

The Harlan property: A new sediment-hosted gold discovery in the Selwyn Basin, Yukon

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ABSTRACT

The Harlan property is a significant new sediment-hosted gold prospect within the Selwyn Basin of east-central Yukon Territory. The property has a large, kilometre-scale surface gold-arsenic-antimony-mercury-bismuth anomaly within a thick sequence of Paleozoic Selwyn Basin shelf and off-shelf sedimentary rocks. A series of mid-Cretaceous, late-stage, Tombstone Suite, quartz-feldspar-porphyrific monzonite dykes and small plugs intrude these rocks. Two major mineralized zones have been defined: 1) the Vortex Zone, a thick package of strongly brecciated, silicified, and argillic-altered coarse clastic sedimentary rocks overlain by a thrust-faulted argillite member; and 2) the West Porphyry Zone, consisting of abundant mineralized and altered monzonitic dykes. Surface sampling over the Vortex Zone has defined a north-northwest-trending 1600 m by 700 m zone averaging over 500 ppb gold in soils, with rock sample values up to 6.5 g/t Au. Within this zone, an intensely brecciated area measuring 500 m x 300 m averages greater than 1 g/t Au in soils. A broad anomalous area was identified from surface sampling across the West Porphyry Zone, revealing gold-in-silt values up to 230 ppb and numerous rock chip samples over 1.0 g/t Au. No drilling has been done on the property to date. NovaGold Resources plans to complete detailed surface geological mapping, geochemical sampling, and geophysical surveys to refine drill targets for testing in 2000.

RÉSUMÉ

La propriété Harlan est un nouvel indice aurifère important dans des sédiments du Bassin de Selwyn, dans le centre-est du territoire du Yukon. La propriété contient une vaste anomalie de surface en or, arsenic, antimoine, mercure, et bismuth, d'échelle kilométrique, au sein d'une épaisse succession de roches sédimentaires de plateau et de talus de continental du Paléozoïque du Bassin de Selwyn. Une série de dykes et de petits dômes intrusifs tardifs de monzonite porphyrique à quartz et feldspath, d'âge Crétacé moyen de la Série plutonique de Tombstone, recoupent les roches sédimentaires. Deux zones minéralisées majeures sont reconnues : 1) la zone Vortex, une épaisse séquence de roches sédimentaires clastiques à grains grossiers qui sont fortement bréchiques, silicifiées et altérées (argillique), et qui est chevauchée par un membre d'argilite; et 2) la zone de porphyre ouest, contenant de nombreux dykes de monzonite minéralisés et altérés. L'échantillonnage de surface sur la zone Vortex a permis de définir un corridor d'orientation nord-nord-ouest, long de 1 600 m et large de 700 m, où les sols ont des concentrations moyennes de plus de 500 ppb d'or, et les échantillons de roches titrent jusqu'à 6,5 g/t Au. Au sein de ce corridor, une région fortement bréchique, de 500 m par 300 m, a des concentrations moyennes de plus de 1 g/t Au dans les sols. Une vaste anomalie, identifiée par l'échantillonnage de surface sur la zone de porphyre ouest, révèle des valeurs atteignant 230 ppb Au dans les silts et de nombreux fragments de roches contenant plus de 1,0 g/t Au. Il n'y a pas eu de forage exécuté sur cette propriété jusqu'à ce jour. NovaGold Resources prévoit compléter la cartographie géologique détaillée, l'échantillonnage géochimique, et des relevés de géophysique afin de définir des cibles de forage qui seront examinées au cours de l'année 2000.

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LOCATION AND ACCESS

The Harlan property is 100% owned by NovaGold Resources Inc. It is located 150 km north of the town of Ross River, within the Tintina gold belt of Yukon Territory (Fig. 1). It is centred at 63°14' north latitude, 131°40' west longitude on NTS map sheets 105O/4 and 105O/5. The property consists of 339 Yukon quartz mining claims covering 7098 hectares (17,490 acres). The property, located 35 km southeast of the Plata airstrip, has winter road access from Yukon Highway 6 (the North Canal Road), 60 km to the southeast.

