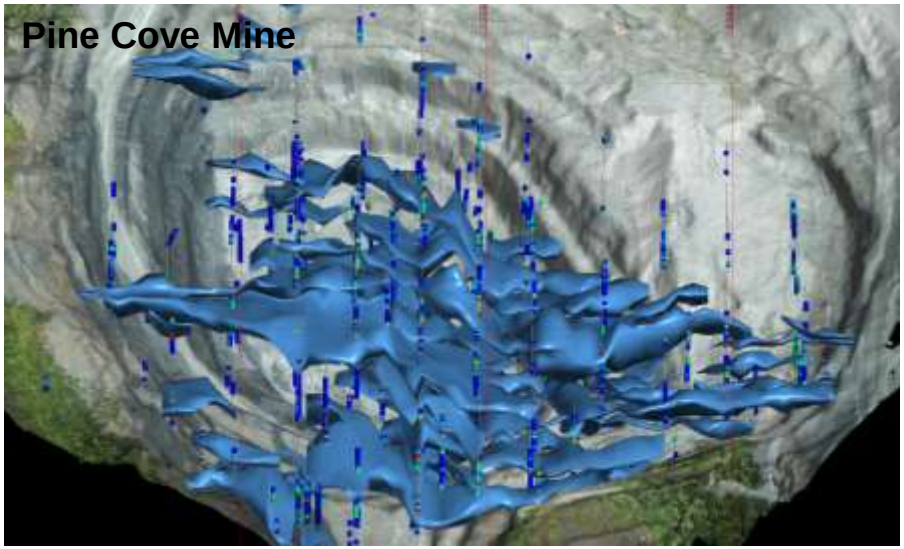
ABSTRACT

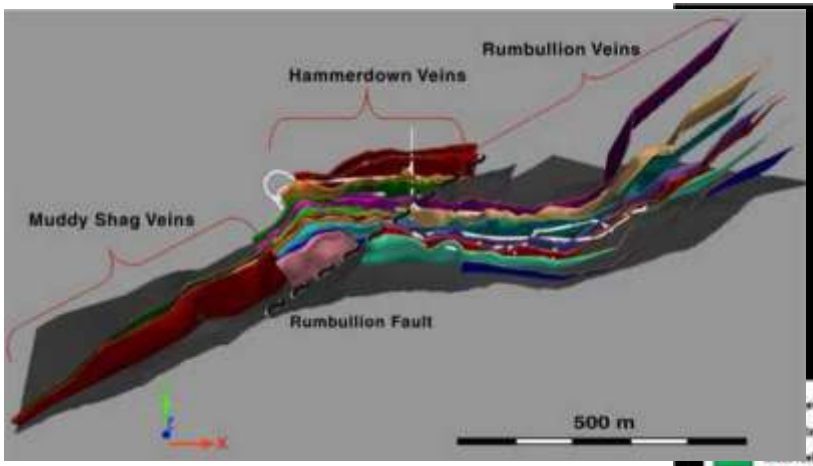
- Historical data is as important as new data acquisition
- Historical data is the most economical of data acquisition

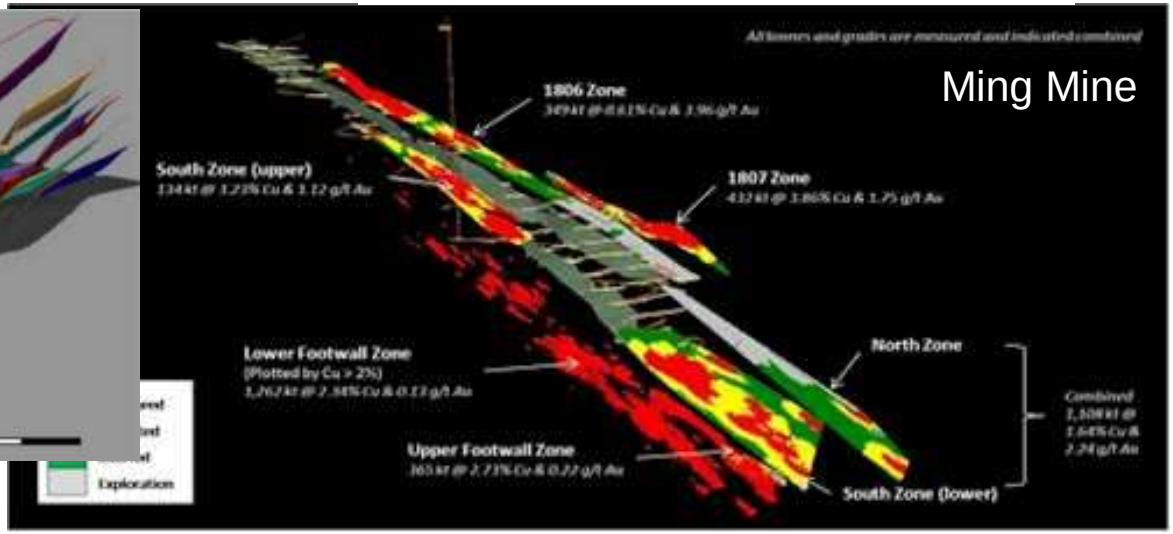
http://www.miga.gov.nl.ca/lands/maps/digital_map.html

Strategy:

How large is it? What is its surface expression? Does it have a surface expression? What will it look like? How do I calculate a resource?







Strategy:

How to find it? Which techniques should I use?

Sampling and data collection: *Purpose of the sample, sample type, size, and distribution*

Purpose: depends on the stage of the project and your goals, but generally the purpose is to gain another layer of data to support/refute ideas and these generate new ideas or allow you to walk away.

