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**SUMMARY REPORT ON THE  
1989 EXPLORATION PROGRAM  
ON THE GNAT PASS PROPERTY**

Liard Mining Division, British Columbia

**Location:**

1. 24 km south of Dease Lake, B.C.
2. NTS Sheet 104 I5/W
3. Latitude 58° 15'N  
Longitude 129° 50'W

**For:**

**Integrated Resources Ltd.**  
700 Toronto Dominion Tower  
Edmonton Center, 10205-101 Street  
Edmonton, Alberta  
T5J 2Z1

**By:**

Gregory Smith, B.Sc. and  
Tom Garagan, B.Sc., FGAC, P.Geol.  
**Aurum Geological Consultants Inc.**  
412-675 West Hastings Street  
Vancouver, British Columbia  
V6B 1N2

July 12, 1990

## SUMMARY

Integrated Resources Ltd.'s Gnat Pass property consists of eight contiguous two-post mineral claims located near Dease Lake, British Columbia. It is accessible by road via the Stewart-Cassiar Highway. The ground became an attractive exploration target in the early 1960's with the discovery of low grade copper mineralization on surface. Extensive diamond drilling completed in 1967 and 1968 outlined drill indicated reserves of 25,000,000 metric tonnes of 0.44% copper.

Volcanic and sedimentary rocks of the Stuhini Group underlie most of the property. The Upper Triassic to Lower Jurassic Hotailuh Batholith lies adjacent the property to the south. A quartz feldspar porphyry plug, assumed to be related to the Batholith, has intruded the stratified rocks. Disseminated and fracture controlled chalcopyrite mineralization and associated quartz/sericite alteration is present in the porphyry plug and adjacent volcanic units.

The current work program consisted of partial grid re-establishment, bulldozer trenching and diamond drilling of eight NQ holes totalling 3070 feet (935.7 meters). Results of the work have confirmed previously reported copper grades averaging 0.4%, tested surface geochemical and geophysical targets outlined in the 1960's, and determined the level of gold associated with copper mineralization in the area tested.

The gold potential of the deposit has not been adequately evaluated. A program consisting of data compilation, resampling of the old core and gold analysis is warranted and recommended. Further work would be contingent on successful results of the above work.