HISTORY AND PREVIOUS WORK

The Harlan project area was first identified by Viceroy Resources Inc. in 1997 during a regional exploration program focussed on bulk tonnage, intrusive-related and sediment-hosted (Carlin-style) gold systems. A thorough GIS database compilation was undertaken of all available regional stream sediment geochemistry, Yukon Minfile occurrences, airborne geophysics, Thematic Mapper Landsat satellite imagery, and published geology for the Selwyn Basin of eastern Yukon

Territory (Schulze, 1998). A multi-factorial prioritization of anomalous geochemistry, geophysics, remote-sensing, and geologic data (Yukon Minfile, 1997, 105J, 105K, 105N, 105O), delineated numerous high-priority reconnaissance level exploration targets. The criteria for prioritization were based on the presence of specific characteristics similar to those found in the Tintina gold belt deposits such as Pogo, Fort Knox, True North, Donlin Creek, and Brewery Creek (Diment, 1997), as well as those for sediment hosted (Carlin-style) gold systems (Poulson, 1996). Using this approach, the Harlan property was acquired based on the return of widespread gold in reconnaissance rock, soil and silt samples (Schulze, 1998). Additional follow-up work was completed during 1998; during 1999 NovaGold Resources acquired 100% interest in the property.

REGIONAL GEOLOGY

The Harlan property is situated within the Selwyn Basin, a broad package of Paleozoic marine sedimentary rocks that extend southeast from the Alaskan border to the Yukon-Northwest Territories border. The project area is located north of the major

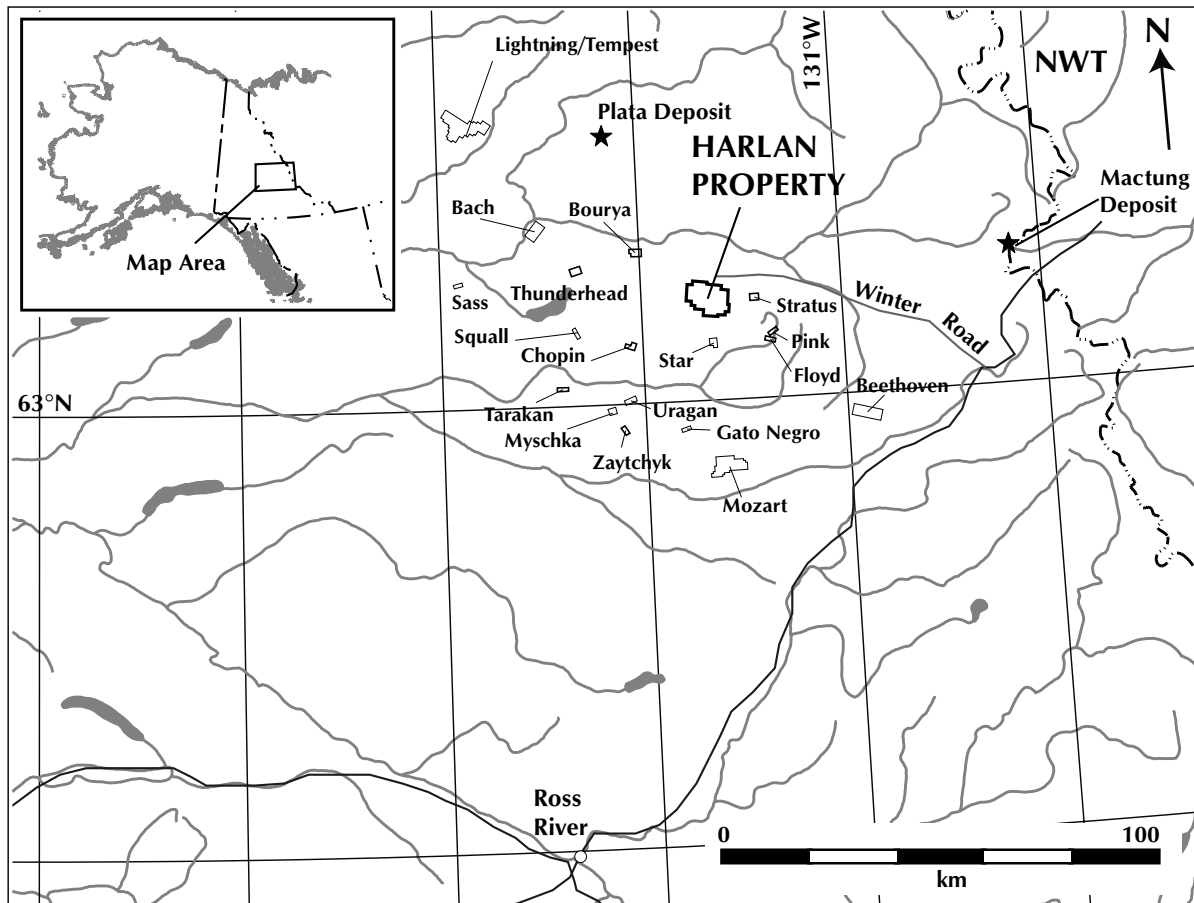


Figure 1. Harlan property location map.

