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# (9) GEOLOGY AND MINERALIZATION OF WESTERN OXFORD LAKE AND CARROT RIVER

## (53L-13; 63I-16S, 9N)

*By R. A. Haskins and J. F. Stephenson*

The season's activities were in the Western Oxford Lake and Carrot River areas. The base and precious metal potential of the region was investigated and detailed mapping of the Lynx Bay-Hyers Island area was undertaken to define the relationships of the intrusive rocks, the volcanic rocks, and the hydrothermal mineralization in the area. Most investigations were confined to the area recently withdrawn from claim holding. Mapping in the Lynx Bay area, with more intense coverage of the batholithic complex, has resulted in a better understanding of the batholithic and volcanic suites. Diamond drilling was carried out on mineral showings which appear to have the highest potential, notably the stibnite and copper-zinc deposits at the east end of Hyers Island and an extensive sulphide conductor at the west end of the Carrot River. Five holes drilled in four locations totalled 399 feet (122 m). Thirty-six assays for Au, Ag, Cu, Zn (Ni, Mo, Sb in some) were carried out on samples from the showings examined and 30 on the drill core obtained from the four drill sites.

Two porphyry copper type bodies, containing subeconomic quantities of copper and molybdenum, were discovered on Lynx Bay and to the northwest of the bay. This form of mineralization had been predicted on the basis of the geological environment determined through mapping by previous survey personnel in the area (Elbers, 1973 and Hubregtse, 1973). The area has also been investigated and mapped by Campbell, Elbers and Gilbert (1971); Scoates (1971); Bell (1962); Barry (1960); and Wright (1931).

### Batholithic complex

The Lynx Bay region is underlain by a tonalite batholithic complex of calc-alkaline affinity. To the south of Lynx Bay, the batholith comprises gneissic tonalite and adjoins massive equigranular tonalite to the north. Separation between the two textural types lies approximately east-west along north latitude 54°44'32". This boundary can be traced inland to the west of Lynx Bay for at least 9 miles (14.5 km). The massive tonalite is porphyritic along its margins with the Lynx Bay dacitic volcanic rocks and their derived sedimentary rocks, and along its margin on the south shore of the Carrot River. Dacitic volcanic rocks occur 10 km west of Lynx Bay and are surrounded by plutonic phases of the batholith. The volcanics center on north latitude 54°45'27" and west longitude 96°12'00" and correspond to an elliptical magnetic high.

A small complex of peridotite and dunite intrudes the gneissic tonalites in the southeast of Lynx Bay.

Several trondhjemite bodies intrude both gneissic and massive phases of the tonalite suite. In the Lynx Bay area, the trondhjemites have caused extensive hydrothermal alteration and chalcopyrite-molybdenite mineralization of the porphyry copper variety (see Figure 9-1).

### Porphyry copper mineralization

Two zones of porphyry copper mineralization were found. Both carry chalcopyrite and minor molybdenite. Both are elliptical in shape and form the core of trondhjemite stocks that intrude the massive tonalites.

One body is located on the northwest side of Lynx Bay (18-74-459) (see Table 9-1 and Figure 9-1). The core zone is 200 feet by 500 feet (60 m by 152 m) from the shore inland, but is obscured by overburden to the west and northwest. This zone contains a closely spaced fracture system that strikes north and dips shallowly to the west. The fractures are filled with chlorite and chalcopyrite, and in places, with minor molydenite. This core zone is surrounded by a halo of epidote-chlorite-pyrite alteration, which is at least 2,000 feet (610 m) wide and affects both the trondhjemites and the surrounding tonalites. Within this alteration halo the plagioclase has been destroyed by saussuritization. The true dimensions of the halo are not known as it enters a large muskeg bog to the west and north.