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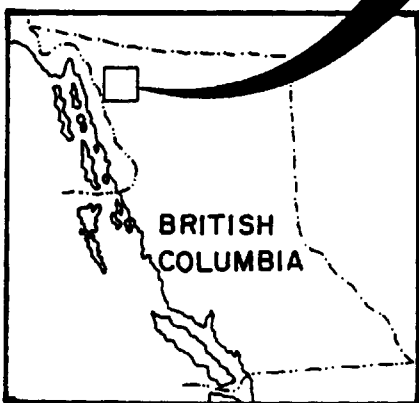
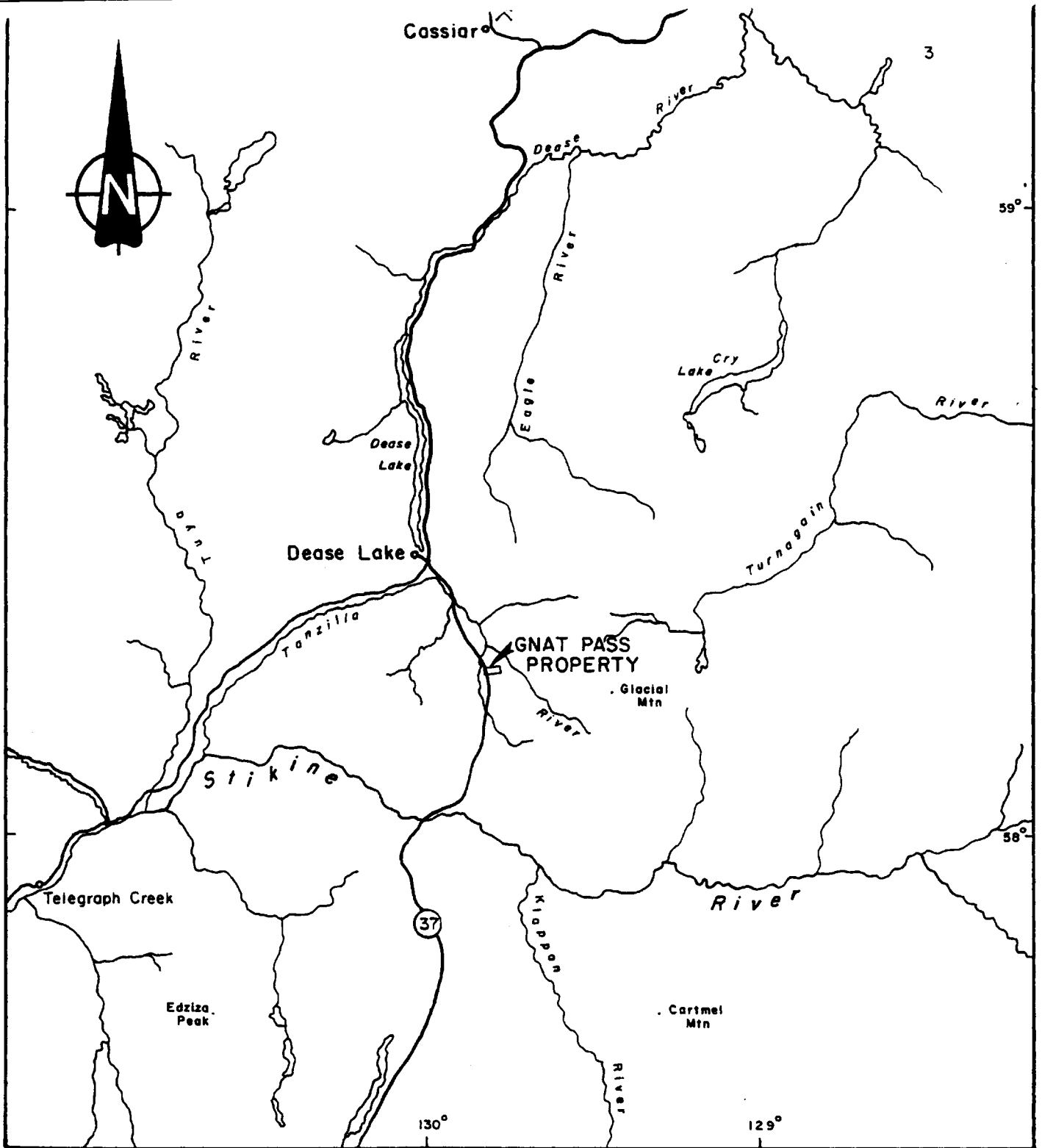
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## INTRODUCTION

This report was prepared at the request of Integrated Resources Ltd. It describes the exploration program carried out on the company's Gnat Pass property between September 10 and October 10, 1989.

Exploration in 1989 focused on the determination of precious metal values associated with known porphyry copper mineralization. Work consisted of partial grid re-establishment, bulldozer trenching and diamond drilling of eight NQ holes totalling 3070 feet (935.7 meters). No attempt was made to compile previous work.

Field work was supervised by Greg Smith of Aurum Geological Consultants Inc. with project supervision by Tom Garagan (also of Aurum) who visited the property twice during the exploration. Drilling was performed by Interex Minerals Ltd. of Vancouver, British Columbia utilizing a Longyear 38 diamond drill.



INTEGRATED RESOURCES LTD.			
GNAT PASS PROPERTY			
LOCATION MAP			
AURUM GEOLOGICAL CONSULTANTS INC.		JUNE, 1990	
NTS 1041/5	Drawn by GS	Scale 1:1000000	Figure 1



## HISTORY

The first record of exploration on ground now covered by the Gnat Pass property was in 1960 when Cassiar Asbestos Corporation discovered low grade copper mineralization by prospecting. In 1964 Newconex Canadian Explorations carried out work on the same ground. Lytton Minerals Ltd. performed extensive geophysical and geochemical surveying in 1965 in the area. At that time the property consisted of the June 1-12, Stikine 1-20, September 1-35, and July 1-5 mineral claims. The claims were transferred to Deas Lake Mining prior to 1966 when they carried out additional geochemical and geophysical surveying as well as trenching and drilling of 55 holes totaling 30,936 feet (9,429 meters). Additional drilling was completed the following year (Jeffery, 1966 and Clarke, 1967).

During the late 1960's Hudson's Bay Mining and Smelting (H.B.M. & S.) was involved in the exploration of Gnat Pass. Barr, D.A. et al, 1976, list H.B.M. & S. as the owner of the Gnat Pass deposit and unpublished reports state that they returned in the 1970's to resample selected sections of core. No documentation has been obtained to further enhance the understanding of H.B.M. & S. involvement.