northwest-trending Tintina Fault. The Selwyn Basin consists of shallow-shelf to off-shelf marine clastic and chemical sediments, as well as basinal clastic sediments derived from the ancient North American platform to the northeast (Gordey and Anderson, 1993). Several episodes of basin formation have occurred with deposition of chert and fine clastic sediments, followed by periods of increased erosion resulting in the deposition of sequences of higher energy, coarse-grained, shallow-water sediments (Diment, pers. comm., 1997). Age of deposition ranges from Late Precambrian to Triassic. The Selwyn Basin is comprised of numerous stratigraphic groups, including: Late Precambrian to Early Cambrian Hyland Group, consisting of coarse clastic grits and shales; Ordovician to Early Devonian Road River Group, consisting of chert, shale, and siltstone; and Devono-Mississippian Earn Group, consisting of chert-pebble conglomerate, greywacke and shale (Gordey and Anderson, 1993; Roots et al., 1995).

Sedimentary rocks of the Selwyn Basin have been intruded by the 90 to 110 Ma mid-Cretaceous Tombstone Plutonic Suite, forming a southeast-trending belt of intrusive rocks extending from Alaska to the Yukon-Northwest Territories border (Diment,

1997). These rocks vary in composition from dioritic to granitic, most commonly monzonitic to quartz-monzonitic, with common porphyritic phases. These intrusives are important due to their close association with the formation of numerous gold deposits in the region, most notably the world class Pogo and Fort Knox deposits in Alaska.

In the region of the Harlan property, several west-northwest-trending thrust faults, reactivated as dextral strike-slip faults, have formed a compressional setting of Selwyn Basin stratigraphy (Roots, 1998; Roots, pers. comm., 1998). Such faults are associated with fairly intense, locally overturned folding and comprise a broad deformation belt referred to as the “Gold River Fold Belt” (J.G. Abbott, pers. comm., 1999). Stratigraphy is dominated by a southeast-trending, imbricated assemblage of Earn Group siliclastic rocks with lesser Road River Group chert, siltstone and limestone, as well as Gull Lake Formation siliceous shale and siltstone (Cecile and Abbott, 1992). This stratigraphy occurs within a major northwest-trending regional antiformal structure. Several Tombstone suite quartz-monzonite to syenite stocks intrude this structural zone and occur within 20 km of the property.