Sample Types (Geochemical Survey):

Lake Sediment Samples

Water Samples

Rock Samples

Soil Samples

Till Samples

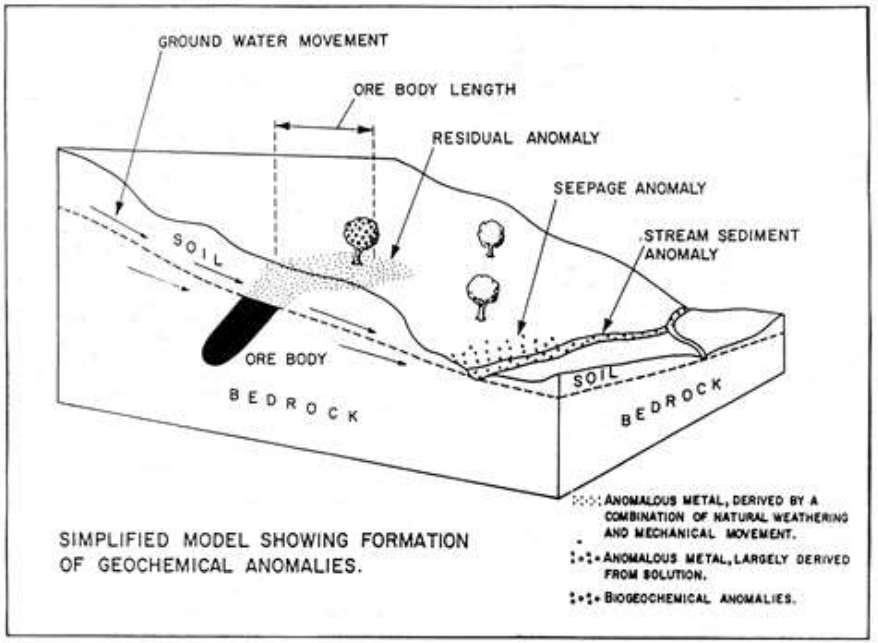
Radon Samples

Stream Sediment Samples

Biological Samples

Mobile Metal Ion Sample

Heavy Metal Separates



SIMPLIFIED MODEL SHOWING FORMATION OF GEOCHEMICAL ANOMALIES.

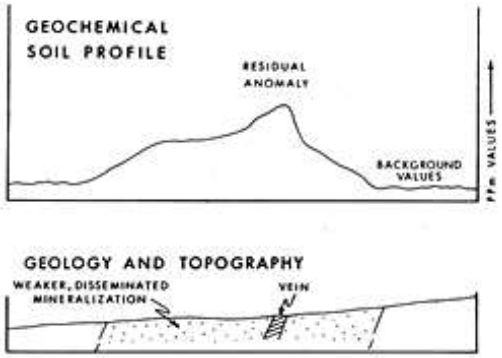
SME Mining Engineering Handbook

Geochemical Sampling: Soils

Size of sample – about the palm of your hand

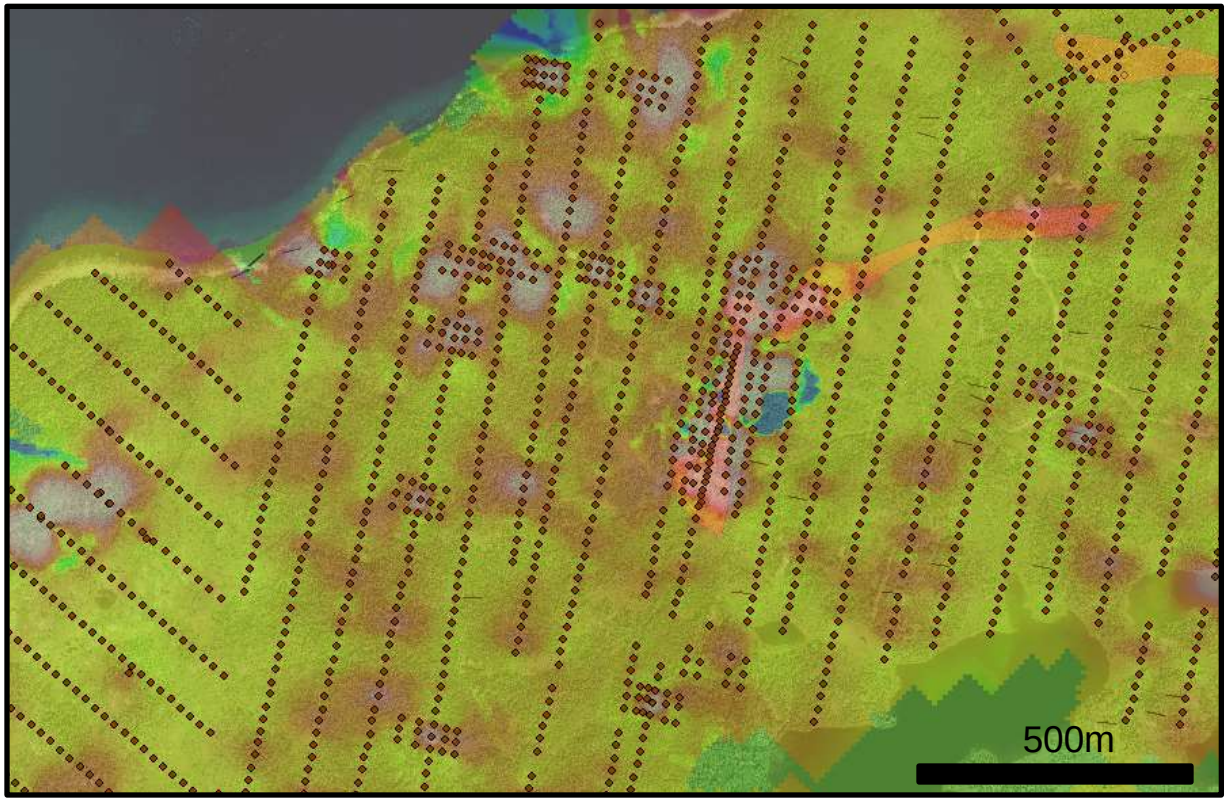
Sample distribution depends on your goals

In the example below-right from the Corkscrew deposit, the original soil samples followed a (general) 100m spaced lines with 25 meter samples on the line. Anomalies were followed up to test the anomalous area.

