Northwest Mineral Province Deposit Atlas

Selwyn Region Cu-Au-Mo Deposits

INDUSTRY TECHNICAL WORKSHOP

6th December, 2018

The University Of Queensland AUSTRALIA

SMI BRC
WH Bryan Mining & Geology Research Centre

Queensland Government

chinova resources

Selwyn Region Cu-Au-Mo Deposits Atlas

Workshop Exercise

Using recently-released, '1370' Cloncurry detailed Magnetics & Radiometrics and Chinova Gravity, heli-TEM & geochemistry …

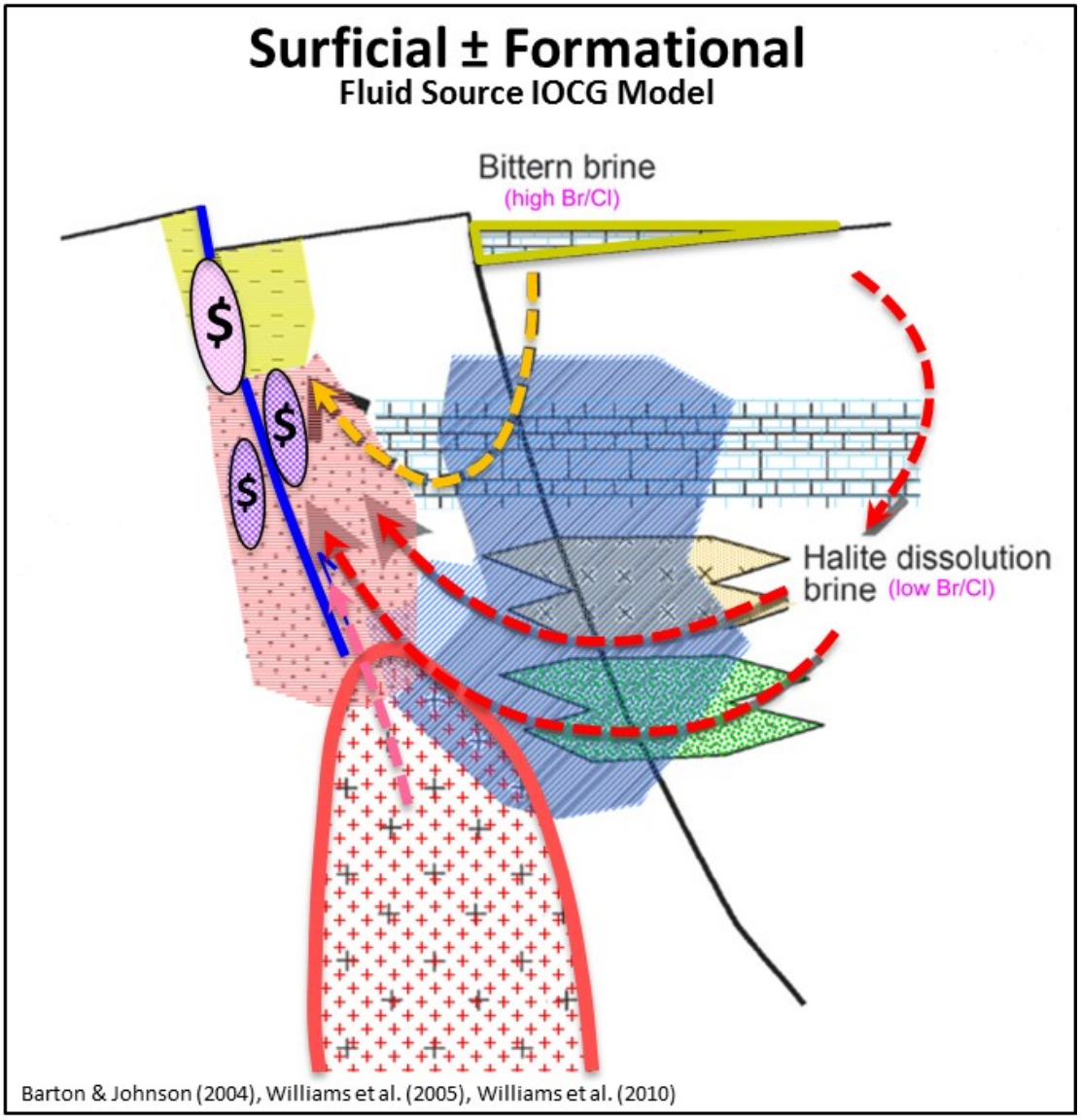
"Where would you be wanting to hold tenure?"