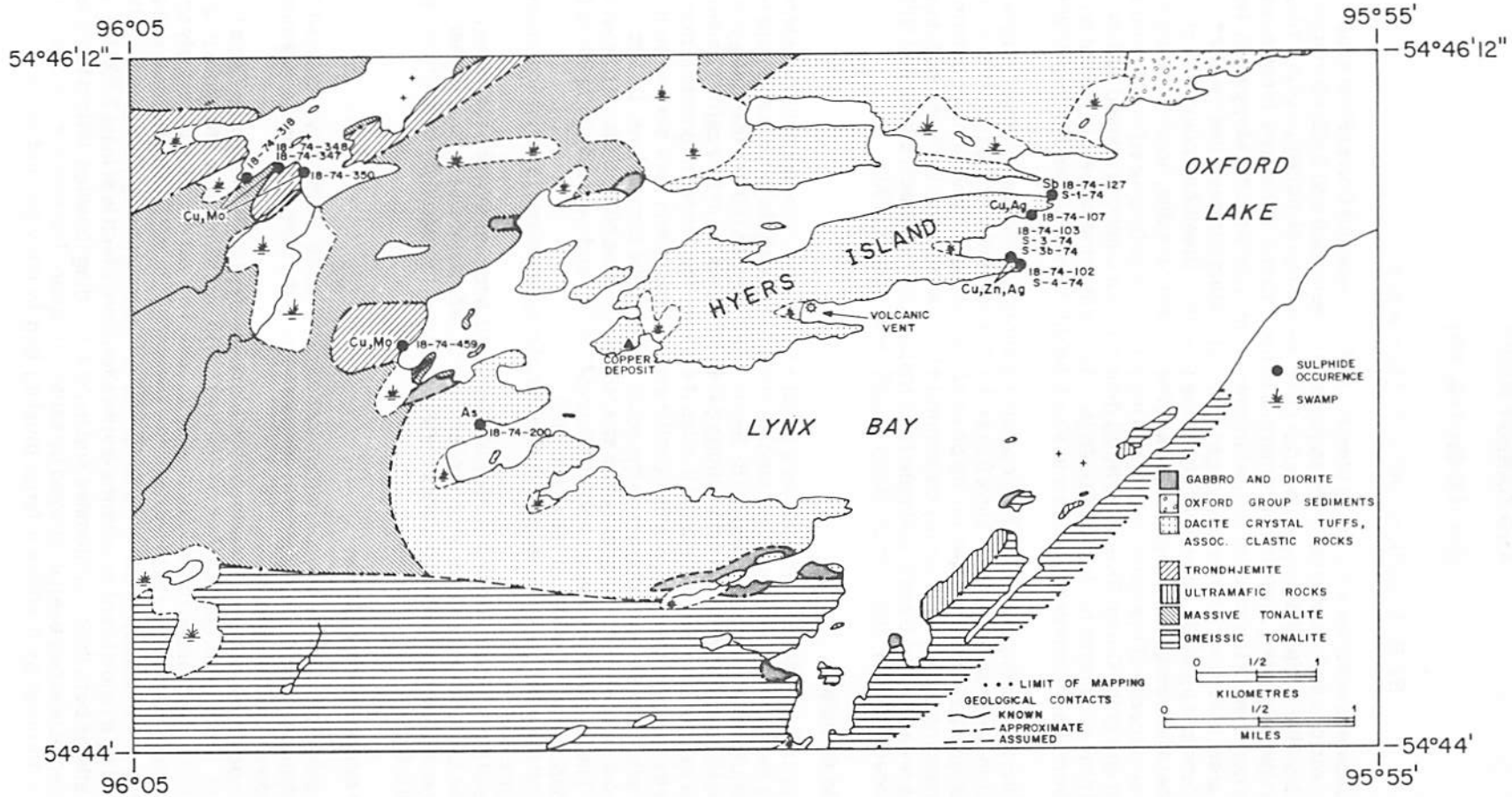


**Figure 9-1 General geology of Lynx Bay area, western Oxford Lake, showing sulphide occurrences and diamond drill locations. Geology modified from Hubregtse (1973).**

