THE UNIVERSITY OF QUEENSLAND
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Northwest Mineral Province Deposit Atlas Prototype

Mount Isa Cu-Pb-Zn-Ag and Ernest Henry Cu-Au

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Introduction

This report forms part of the Northwest Mineral Province Geoscience Compilation project within the DNRME Strategic Resources Exploration program. The overall aim of this project is to assemble information relating to all relevant geoscientitic studies of the region and to extract information on the geographic extent, key focus, outcomes and a range of other parameters relating to each study.

The Northwest Queensland Mineral Province has been a strong driver of economic prosperity in Queensland for many years, but many of the important mining and processing facilities in the area are reaching maturity, and there is a need to improve and accelerate the exploration success rate in order to maintain the economic success of the region. As a result of this, the Queensland State Government has decided to fund a new geoscience initiative aimed at providing the knowledge, insights and datasets to drive the next round of discovery and development in the region.

The Mount Isa region is one of the world's best endowed belts of zinc, lead, silver, copper and gold. It hosts a number of world class deposits, and has been intensely explored for the last 50 years or more. Intense exploration over the past several decades has failed to replace the region's world class orebodies, and a continuation of the current exploration trend appears unlikely to produce a better result. The question arising from this situation is - what can be done differently to maximise the chance of making new world-class discoveries in the region?

The Mount Isa region is host to many large deposits of Cu, Pb, Zn, Ag and Au, and there is significant variation between the deposits. Knowledge relating to the geology, mineralogy and geochemistry of each deposit and its associated inner and outer haloes as they are expressed in common exploration datasets can provide important information for assessment of exploration projects in a number of ways including:

- Provision of a basis for assessment of mineral system affinity of a new early stage exploration target
- Provision of assistance in the vectoring of exploration drillholes on the basis of geochemical, geological, and/or mineralogical gradients found to exist in known deposits of similar type.

This report provides draft prototypes of the Northwest Mineral Deposit Atlas for two of the most important mineral deposits in the region: Mount Isa and Ernest Henry. Data has been sourced mainly from pubic domain information, but the generous provision of data and support by Glencore is also gratefully acknowledged

The aim of each atlas prototype has been to provide a compilation of geoscientific information for each deposit, with a focus on:

- Location
- Basic resource and production information;
- Geology of host rocks and alteration;
- Orebody dimensions and geometry;
- Basic structural characteristics and history;
- Characteristics of the inner and outer halo of the deposit in terms of:
    - Extent;
    - Geophysical expression;
    - Explroation geochemistry;
    - Lithogeochemistry; and
    - Mineralogy
- Relative and absolute timing of mineralisation (where possible to determine)

The aim wherever possible is to express these characteristics in a way that can be applied to routinely collected exploration datasets such as widely available geophysical data or commercially available geochemical laboratory suites.

The aim of these atlas prototypes is NOT to extensively revisit and update the well-studied and long-debated process models for each deposit type (summarised for example, in the NWQMEP 2011 report). This is not to say that such process models are not important, as they play an irreplaceable role in the area selection process. As noted by McCuaig et al (2010), as exploration progresses to more detailed scales there is a decrease in the effectiveness of model-based conceptual targeting and an increasing reliance on direct detection, with its associated high high risk of "false positives". The best way to maximise the effectiveness of exploration at this scale is to ensure that exploration is being carried out with the most compreniove knowledge possible of the expression of the outer and inner haloes of the deposit style in question.

The structure of information heading for the atlas entries used as a starting point the structure presented in Meriwa Report Number 193 (Vanderhor and Graves, 1998), which presented summary information on a large number of gold deposits from the Yilgarn Craton of WA. Departures from this structure included more specific sections relating to the inner and outer haloes, as well as a stronger emphasis on the provision of graphical content relating to the expression of the deposits in typical geoscientific datasets.

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