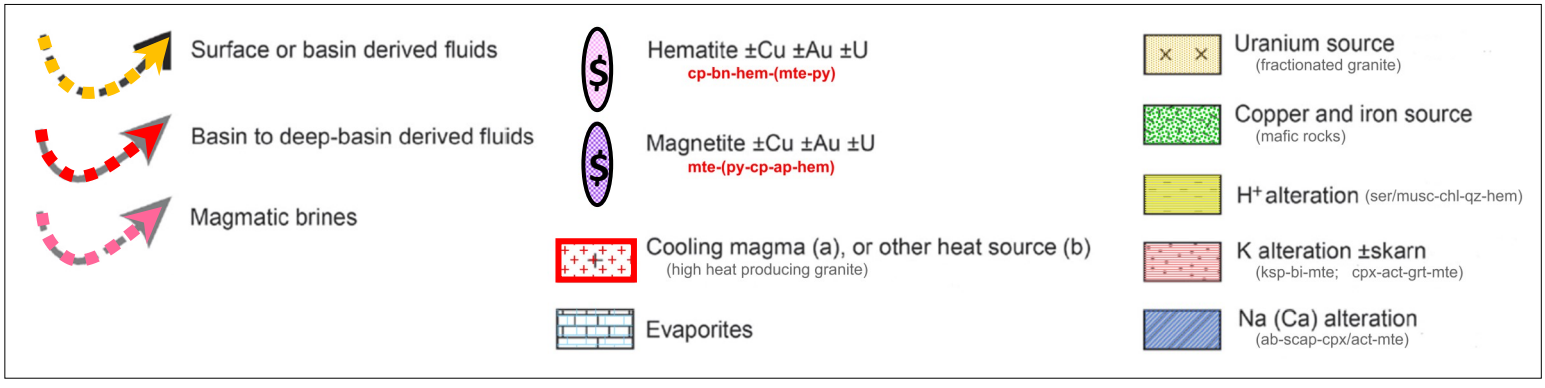
IDENTIFY outstanding drill targets in the Selwyn Region

Materials/Data Provided:
NWQMP Deposit Atlas-Selwyn Chapter
IOCG characteristics
Recently-released, '1370' Cloncurry detailed Magnetics & Radiometrics (geotifs)
Selwyn Region geology & geophysics geotiffs
Mount Elliott-SWAN geology, geophysics & geochemistry geotiffs
Merlin-Mount Dore geology, geophysics & geochemistry geotiffs
Starra Line geology, geophysics & geochemistry geotiffs

Generally agreed IOCG characteristics:

- abundant, low-Ti, Fe-oxides: **magnetite** and/or **hematite**;
- **Cu** ± **Au** at economic grades;
- a distinctive suite of minor elements: (*differing mixes of*) **Ag**, REE, **U**, **Mo**, F, P, Ni, As, **Co**, & Ba;
- an association with extensive & pervasive alkali alteration – both sodic-calcic, **Na-(Ca)** and potassic, **K**;
- formed in shallow crustal environments, in brittle regimes *(in the 2-12km depth range);*
- prominent **structural** ± **lithological** control;
- most commonly coeval, but *(usually)* not proximal to magmatism *(plutons & batholithic complexes);*
- common district association with Cu-Au-barren, Fe-oxide deposits.





Na(-Ca) Alteration

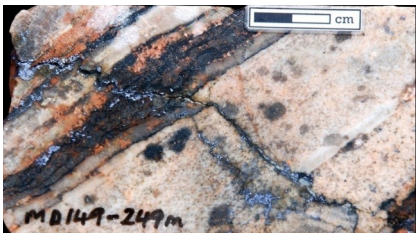
- Semi-regional to regional extent?
- Fracture & fabric-controlled
- Bleaching due to biotite & graphite destruction
- Quartz-(hematitic) albite-sericite-calcite (±scapolite ±pyrite ±pyrrhotite ±fluorite) intensifies inward
- Post-peak metamorphic in timing.

Stronger Na-Ca Alteration

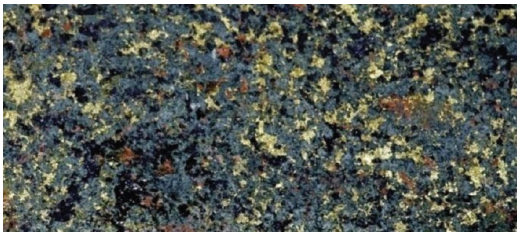
- texturally-destructive
- clinopyroxene (diopside-hedenbergite) and/or amphibole (actinolite-tremolite)-scapolite
- Veined to vein network to breccia

K Alteration (& **Mineralisation**)

- Fracture/breccia-controlled to massive replacement
- K feldspar-calcite-clinopyroxene ±andradite garnet
- Clinopyroxene-actinolite-scapolite-calcite-magnetite (±andradite ±tourmaline ±allanite ±apatite ±biotite ±K feldspar)



- Late fracture/breccia-controlled mineralisation
- Chlorite-epidote-calcite-chalcopyrite-pyrite-magnetite±hematite