## Table 9-1. Assays to Hyers Island-Lynx Bay showings

| Sample Number | UTM Northing | UTM Easting | Mineralization | Host Rock | Assay lab Number | Assay Results† oz/ton Au | oz/ton Ag | Per cent Cu | Per cent Zn | Per cent Mo | Per cent Sb |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 18-74-102 | 6073390 | 309330 | Pyrite Chalcopyrite Sphalerite | Quartz vein in sheared agglomerate | M6275 | 0.11 | 6.7 | 2.46 | | | |
| | | | | | M6297 | 0.04 | 1.30 | 0.47 | | | |
| | | | | | M6298 | 0.01 | 0.50 | 0.06 | | | |
| | | | | | Average | 0.05 | 2.83 | 1.00 | | | |
| 18-74-103 | 6073430 | 309300 | Pyrite Chalcopyrite Sphalerite | Quartz vein in sheared agglomerate | M6299 | 0.01 | 0.45 | 0.34 | | | |
| 18-74-107 | 6073750 | 309430 | Chalcopyrite Pyrite | Quartz carbonate vein in sheared dacite crystal tuff | M6365 | 0.04 | 0.5 | 1.50 | | | |
| 18-74-127 (5)* | 6073880 | 309590 | Stibnite Pyrite | Quartz carbonate vein in sheared dacite crystal tuff | M6288 | 0.01 | 0.6 | Tr. | | | 2.45 |
| | | | | | M6289 | Tr. | Nil | Tr. | | | 4.4 |
| | | | | | M6290 | Tr. | 0.8 | Tr. | | | 3.1 |
| | | | | | M6291 | Tr. | Nil | Tr. | | | 1.2 |
| | | | | | M6292 | Tr. | 0.10 | Tr. | | | 2.7 |
| | | | | | M6293 | Tr. | Nil | 0.02 | | | 6.15 |
| | | | | | Average | Tr. | 0.4 | 0.003 | | | 3.33 |
| 18-74-200 | 6071852 | 290850 | Arsenopyrite Pyrite | Sheared dacite crystal tuffs and agglomerate | M6294 | 0.05 | 0.10 | | | | |
| | | | | | M6295 | 0.03 | Tr. | | | | |
| | | | | | M6296 | Tr. | Tr. | | | | |
| | | | | | Average | 0.025 | 0.03 | | | | |
| 18-74-318 | 6073800 | 288690 | Chalcopyrite Molybdenite Pyrite | Sheared tonalite adjacent to fractured porphyritic trondhjemite | M6306 | Nil | Tr. | 0.02 | Tr. | Tr. | |
| | | | | | M6307 | Nil | Nil | 0.03 | Tr. | Tr. | |
| | | | | | M6314 | Nil | Nil | 0.02 | | Nil | |
| | | | | | M6315 | Nil | Nil | 0.02 | | Nil | |
| | | | | | Average | Nil | Nil | 0.02 | Tr. | Tr. | |
| 18-74-347 | 6073950 | 289000 | Chalcopyrite Molybdenite Pyrite | Fractured porphyritic trondhjemite | M6323 | Tr. | Nil | 0.02 | | Nil | |
| 18-74-348 | 6073950 | 288950 | | | M6324 | Tr. | 0.10 | 0.15 | | Tr. | |
| 18-74-350 | 6073860 | 288925 | | | M6325 | Nil | Nil | 0.02 | | Tr. | |
| 18-74-459 | 6072490 | 290125 | Chalcopyrite Molybdenite Pyrite | Fractured porphyritic trondhjemite | M6362 | Nil | Nil | 0.18 | | Nil | |
| | | | | | M6363 | Nil | Nil | 0.25 | | Tr. | |
| | | | | | M6364 | Nil | Nil | 0.15 | | Nil | |
| | | | | | Average | Nil | Nil | 0.19 | | Tr. | |

*Barry, G. S. (1960): "Geology of the Western Oxford Lake-Carghill Island Area"; Man. Mines Br., Publ. 59-2,pp. 34-35.
†Tr. ≤ 0.005%

Another porphyry copper body is located on the west and south shore of a lake 6,000 feet (1.89 km) north-northwest of the first porphyry copper body (18-74-318, -347, -348, -350)) (see Figure 9-1 and Table 9-1). This is a narrow elliptically shaped body that trends east-northeast and has two core zones, one at each end of its exposed length. The body is a trondhjemite intruding tonalite. Its dimensions are at least 6,000 feet by 1,000 feet (1820 m by 310 m). Its possible extension to the east is concealed by overburden. The western core zone contains fracture controlled chalcopyrite mineralization with some minor molybdenite. This mineralization extends outward into the tonalites as well. The size of this core zone is 600 feet by 200 feet (182 m by 61 m). The two core zones are possibly continuous beneath the lake. The limits of the alteration halo which surround the core zones are not fully defined at present. However the known extent of the halo corresponds to the outline of the trondhjemite. This alteration halo also contains epidote-chlorite and in places pyrite, thereby closely resembling the Lynx Bay body.

**Lynx Bay-Hyers Island mineralization**

The Lynx Bay-Hyers Island area of Western Oxford Lake was the major focus of activitiy for the 1974 field season. Mineral assessment work was carried out on known deposits on Hyers Island and other showings were examined in the Lynx Bay region. The Lynx Bay area is underlain by dacitic volcanic rocks of calc-alkaline affinity with associated locally derived volcanic sediments. Because it was a center of intense volcanism, it was also a center of intense hydrothermal activity in the form of hydrothermal veins. The veins are of two types. The earliest are quartz-carbonate-chlorite veins that contain pyrite. On the former New Falu claim, stibnite also occurs in this type of vein as shown by antimony values (18-74-127) (S-1-74). These veins have intense alteration halos in their wall rocks. The alteration sequence from the vein outwards is chloritization, silicification, bleached zone, and carbonatization of the host rocks. The second type of vein is a quartz sulphide vein which contains pyrite, chalcopyrite, and sphalerite, and give copper, zinc and silver values (18-74-102, -103, -107) (S-3-74, S-3B-74, S-4-74). These occur on the former Mora claim on Hyers Island.