A total of 57,035 feet (17,384 meters) of diamond drill core in 102 holes was drilled in the 1960's (Panteleyev, 1977). Drilling concentrated on the Hill Zone, an area containing copper mineralization exposed on surface. Current drill-inferred reserves are reported to be 25,000,000 metric tonnes of 0.44% copper with an undetermined gold content (Barr et al., 1974).

The Troy 1-8 claims were staked by John Hope (President of Integrated Resources) on July 29, 1986 to cover the previously discovered Creek and Hill Zones. Integrated Resources Inc. completed eight diamond drill holes totalling 3070 feet (935.7 meters) during the period September 10 to October 10, 1989. The drilling attempted to test the precious metal content of previously explored copper mineralization at the Hill Zone and to explore previously outlined soil geochemical anomalies over the Creek Zone. The property was optioned by Integrated Resources Inc. on November 15, 1989.



## GEOLOGY

### Regional Geology

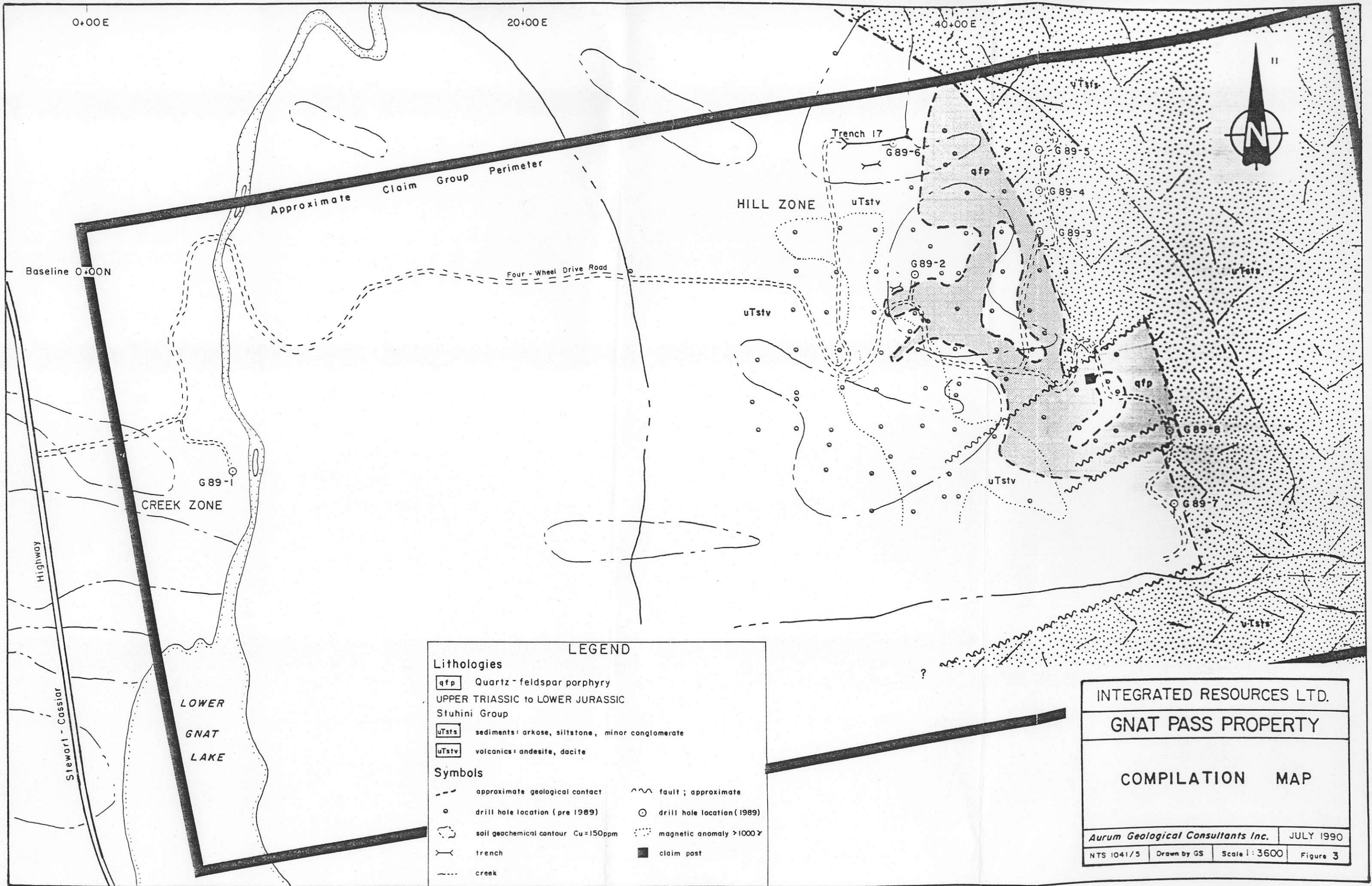
The Gnat Pass property is situated within the Intermontane Belt; a relatively low trough underlain mainly by Mesozoic sedimentary and volcanic rocks. This belt is bounded to the east by the Omineca Crystalline Belt and to the west lies the Coast Plutonic Complex.