Selwyn Regional LEGENDS

Merlin Mo projected
Little Wizard Mo projected
Mount Dore Cu projected

Structure

late Xcut Faults (post WILLIAMS)
very late D4 Faults (post WILLIAMS)
late D4 Faults (syn-late WILLIAMS)
early D4 Faults (syn WILLIAMS)
D3 Faults
D2 Faults
D2-D3 antiform
D2-D3 synform
D1 Faults
pre D1 Faults

contacts
bedding trend lines
metamorphic trend lines
amphibolite, metadolerite
metabasalt

Amythest Castle breccia
WILLIAMS (Mount Dore, Yellow Waterhole, Squirrel Hills Granites)
metadolerite, amphibolite
SWAN diorite

TIMESLICE / Stratigraphy / Lithology

XXXX (undifferentiated)
XXXX (carbonaceous metased)
XXXX (shale, slate, carbonaceous silt)
XXXX (phyllite)
XXXX (schist)
XXXX (metadolerite)
XXXX (metabasalt)

ANSWER (undifferentiated)

NEW HOPE-MT NORNA (New Hope Sandstone)

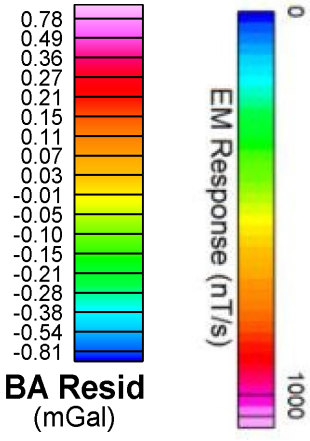
KURIDALA (undifferentiated)
KURIDALA (meta siltstone)
KURIDALA (phyllite-phyllitic silt)
KURIDALA (carbonaceous siltstone)

ROXMERE (Roxmere Quartzite)

STAVELEY (undifferentiated)
STAVELEY (carbonate siltstone-sandstone)
STAVELEY (calc-silicates)
STAVELEY (chl-mte schist)
STAVELEY (qz-hem IF)
STAVELEY (qz-mte IF)

WONGA (Gin Creek Granite)
DOUBLE CROSSING METAMORPHICS (intruded/hornfelsed)
DOUBLE CROSSING METAMORPHICS (undifferentiated)
DOUBLE CROSSING METAMORPHICS (amphibolite)
DOUBLE CROSSING METAMORPHICS (mica-chl schist)

Holocene Cover
Late Tertiary-Quaternary Cover
Mesozoic Cover



Mount Elliott-SWAN LEGENDS

Mt Elliott-Corbould-SWAN Grade Shells

- 0.25eq pct Cu projected
- 1.0 eq pct Cu projected
- 2.0 eq pct Cu projected

Structure

- late Xcut Faults (post WILLIAMS)
- late D4 Faults (post WILLIAMS)
- early D4 Faults
- D2 Faults
- D2-D3 antiform
- D2-D3 synform
- D1 Fault
- possible D1 fold
- contacts
- bedding trend lines

Mount Elliott-Corbould-SWAN
0.25eq pct Cu projected

Structure

- late Xcut Faults (post WILLIAMS)
- late D4 Faults (post WILLIAMS)
- early D4 Faults
- D2 Faults
- D2-D3 antiform
- D2-D3 synform
- D1 Fault
- possible D1 fold
- contacts
- bedding trend lines

- microdiorite
- ironstone/gossan
- WILLIAMS (Squirrel Hills Granite)
- metadolerite, amphibolite
- SWAN diorite

TIMESLICE / Stratigraphy / Lithology

- XXXX (undifferentiated)
- XXXX (carbonaceous metased)
- XXXX (shale, slate, carbonaceous silt)
- XXXX (phyllite)
- XXXX (schist)
- XXXX (metadolerite)
- XXXX (hematitic chert)
- XXXX (metabasalt)
- NEW HOPE-MT NORNA (New Hope Sandstone)
- KURIDALA (schist)
- KURIDALA (undifferentiated)
- KURIDALA (phyllite-phyllitic silt)
- KURIDALA (carbonaceous siltstone)
- ROXMERE (Roxmere Quartzite)
- STAVELEY (undifferentiated)
- STAVELEY (calc-silicates)

Mt Elliott Auger-80# - CU
(Cu ppm)