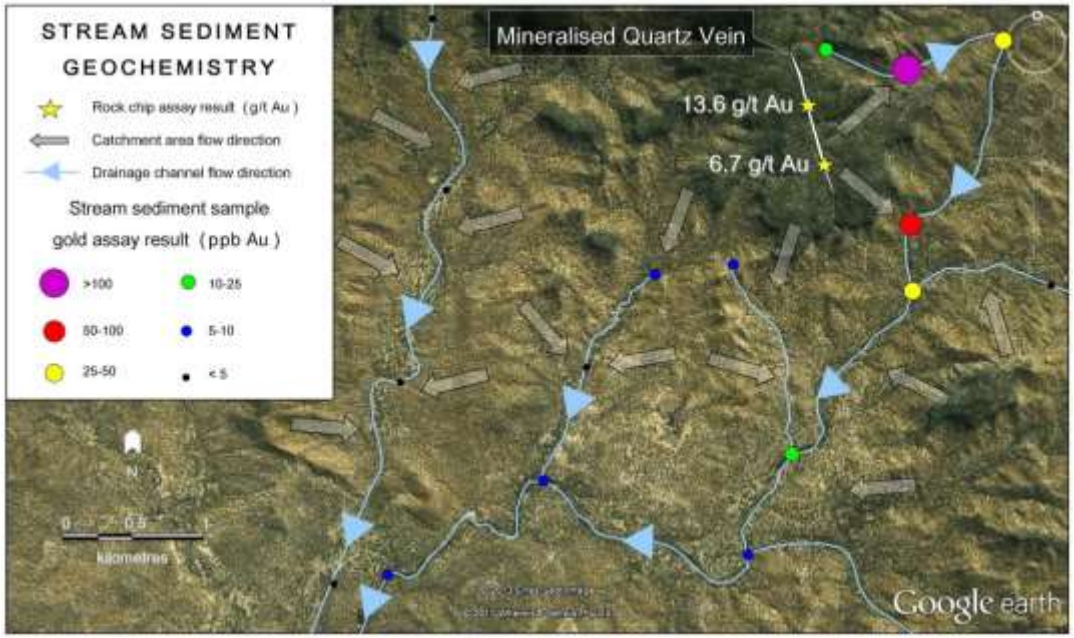


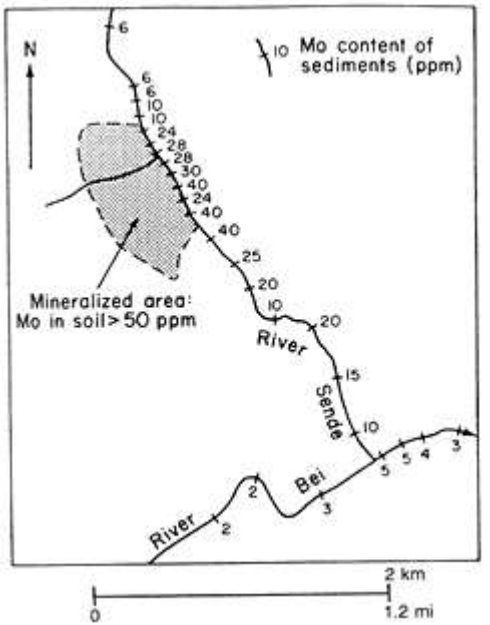
SME Mining Engineering Handbook

An example of a soil profile over a vein with associated disseminated mineralization



Geochemical Sampling: Stream Sediments





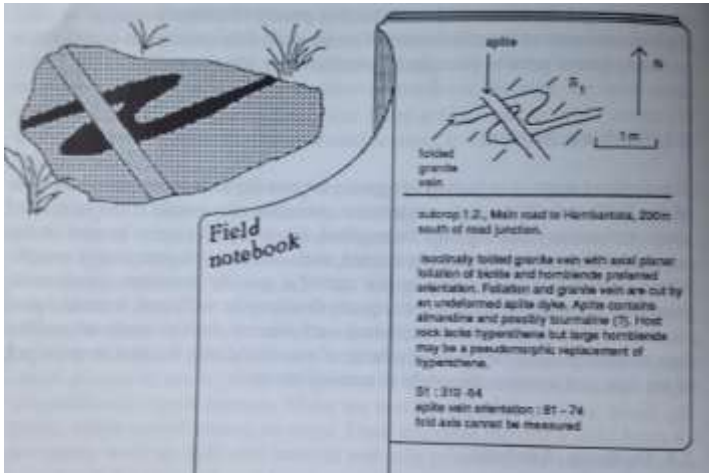
SME Mining Engineering Handbook

Heavy Metal Separates

Size of sample – about the palm of your hand

Sample distribution depends on the area of interest. In the two maps shown samples are collected about 1km apart (top left) and 25 -100 meters.