The largest and most attractive veins occur in shear zones that trend 090 degrees to 110 degrees and dip vertically. All veins were sampled and assayed (18-74-102, -103, -107, -127) and the results are given in Tables 9-1 and 9-2. Two veins in the former Mora claim on the southeast peninsula of Hyers Island (18-74-102, -103) were drilled with a portable Winkle diamond drill, hole numbers S-3-74, S-3B-74, S-4-74 (see Figure 9-2). The mineralized sections of the core, which occur in quartz sulphide veins, were assayed and the results are given in Table 9-2 (see Figure 9-3). A diamond drill hole was put down on the former New Falu claim on the northeast peninsula of Hyers Island, hole number S-1-74 (see Figure 9-4). The mineralized sections were assayed and the results given in Table 9-2 (see Figure 9-5). The surface assays (18-74-127) are given in Table 9-1. Disseminated stibnite was observed in much of the core, and several stibnite stringers associated with small quartz-carbonate-chlorite veins were intersected in the lower portions of the hole.

Gossans and rust zones that occur in sheared dacites along the north shore of Lynx Bay were sampled and assayed but the results were negative. The pyrite-bearing talc-sericite schists contain only traces of copper, gold and silver.

Noranda Exploration Limited is investigating a small copper deposit at the southwest end of Hyers Island. The mineralized zone is a pipe-like body, 165 feet by 108 feet (50 m by 33 m) in diameter, plunging to the northwest at a steep angle. Estimates from extensive earlier drilling indicate that the chalcopyrite-pyrite body contains 400,000 tons of 2.56 per cent copper.

An arsenopyrite showing in a shear zone in southwest Lynx Bay (18-74-200) was sampled and assayed. The results are given in Table 9-1. The arsenopyrite is coarsely crystalline and randomly oriented in the shear zone. The shear zone cuts through agglomerate and dacitic volcanic rocks.

**Carrot River mineralization**

The Carrot River region was examined and evaluated for base and precious metal deposits (see Figure 9-6). Barry's (1960) showings were examined and sampled for assay, the results are given in Table 9-3.

