

Exploration Methods Explained: Geological Mapping and Geochemical Surveys

Geological mapping and geochemical surveys are commonly undertaken early in an exploration program. Mineral exploration is undertaken in stages, with each step dependent on the results of the previous stage. This fact sheet explains these exploration methods and equipment, how exploration is regulated, the potential impacts and how these can be managed.

Geological Mapping

Geological mapping is commonly the first mineral exploration method undertaken on the ground. This involves a visit by a geologist to look at rock outcrops and to observe the location, orientation and characteristics of the rocks or sediments exposed at the surface. It may involve vehicle access to a property, taking and recording measurements and walking across the area. It may also involve gathering small samples from rock outcrops, soils or streams for chemical analysis. This information can then be used to prepare a geological map of the exploration area, recording the rock types and structures.



Geological mapping involves geologists observing the location, orientation and characteristics of rock outcrops

Geochemical Surveys

Geochemical surveys are undertaken to target areas for further exploration. The surveys usually involve the collection of soil, rock and/or sediment samples. These samples are sent for laboratory analysis to identify areas of potential mineralisation. The surveys may comprise:

Soil sampling – Hand-held tools such as shovels, picks and hand augers are used to collect samples of soil and subsoil. Samples are typically collected on a regular grid pattern and involve collection of small (approximately one kilogram) samples of soil. Power augers, either hand operated or vehicle-mounted, may be used. Sampling programs undertaken using hand tools are supported by a four-wheel motorbike or vehicle. Holes excavated during the program are typically back-filled and vegetation replaced immediately following sampling.



Soil sampling involves a geologist using hand held tools to collect approximately 1 kg for chemical analysis

Stream sediment sampling – Approximately two kilogram samples of sediment are collected within drainage lines. Three samples are usually taken at the junction of two creeks: one downstream of the junction and two upstream of the junction (in each of the merging drainage lines). Samples are typically extracted using hand tools and may be sieved during collection.

Rock chip sampling – Up to a few kilograms of rock material from outcrops are collected using hand-held tools. Rock chip samples will usually be collected during geological mapping programs.

Channel sampling – A series of samples of soil or rock are collected along the face of the excavation. This may be a road cutting, the face of an open-cut or underground mine, a trench or similar.

Regulation of Geochemical Surveys

Geological mapping and geochemical surveys are strictly regulated in the conditions of all exploration licences. As most geological mapping and geochemical survey work has minimal, if any, surface disturbance, further approvals for this work are only required in sensitive areas. On private land, this work must be covered in an access agreement with the landholder before work begins.

Rehabilitation of Geochemical Surveys

Rehabilitation is a condition of every exploration licence and is undertaken as soon as practical following surface disturbance. Planning for rehabilitation is undertaken before surface disturbance and occurs in consultation with the landholder.

Surface disturbance from most geochemical surveys is minimal and rehabilitation is usually undertaken straight after the survey. Any disturbed soil is replaced and is reseeded and fertilised as appropriate to the surrounding area.

Further information

NSW Trade & Investment – Division of Resources and Energy
www.resources.nsw.gov.au

NSW Minerals Industry Exploration Handbook
www.nswmining.com.au/menu/media/publications

For additional Exploration Fact Sheets, see
www.nswmining.com.au/menu/media/fact-sheets

These descriptions are primarily provided for those who may not be familiar with exploration operations. As a result they are, by their nature, general. The descriptions have been written in consultation with NSW Trade & Investment - Division of Resources and Energy. Our thanks to Malachite Resources Limited, Oakland Resources Limited and Alkane Resources Ltd for contributing photos to this fact sheet.



Stream sampling involves collecting approximately 2kg samples using hand tools



A geologist's tool is the g-pick (geological pick similar to a hammer with a pointed tip)



Rock chip sampling uses a g-pick to collect a few kilograms of rock for analysis



Channel sampling in a trench or costean

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