Geological Surveys



Take Notes: Note Book and/or Map

- Take notes on everything
- Stay organized through your notes and maps
- Describe what you see
- Don't be afraid to be wrong
- What are your thoughts and general impressions

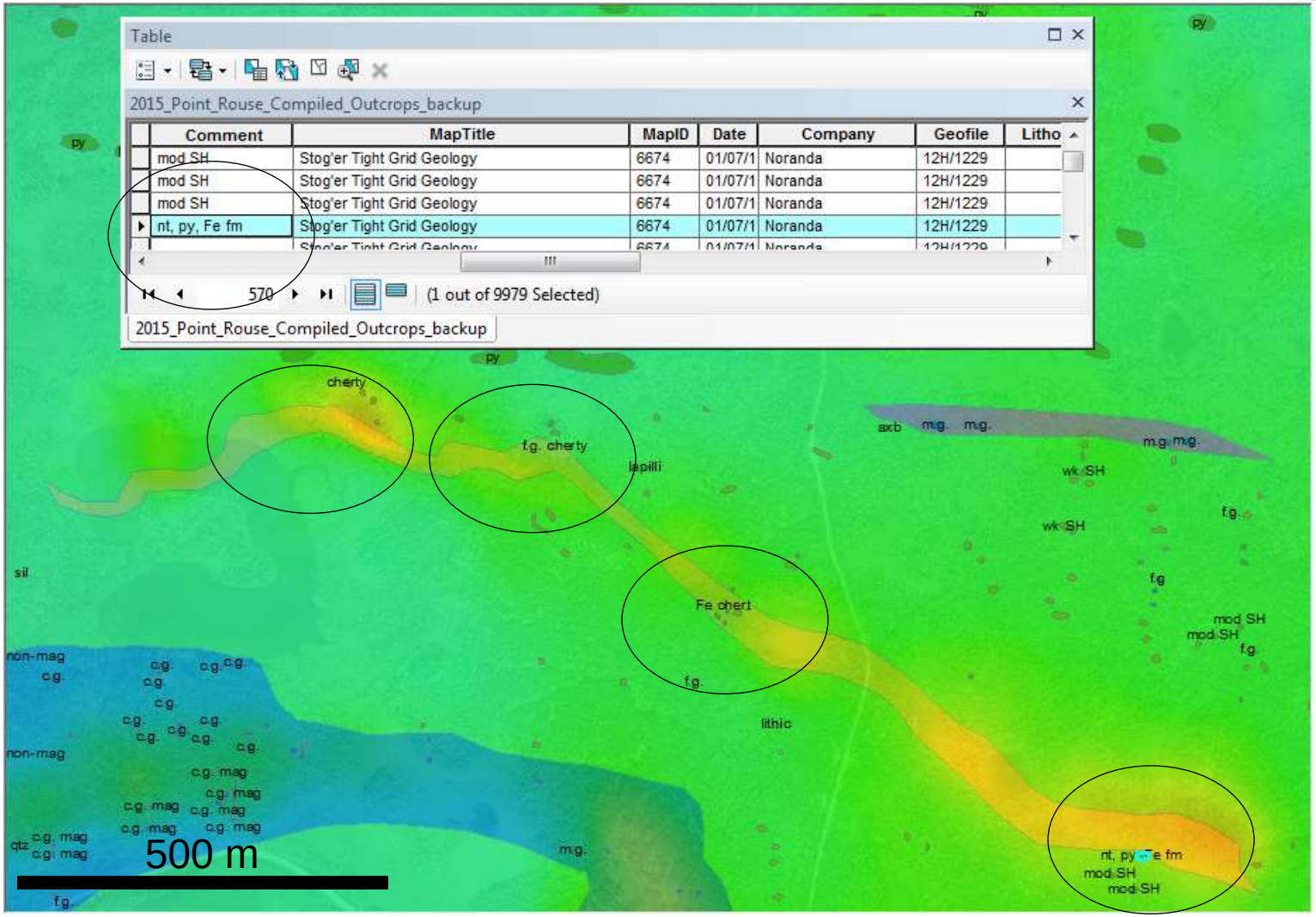
Map Reading and Map Making

- Maps can be hand drawn, drawn on a base map or image, taken from a GPS, produced using a GIS.
- A map is the best tool to communicate all geological data.
- Anyone can make a geological map – you don't need a geologist.

Dorsetcountymuseum.wordpress.com Robert Smith, 1815

Map Making and An Example of Why Notes Are Important

Without the comments on samples this would not have been mapped as iron stone



Geophysical Surveys

- Ask yourself the questions: How much existing Geophysical data can I work with? Will new surveys help me? Which survey(s) are appropriate for the deposit type I am looking for? What scale of survey is appropriate.

- Basic Ground Geophysical Survey Types:
  - Ground Magnetics (cost effective, fairly simple to complete, applicable to all deposit types, mapping geology, magnetic destruction alteration zones)
  - Ground EM Surveys (cost effective, requires some geophysical knowledge and experience to complete, applicable to most deposit types; but with some limitations (e.g. VMS massive sulphide deposits, sulphide bearing gold systems; mapping geology)
  - Ground IP Surveys (moderately expensive, requires extensive geophysical knowledge and experience to complete, applicable to some deposit types (e.g. VMS, Gold, Porphyry, disseminated sulphide deposits)
  - Ground Gravity Surveys (cost effective, requires some geophysical knowledge and experience to complete; applicable to a few deposit types (e.g. VMS, Porphyry, MVT, massive sulphides)
  - Ground Radiometrics (cost effective, fairly simple to complete, applicable to some deposit types (e.g. uranium))