## Table 9-2. Assay results of diamond drill core from Hyers Island, Western Oxford Lake

| Station No.: 18-74-127 | Core Sample No. | Assayed footage | | | oz/ton | | Per cent | | | Combined assay footages (including non-assayed intervals) | | | | Averaged assay values | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | Total intersection | | oz/ton | | Per cent | | |
| | | From | To | Inter-section | Au | Ag | Cu | Zn | Sb | From | To | Apparent | True* | Au | Ag | Cu | Zn | Sb |
| DDH No.: S-1-74 | S-1-74-1 | 56'4" | 58'9" | 2'5" | Nil | Nil | 0.02 | | 2.90 | 56'4" | 63'6" | 7'2" | 5'1" | Nil | Nil | 0.007 | | 1.40 |
| UTM: 309590E, 6073880N | S-1-74-2 | 61'4" | 63'6" | 2'2" | Tr.† | Tr. | 0.25 | | 1.40 | | | | | | | | | |
| | S-1-74-3 | 76'0" | 78'3" | 2'3" | Tr. | Tr. | 0.01 | | 0.45 | 76'0" | 88'6" | 12'6" | 12'6" | Tr. | Tr. | 0.006 | | 0.25 |
| Azimuth: 355° | S-1-74-4 | 85'2" | 88'6" | 3'4" | Tr. | Tr. | 0.15 | | 0.65 | | | | | | | | | |
| Angle: 45° | | | | | | | | | | | | | | | | | | |
| Length: 125'10" | | | | | | | | | | | | | | | | | | |
| Station No.: 18-74-103 | S-3-74-1 | 5'6" | 7'1" | 1'7" | Tr. | 0.7 | 1.02 | 3.46 | | 5'6" | 15'10" | 10'4" | 1'6" | 0.002 | 0.27 | 0.33 | 0.57 | |
| DDH No.: S-3-74 | S-3-74-2 | 11'1" | 13'0" | 1'11" | 0.01 | 0.9 | 0.62 | 0.14 | | | | | | | | | | |
| UTM: 309300E, 6073430N | S-3-74-3 | 14'2" | 15'10" | 1'8" | Nil | Nil | 0.32 | 0.09 | | | | | | | | | | |
| Azimuth: 245° | | | | | | | | | | | | | | | | | | |
| Angle: 60° | | | | | | | | | | | | | | | | | | |
| Length: 39' 10" | | | | | | | | | | | | | | | | | | |
| Station No.: 18-74-103 | S-3B-74-1 | 2'7" | 8'9" | 6'2" | 0.01 | 0.3 | 0.46 | 0.03 | | 2'7" | 12'0" | 9'5" | 5'5" | 0.008 | 0.25 | 0.44 | 0.10 | |
| DDH No.: S-3B-74 | S-3B-74-2 | 10'0" | 11'4" | 1'4" | 0.01 | 0.4 | 1.04 | 0.60 | | | | | | | | | | |
| UTM: 309300E, 6073430N | S-3B-74-3 | 12'4" | 12'11" | 0'7" | Tr. | 0.5 | 0.10 | 0.15 | | 12'0" | 20'0" | 8'0" | 4'0" | 0.007 | 0.17 | 0.12 | 0.16 | |
| | S-3B-74-4 | 14'10" | 16'1" | 1'3" | 0.01 | 0.3 | 0.21 | 0.23 | | | | | | | | | | |
| Azimuth: 205° | S-3B-74-5 | 16'9" | 17'3" | 0'6" | Tr. | 0.2 | 0.17 | 0.02 | | | | | | | | | | |
| Angle: 60° | S-3B-74-6 | 18'5" | 19'4" | 0'11" | Tr. | 0.2 | 0.08 | 0.05 | | | | | | | | | | |
| Length: 59'9" | S-3B-74-7 | 19'4" | 20'0" | 0'8" | 0.06 | 0.6 | 0.74 | 1.23 | | | | | | | | | | |
| | S-3B-74-8 | 32'2" | 34'11" | 2'9" | 0.02 | 0.06 | 0.66 | 0.04 | | 32'2" | 41'2" | 9'0" | 4'6" | 0.01 | 1.1 | 1.6 | 0.12 | |
| | S-3B-74-9 | 36'0" | 38'6" | 2'6" | 0.01 | 1.9 | 3.47 | 0.02 | | | | | | | | | | |
| | S-3B-74-10 | 38'6" | 41'2" | 2'8" | 0.01 | 1.3 | 1.45 | 0.34 | | | | | | | | | | |
| Station No.: 18-74-102 | S-4-74-1 | 5'2" | 5'8" | 0'6" | 0.08 | 3.7 | 2.42 | 0.03 | | 5'2" | 5'8" | 0'6" | 0'4" | 0.08 | 3.7 | 2.42 | 0.03 | |
| DDH No.: S-4-74 | S-4-74-2 | 18'5" | 19'9" | 1'4" | 0.01 | 0.65 | 0.26 | 1.70 | | 18'5" | 26'0" | 7'7" | 5'4" | 0.048 | 0.15 | 0.09 | 1.08 | |
| UTM: 309330E, 6073390N | S-4-74-7 | 24'0" | 24'7" | 0'7" | 0.04 | 0.40 | 0.54 | 10.20 | | | | | | | | | | |
| | S-4-74-3 | 27'9" | 29'3" | 1'6" | 0.26 | 1.10 | 0.31 | 1.53 | | 26'0" | 33'0" | 7'0" | 4'11" | 0.076 | 0.44 | 0.17 | 0.47 | |
| Azimuth: 010° | S-4-74-4 | 32'2" | 33'0" | 0'10" | 0.17 | 1.75 | 0.87 | 1.20 | | | | | | | | | | |
| Angle: 45° | S-4-74-5 | 53'4" | 54'5" | 1'1" | 0.08 | 2.5 | 0.28 | 0.02 | | 53'4" | 63'3" | 9'11" | 7'0" | 0.04 | 0.57 | 0.18 | 1.80 | |
| Length: 70'2" | S-4-74-8 | 55'0" | 57'1" | 2'1" | 0.10 | 1.40 | 0.64 | 4.74 | | | | | | | | | | |
| | S-4-74-9 | 57'1" | 59'0" | 1'11" | 0.03 | Tr. | 0.04 | 3.80 | | | | | | | | | | |
| | S-4-74-6 | 62'5" | 63'3" | 0'10" | 0.04 | Tr. | 0.07 | 0.79 | | | | | | | | | | |