Directly south of the property is the Upper Triassic to Lower Jurassic Hotailuh batholith. This batholith was emplaced along the Stikine Arch, an easterly-trending zone of Permian to mid-Triassic deformation, plutonism and metamorphism. The King Salmon Fault, which forms the border between the Intermontane Belt and the Hinterland Belt, is located 15 kilometers (9 miles) north of the property. The geology of the area has been described by Monger and Thorstad (1978), Anderson (1978, 1980), and Gabrielse (1962, 1976).

The Hotailuh batholith is a multiphase granitoid intrusion emplaced between the Late Triassic and Middle Jurassic. The phases include massive, locally foliated hornblende granodiorite, syenodiorite, granite, quartz monzonite, hornblende diorite, and gabbro. Age dates for the different phases vary between 139 +/-6 million years and 213 +/-11 million years (Wanless et al., 1972). Younger phases of the batholith intrude the Upper Triassic to Lower Jurassic Stuhini group volcanics and sediments, however basal conglomerates and flows contain boulders of earlier phases.

In the Gnat Pass area the Stuhini group rocks consist of a lower unit of interlayered volcanoclastics, greywacke, siltstone and conglomerate. The volcanoclastics and sediments are overlain by massive fine grained feldspar porphyry flows of intermediate composition, with minor interlayered crystal lithic tuffs, and felsic flows. The Stuhini Group rocks dip away from the batholith uniformly at 35 to 45 degrees.

Structure in the area is dominated by large north - south trending faults (Jeffery, 1966). The age and relative movement of these faults is unknown.



**LEGEND**

<b>Lithologies</b>	
qfp	Quartz-feldspar porphyry
UPPER TRIASSIC to LOWER JURASSIC	
Stuhini Group	
uTsts	sediments: arkose, siltstone, minor conglomerate
uTstv	volcanics: andesite, dacite
<b>Symbols</b>	
---	approximate geological contact
o	drill hole location (pre 1989)
o with dot	soil geochemical contour Cu=150ppm
- - -	trench
---	creek
~	fault; approximate
o with circle	drill hole location (1989)
o with star	magnetic anomaly >1000γ
■	claim post

INTEGRATED RESOURCES LTD.	
GNAT PASS PROPERTY	
COMPILATION MAP	
Aurum Geological Consultants Inc.	JULY 1990
NTS 1041/5	Drawn by GS
Scale 1:3600	Figure 3

## Mineralization and Alteration

Copper mineralization and related alteration on the Gnat Pass property is hosted within a quartz-feldspar porphyry plug and the surrounding Stuhini volcanics.

Two zones of mineralization are defined on the Gnat Pass property. The Hill zone is an area of both surface and sub-surface copper mineralization which has been extensively drill-tested and contains all of the reported reserves. The Creek zone contains similar mineralized float and copper soil geochemical anomalies but has received little exploration.

Chalcopyrite is the dominant copper mineral present at Gnat Pass. Visual estimates range from <0.1 to 2 percent with significant changes in copper content over tens of centimeters. Chalcopyrite is found as finely disseminated blebs and fracture fillings in altered rock. Tourmaline veins locally contain up to 20% chalcopyrite. Minor pyrite is associated with copper mineralization as finely disseminated euhedral cubes. Trace magnetite, bornite, cuprite, pyrrhotite and possibly native copper are also present.

Large tourmaline/magnetite/chalcopyrite rich silicified andesite boulders were sampled at various locations on surface. These samples contain significant amounts of copper and gold, most notably; grab sample R-51-01 with 19934 ppm Cu and 354 ppb Au, and grab sample R-51-05 which returned 2.78% Cu and 368 ppb Au. According to Sillitoe (1979) gold mineralization in copper/gold porphyry deposits tends to occur in distinct zones, often related to magnetic anomalies. Ground magnetic response, in work performed in the 1960's, suggests the presence of a magnetite enriched zone within the area of known copper mineralization at the Hill Zone.