Geophysical Surveys

- Airborne Geophysical Survey Types:
  - Generally all are too cost prohibitive for prospectors to complete
  - Generally are available in NL publicly at a variety of scales and vintages
  - Airborne Magnetics (relatively cost effective, applicable to all deposit types, generally simple to interpret, mapping geology)
  - Airborne EM (expensive, applicable to most deposit types, more difficult to interpret beyond looking at conductive and resistive trends in plan)
  - Airborne Radiometrics (relatively cost effective, applicable to few deposit types (e.g. uranium and REE), generally simple to interpret)

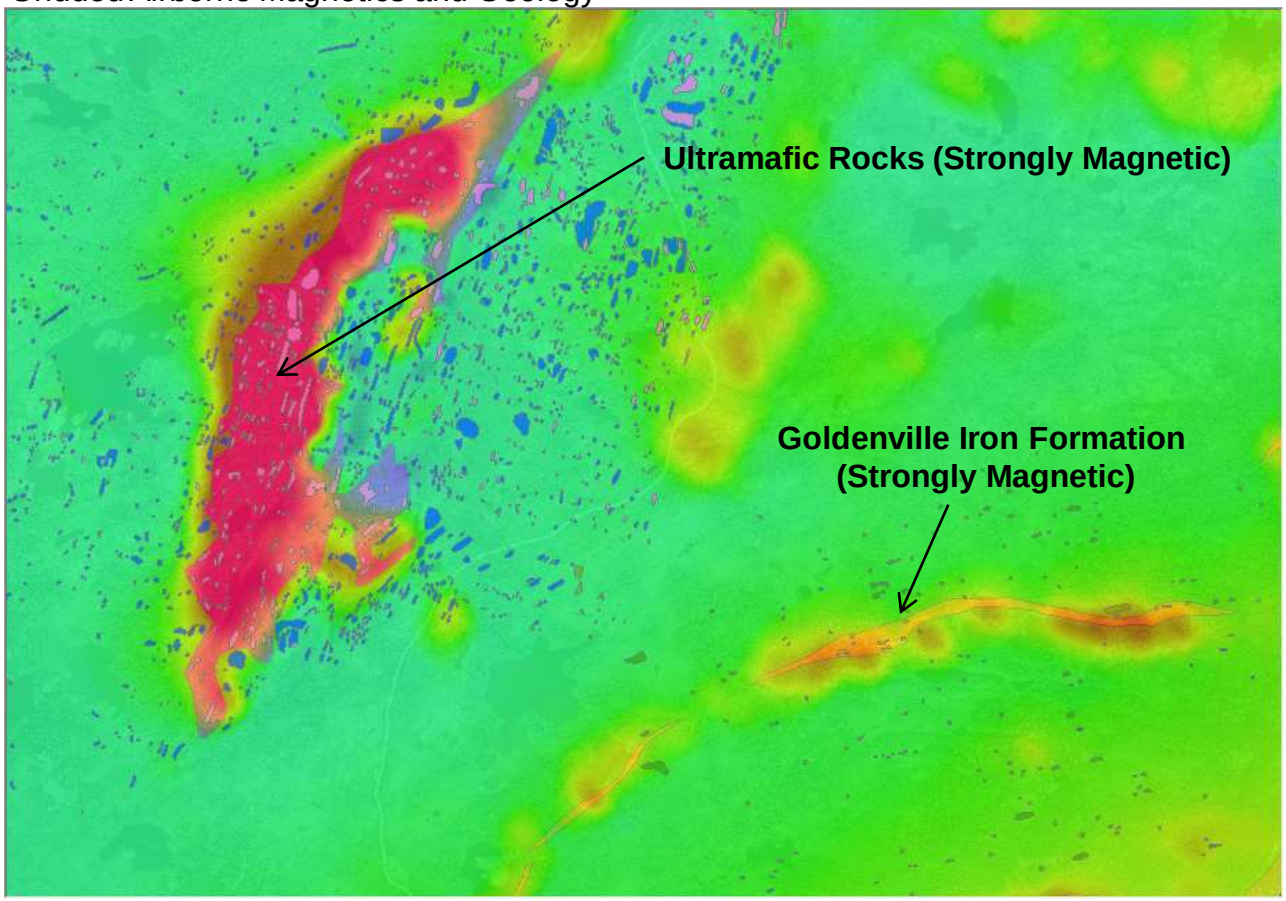
Geophysical Surveys

- Ground Geophysical Surveys Typical Scale:
  - Magnetics: Generally run at 100 m line spacing with readings taken at 25 or 12.5 m or more commonly now “continuous read”
  - EM: Generally run at 100 m spacing with readings taken every 25 or 12.5 metres.
  - IP Surveys: Generally run at 100 m line spacing with readings (dipole spacing) at 12.5 or 25 m and “depth” readings at n=1 to 6
  - Gravity: 100 m line spacing and 12.5 or 25 metre station spacing along lines
  - Radiometrics: 100 m line spacing and 12.5 or 25 metre station spacing along lines

- Airborne Geophysical Surveys Typical Scale:
  - Generally all run at line spacing of 75 to 150 metres for modern surveys