*Calculated from planar fabric orientation to core axis.
†Tr. ≤ 0.005%

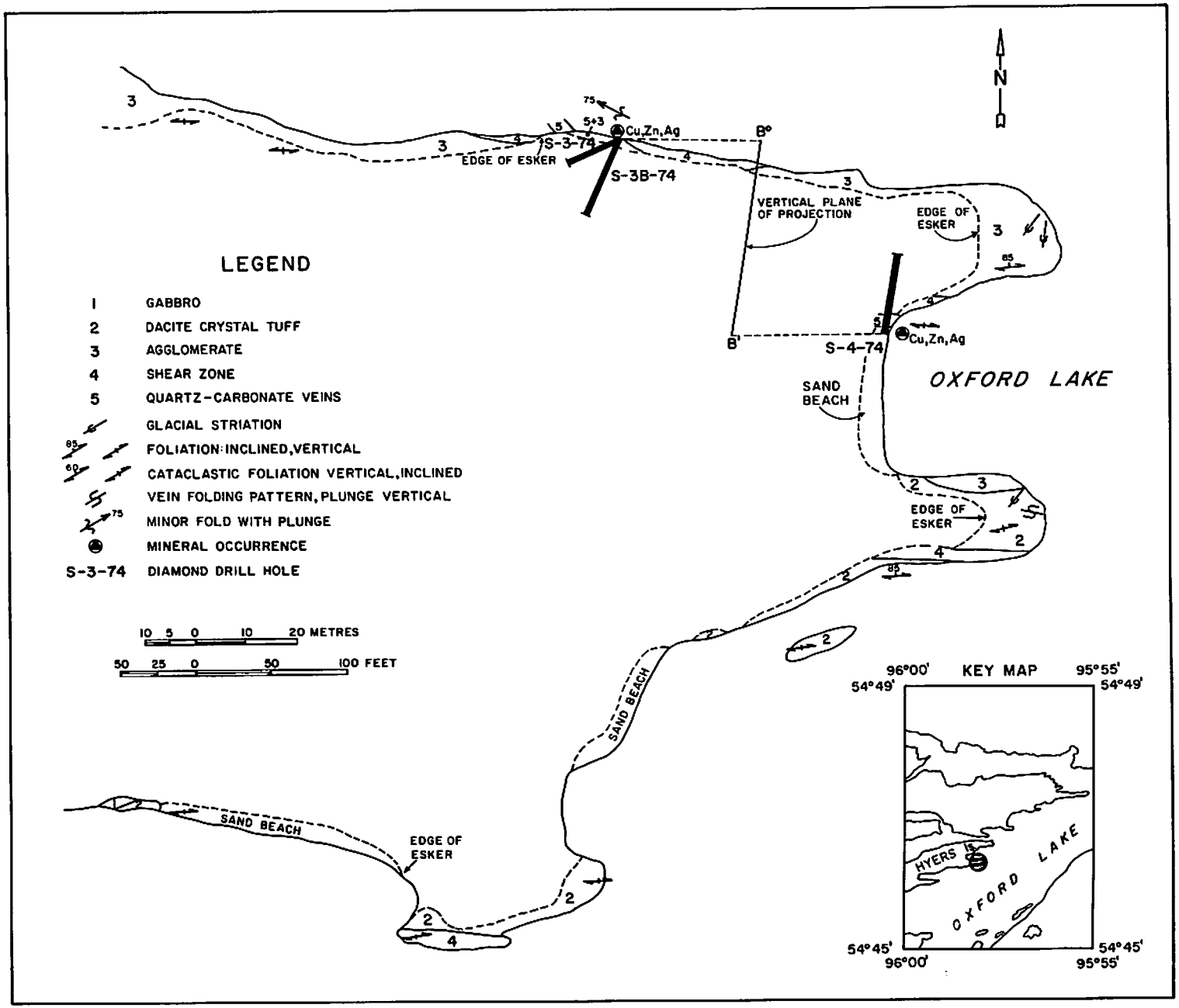


**Figure 9-2. Geology and diamond drill locations at east end of Hyers Island (south peninsula on former "MORA" claim), western Oxford Lake.**