6,200	to	26,000
2,400	to	6,200
900	to	2,400
300	to	900
0	to	300

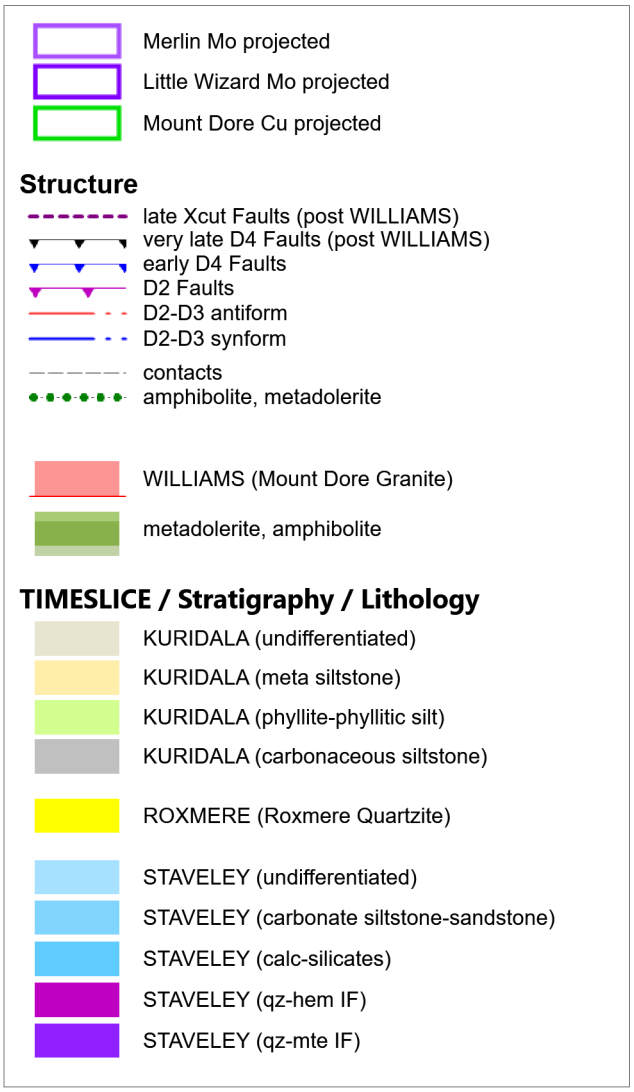
Mt Elliott Auger-80# - AG
(Ag ppm)

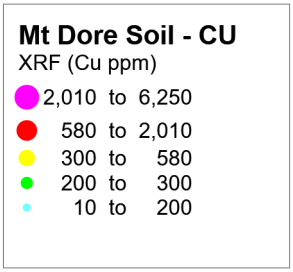
50	to	200
7	to	50
2	to	7
1	to	2
-1	to	1

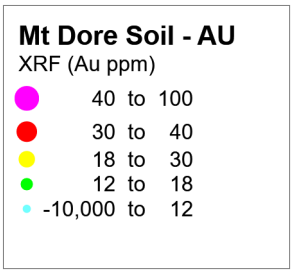
Mt Elliott Auger-80# - CO
(Co ppm)

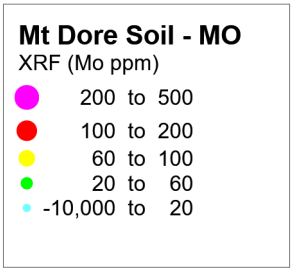
350	to	4,200
120	to	350
80	to	120
50	to	80
0	to	50

Merlin-Mount Dore LEGENDS









Starra LEGENDS

Starra Cu-Au projected
Merlin Mo projected
Little Wizard Mo projected
Mount Dore Cu projected

Structure

late Xcut Faults (post WILLIAMS)
late D4 Faults (post WILLIAMS)
early D4 Faults (syn WILLIAMS)
D2 Faults
D2-D3 antiform
D2-D3 synform
D1 Faults
pre D1 Faults

contacts
bedding trend lines
metamorphic trend lines
amphibolite, metadolerite

Amythest Castle breccia
WILLIAMS (Mount Dore Granite)
metadolerite, amphibolite

TIMESLICE / Stratigraphy / Lithology

NEW HOPE-MT NORNA (New Hope Sandstone)

KURIDALA (undifferentiated)
KURIDALA (meta siltstone)
KURIDALA (phyllite-phyllitic silt)
KURIDALA (carbonaceous siltstone)

ROXMERE (Roxmere Quartzite)

STAVELEY (undifferentiated)
STAVELEY (carbonate siltstone-sandstone)
STAVELEY (calc-silicates)
STAVELEY (chl-mte schist)
STAVELEY (qz-hem IF)
STAVELEY (qz-mte IF)

WONGA (Gin Creek Granite)
DOUBLE CROSSING METAMORPHICS (intruded/hornfelsed)
DOUBLE CROSSING METAMORPHICS (undifferentiated)
DOUBLE CROSSING METAMORPHICS (mica-chl schist)

Starra Line Soil - CU

(Cu ppm)

1,500 to	2,880
800 to	1,500
500 to	700
200 to	500
0 to	200

Starra Line Soil - AU

(Au ppb)

900 to	1,650
100 to	900
50 to	100
25 to	50
0 to	25