Geophysical Surveys: Examples of how to use them

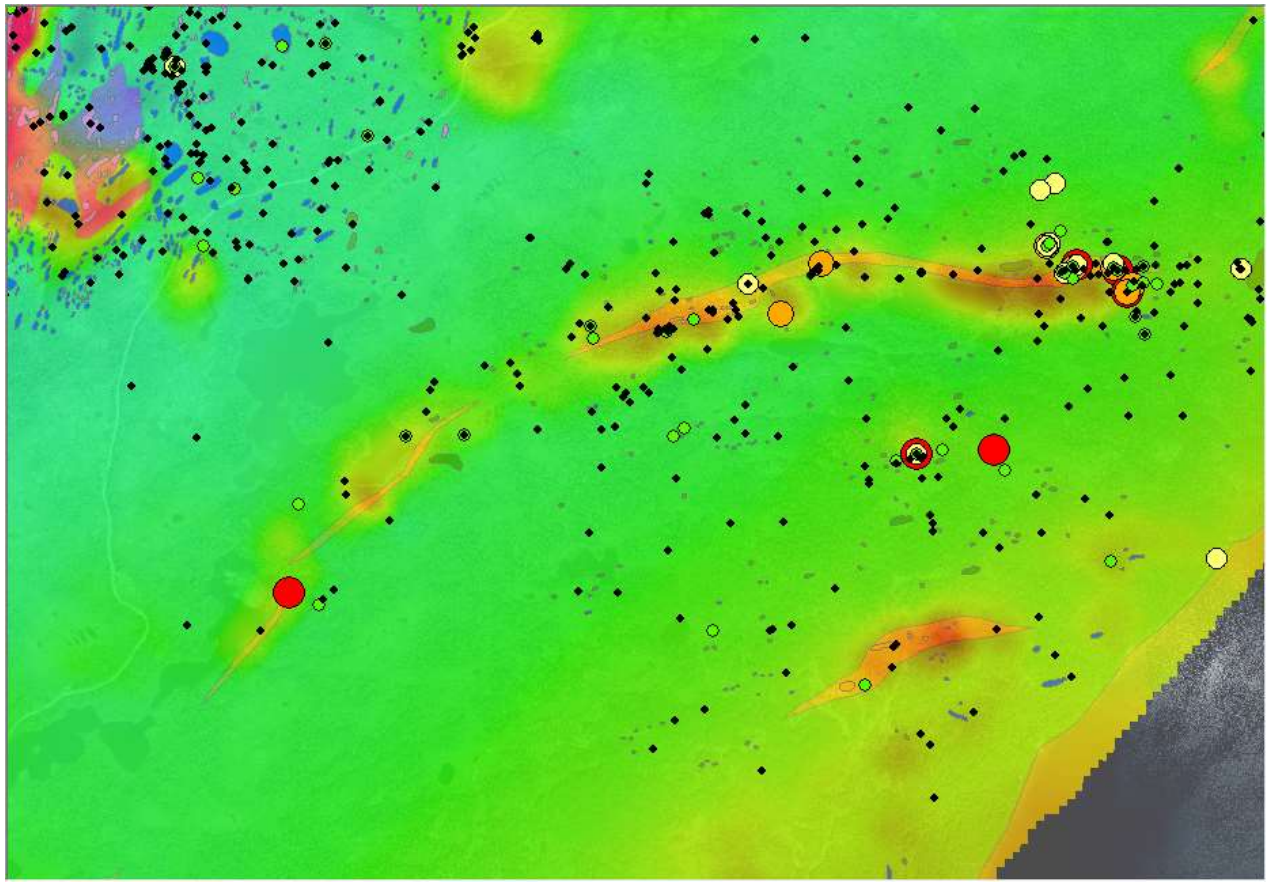
Gridded Airborne Magnetics and Geology



Using Airborne Magnetics and Outcrop Mapping to interpret Geology

Geophysical Surveys: Examples

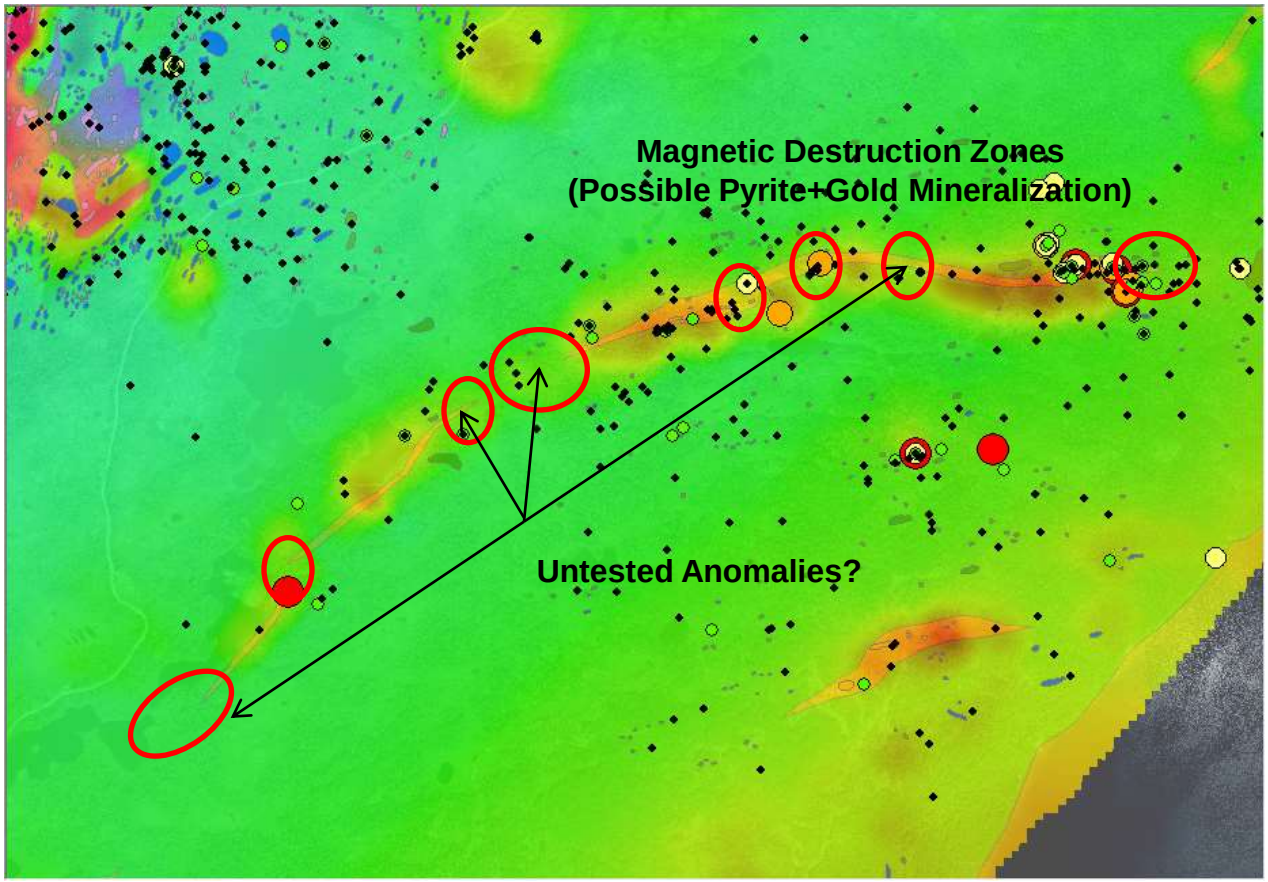
Gridded Airborne Magnetics and Geology



Using Airborne Magnetics to outline potential exploration Targets