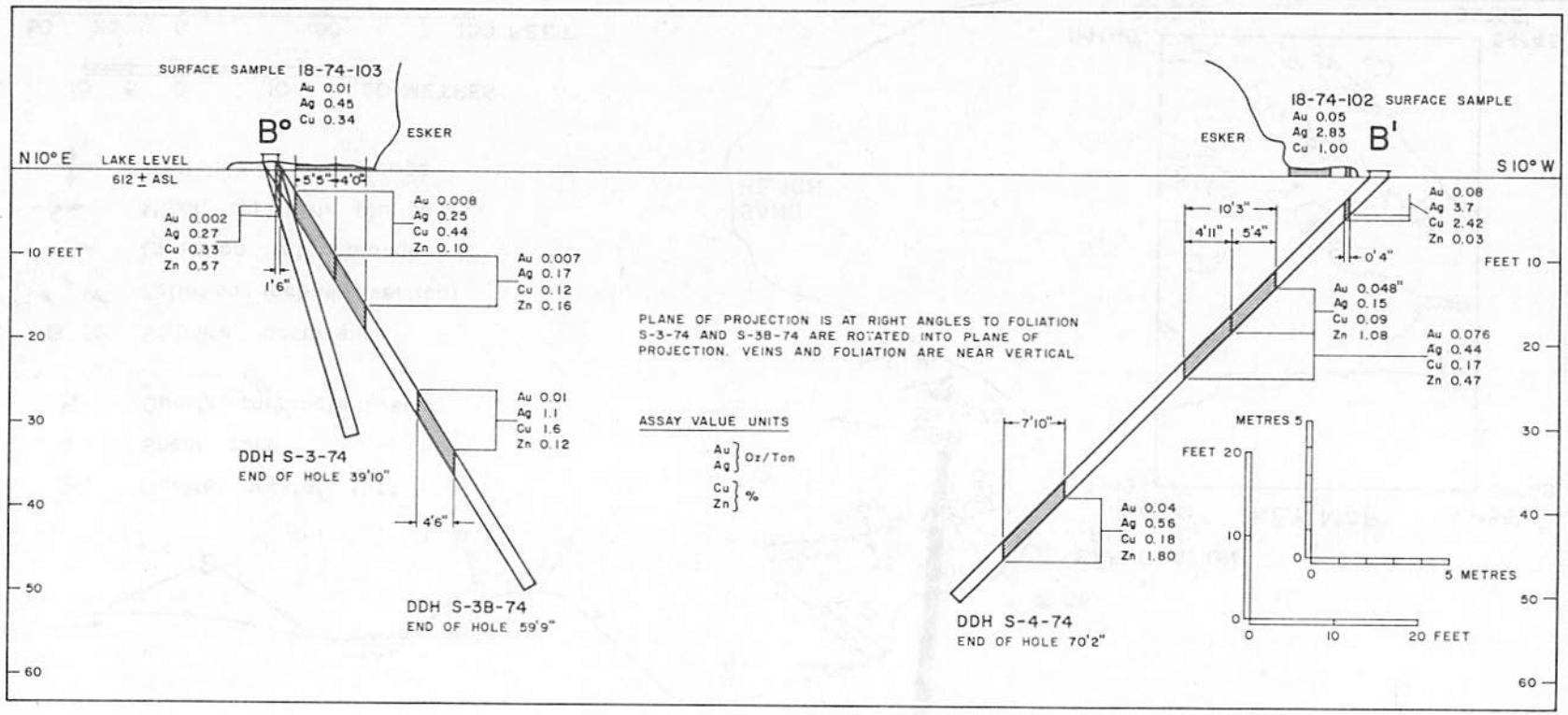


**Figure 9-3 Vertical projection of diamond drill holes with assay results at east end of Hyers Island (former "MORA" claim), western Oxford Lake.**