Late stage calcite (+/- minor quartz) veinlets cross-cut all previously discussed alteration and mineralization throughout the core. Individual veinlets range up to 5 centimeters in width but average 1 millimeter and are dominantly oriented at 10° to 15° to the core axis of vertical holes. Veinlets locally form a stockwork cementing brecciated fragments of altered host rock. Calcite is often associated with clay alteration and clay-coated slickensided fractures. Trace chalcopyrite and pyrite are present as isolated blebs within these veinlets.

The predominant alteration within both the porphyry and the volcanic rocks is pervasive silicification and sericitization/chloritization resulting in a fine-grained light grey-green massive rock. Phenocrysts have been completely replaced by fine grained quartz or albite. These rocks are locally brecciated with angular fragments, averaging 1 cm in diameter, cemented by a stockwork of tourmaline. Tourmaline veining is up to 20% of the rock. Potassium feldspar alteration is sporadic, most often as halos of fresh pink-orange feldspar adjacent to tourmaline filled fractures. Dominant core angle in vertical holes of mineralized fractures is 40 - 45 with an average width of 1 millimeter.

No alteration or mineralization zoning could be identified from the drill holes completed in 1989.

## EXPLORATION

### Diamond Drilling

A total of 3070 feet (935.7 meters) of diamond core drilling in eight NQ holes (Table 1.) was completed on the Gnat Pass property during the period September 10 to October 10, 1989. The drilling was designed to: 1. test known copper mineralization 2. determine precious metal content, and 3. explore previously outlined copper soil geochemical anomalies at the Creek Zone.

Entire core lengths were placed in core boxes and logged for lithology, structure, mineralization and competency. All core, with the exception of unmineralized sediments in hole G-89-7, was split, sampled and analyzed for total Au, Ag, and Cu by Bondar-Clegg and Company Ltd. of North Vancouver, B.C. Gold analyses were by fire-assay techniques using an atomic absorption finish. A one assay-ton sample was used. Total silver and copper were determined using hot HNO<sub>3</sub>-HCl extracting solutions and atomic absorption.

Significant copper mineralization was intersected in five of the eight holes drilled in 1989, all within the Hill zone. Hole G-89-1, drilled at the Creek zone, failed to penetrate overburden, hole G-89-5 was lost in unmineralized sediments and hole G-89-7 intersected unmineralized sediments. Limits of known mineralization were extended to the north and drilling within the deposit confirmed reported copper grades of 0.4 %. Values ranged up to 9863 ppm copper and 208 ppb gold over five feet.

Analytical reports and drill logs are presented in Appendix A and B respectively. Four drill sections (0+00N, 6+00N, 44+25E, and 52+00E) are included as figures 4, 5, 6, and 7 respectively in the pocket of this report. Drill log summaries are presented in Table 2.

## CONCLUSIONS AND RECOMMENDATIONS

The Gnat Pass property is underlain by Upper Triassic to Lower Jurassic volcanics and sediments intruded by a quartz feldspar porphyry of uncertain age but assumed to be related to the nearby time equivalent Hotailuh batholith.

Previous work has outlined a porphyry copper deposit with drill-indicated reserves of 25,000,000 metric tonnes of 0.44% copper. Prior to the current program the ground was not extensively explored for gold.

The 1989 exploration program:

1. confirmed the copper grades of previous drilling
2. did not intersect significant gold mineralization, however grab samples on surface contained up to 368 ppb
3. was unsuccessful in reaching bedrock within the Creek zone copper soil anomaly
4. extended the area of copper mineralization to the north

The 1989 diamond drilling did not sufficiently test the gold potential of the Gnat Pass deposit. Gold mineralization within porphyry copper-gold systems tends to occur in distinct zones, often related to magnetic anomalies. Large areas of the deposit, including an area with anomalous magnetic response, remain untested.

The following program is recommended:

1. Compilation of all available data relating to the property with specific emphasis on the geology and geochemistry of previous drill core.
2. Relogging, resampling and gold analysis of all suitable old drill core currently on site (estimated to be 60 to 75 % of total core drilled).
3. Should the above program be successful in outlining a gold enriched zone, further exploration consisting of geophysics, soil geochemical surveying and diamond drilling would be warranted and recommended.

This one phase program is estimated to cost approximately \$60,000.



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