Geophysical Surveys: Examples

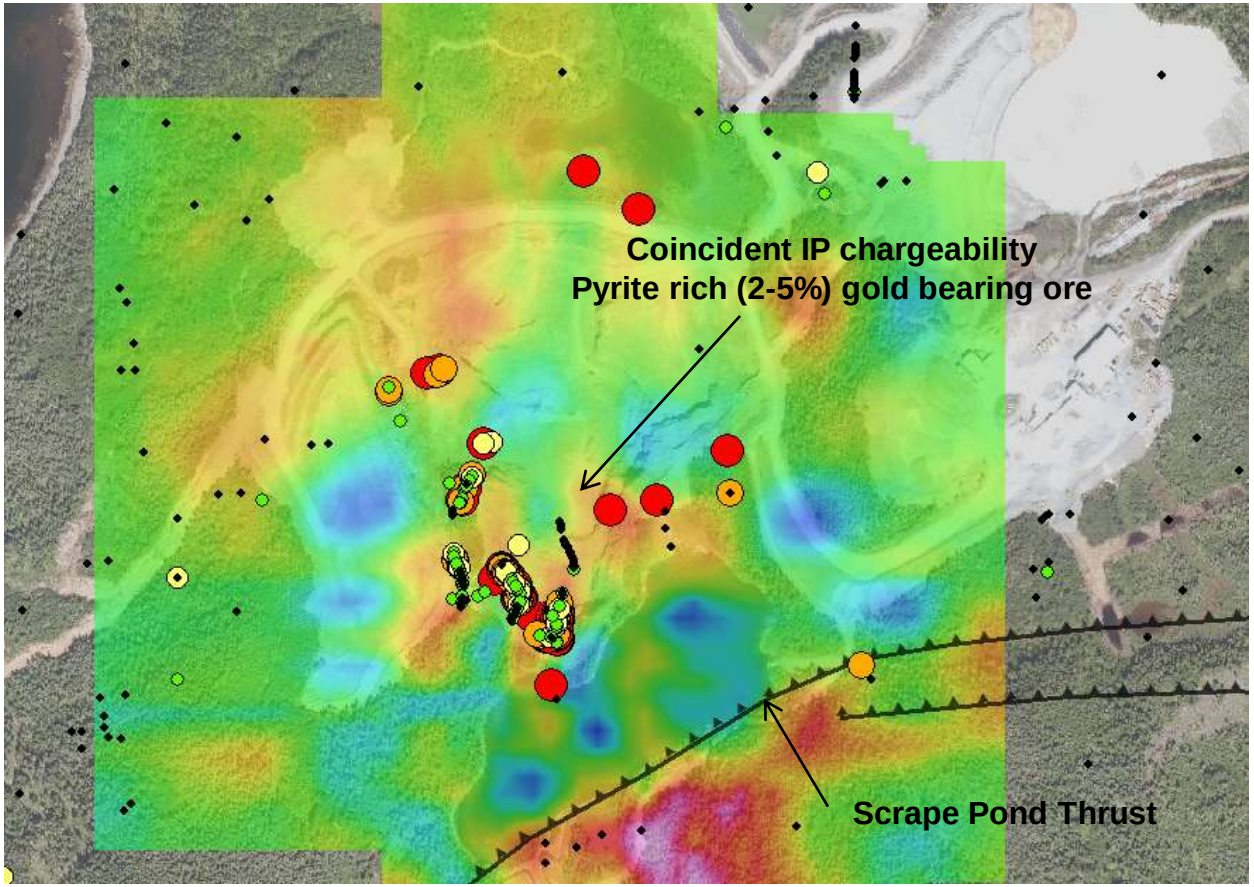
Gridded Airborne Magnetics and Geology and Rock Geochemistry



Using Airborne Magnetics to outline potential exploration Targets with layered rock samples

Geophysical Surveys: Examples

Gridded Ground IP Chargeability and Rock Geochemistry



IP chargeability and channel samples outline near surface exposure of the Pine Cove Mine.