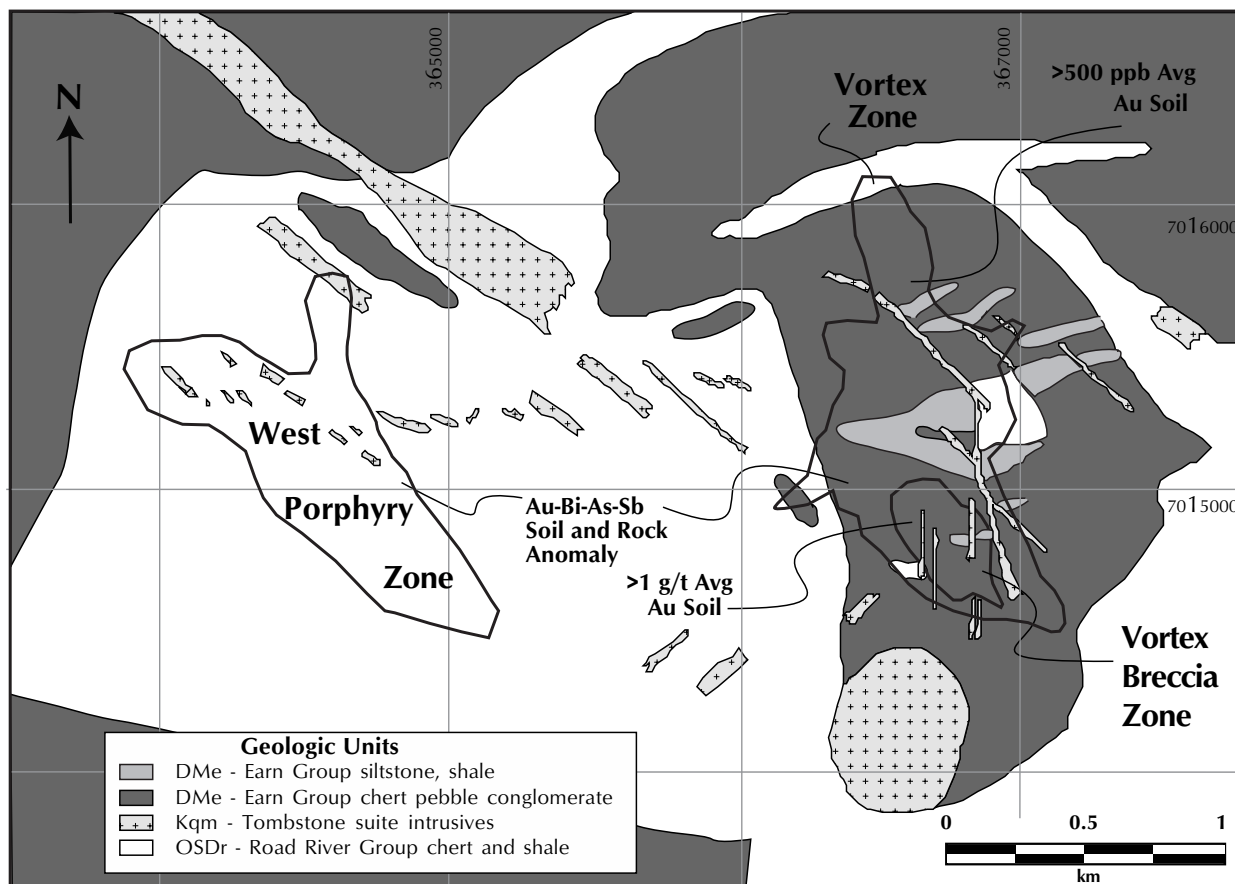


Figure 2. Harlan property geology and geochemical anomaly map.

PROPERTY GEOLOGY AND MINERALIZATION

The Harlan property is underlain by a thick sequence of locally calcareous chert-pebble conglomerate, sandstone and greywacke of the Earn Group; minor shale and siltstone members are present. Several southeast-trending units of Road River Group shale to siltstone, and graphitic argillite units extend across the property and appear to be thrust over locally intensely altered Earn Group rocks (Schulze, 1998). Southeast-trending, moderately south-dipping thrust faults have been mapped within Earn and Road River Group stratigraphy in the area.

An approximately 10 km² area of anomalous surface geochemistry has been identified on the Harlan property. Within this broadly anomalous area, two kilometric-scale target areas have been identified that contain highly anomalous gold, bismuth, arsenic, antimony and mercury in rock and soil geochemical samples (Fig. 2). Follow-up sampling on the central part of the Harlan property has identified a major northwest-trending gold-bismuth-arsenic-antimony-mercury anomaly measuring 1600 m by 700 m that averages over 500 ppb gold in soil; this area is known as the Vortex Zone. Rock samples within this zone contain values up to 6.5 g/t Au. Within this area is an intensely brecciated and clay-altered zone measuring 500 m by 300 m that contains gold-in-soil values up to 10.4 g/t Au and averages over 1 g/t Au in soil. Rocks within the breccia zone contain both altered dyke and sedimentary clasts and are highly anomalous in gold, arsenic, and mercury.

Mineralization within the Vortex Zone is associated with intense advanced argillic alteration and silicification with multi-episodic quartz stockwork and veining, and brecciation of locally calcareous chert-pebble conglomerate, greywacke, siltstone, and shale (Schulze, 1998). This sedimentary sequence has been intruded by a series of altered Tombstone suite porphyritic monzonite dykes and sills. Numerous north-, northwest-, and northeast-oriented structural zones are evident within the sedimentary sequence. These structures appear to have controlled the emplacement of small intrusive dykes and sills and were an important focus for later gold mineralization.

A second kilometric-scale target area, the West Porphyry Zone, occurs one kilometre west of the western limit of surface exposure of the Vortex Zone. The West Porphyry Zone, measuring 1500 m by 500 m, is a broad geochemically anomalous area defined by surface sampling containing values up to 2.5 g/t Au from rock chip sampling and stream silts up to 230 ppb Au. Channel sampling of abundant mineralized northwest-trending Tombstone suite porphyritic dykes returned values of slightly less than 1 g/t Au over 20.8 m (Schulze, 1998). A second dyke returned gold values exceeding 1 g/t Au over 8 m. Due to the widely spaced traverses and preliminary nature of exploration, all of the anomalous zones are open and expandable.

CONCLUSION

Favourable structural and stratigraphic settings, combined with the widespread nature of gold mineralization, indicate that the Harlan property has excellent potential to host a new style of bulk-tonnage, intrusive-related/sediment-hosted gold deposit within the Tintina gold belt. The Vortex and West Porphyry zones, both hosting kilometric-scale gold, bismuth, arsenic, antimony and mercury anomalies on the Harlan property are significant new exploration targets. NovaGold Resources plans to complete detailed surface geological mapping, geochemical sampling, and geophysical surveys in preparation for the first planned drilling program scheduled for the 2000 field season.

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