Drilling Targets: *What makes a marketable drill target?*

What makes a project marketable?

Depends on who you talk to…

- What are the goals of the other person?
- What is the timeline for achieving those goals?
- Do they have the background to recognize the potential?
- What do they want to hear?

What makes a drill target?

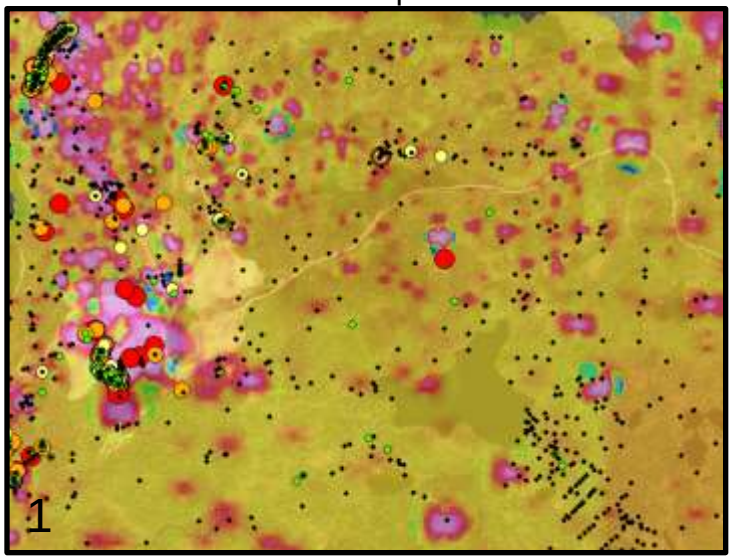
Multiple layers of data all pointing to the same target areas.

Notes:

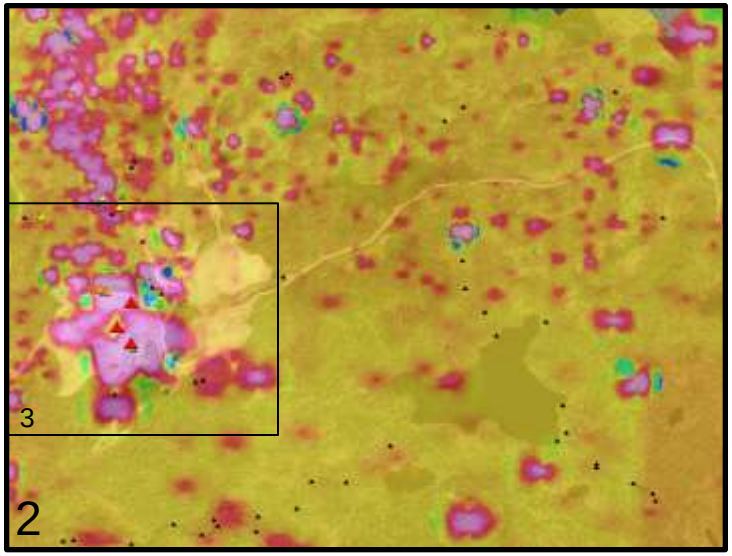
- Grade is good. Many anomalies may be better.
- Alteration is commonly easier to find than mineralization
- e.g. Pine Cove Gold Deposit…

Drilling Targets:

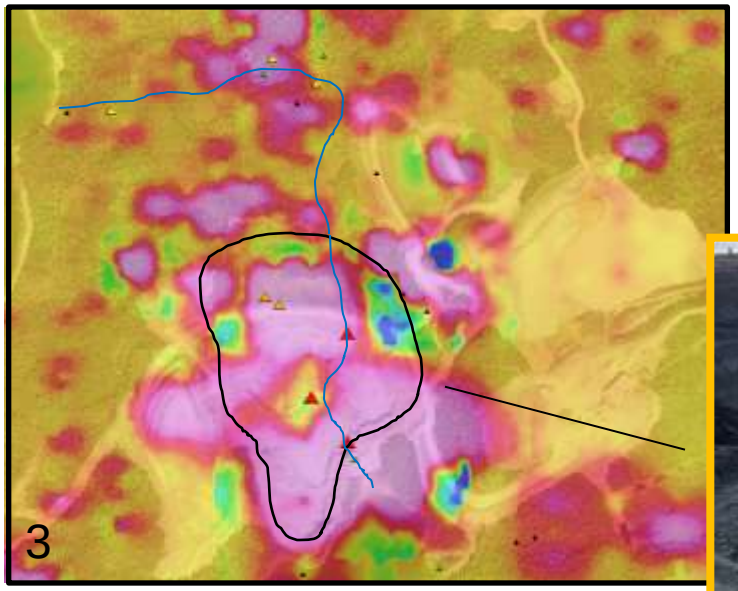
Gridded soils and rock samples



Gridded soils and HMS



Gridded soils and HMS



Multiple layers of data all pointing to the same target areas.

The gold mine is at the intersection of three data sets

Key Messages on Prospecting Strategy, Sampling, Surveys and Developing a Marketable Targets

- Ask yourself the questions: What are you looking for? What information is already available? What is the access and timeline to developing a project? What are the dimensions of the target? What is its surface expression? Which techniques will allow me to find it?
- Leverage existing data of all types, geology, geophysics, geochemistry, imagery, historical data, company websites, books.
- Take good notes, describe what you see and do, stay organized, don't worry about being wrong.
- Approach all work with a goal and a strategy to reach the goal.
- Develop your story and tell it to the right people.
- Despite all the above – remain field focused. The job is to discover.