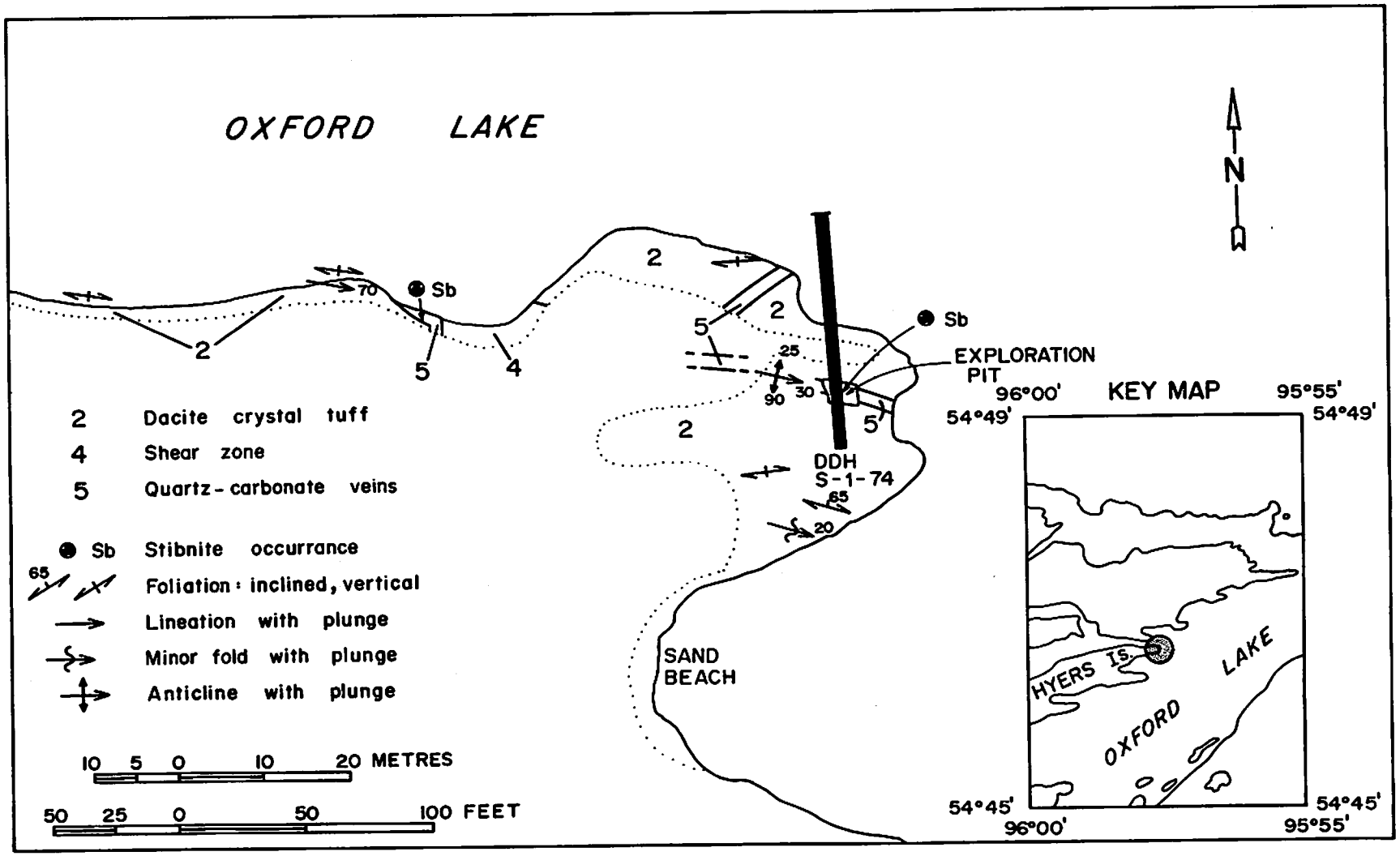


**Figure 9-4. Geology and diamond drill location at east end of Hyers Island (north peninsula on former "NEW FALU" claim), western Oxford Lake.**

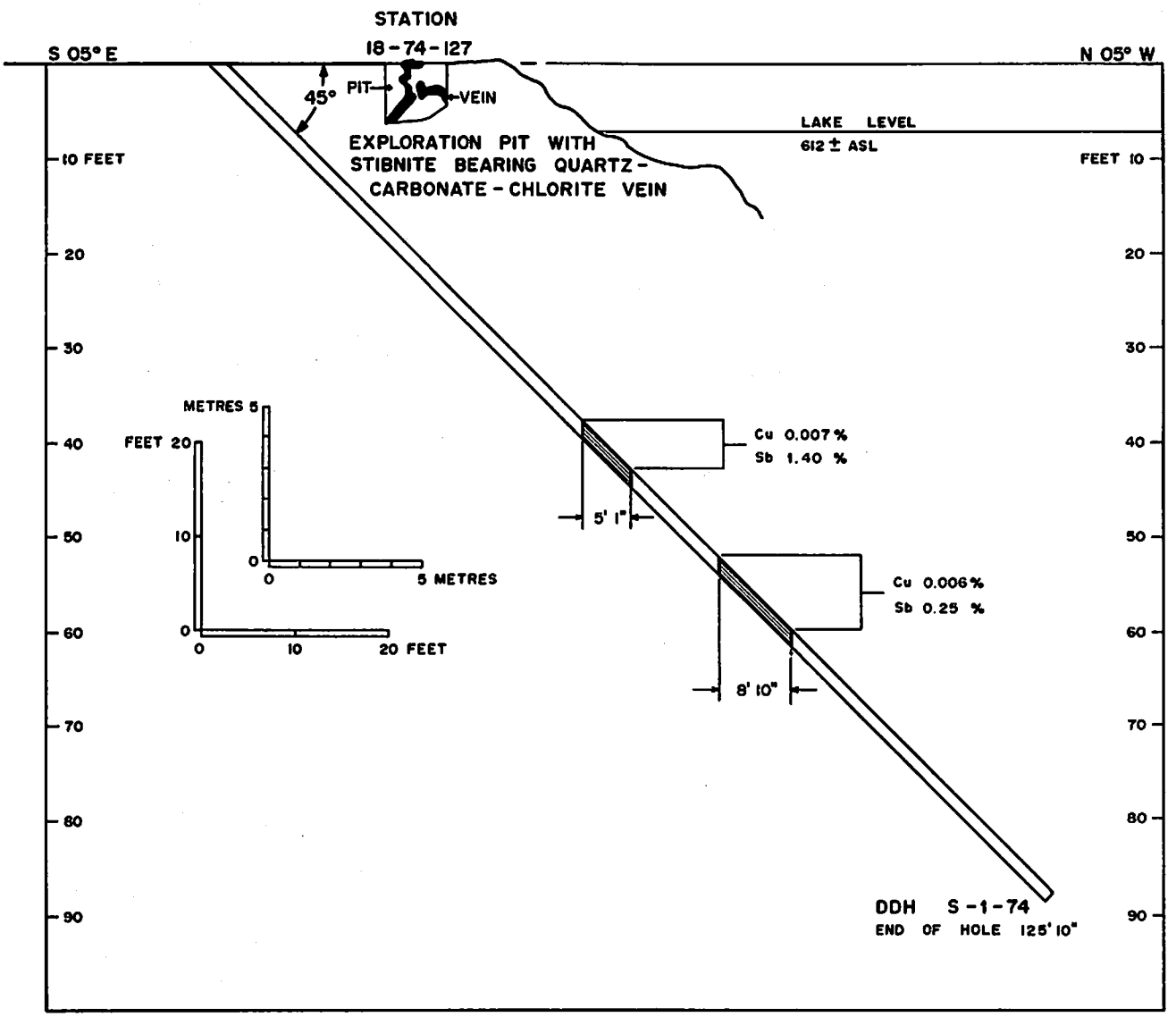


**Figure 9-5. Diamond drill location with assay results at east end of Hyers Island (former "NEW FALU" claim), western Oxford Lake.**

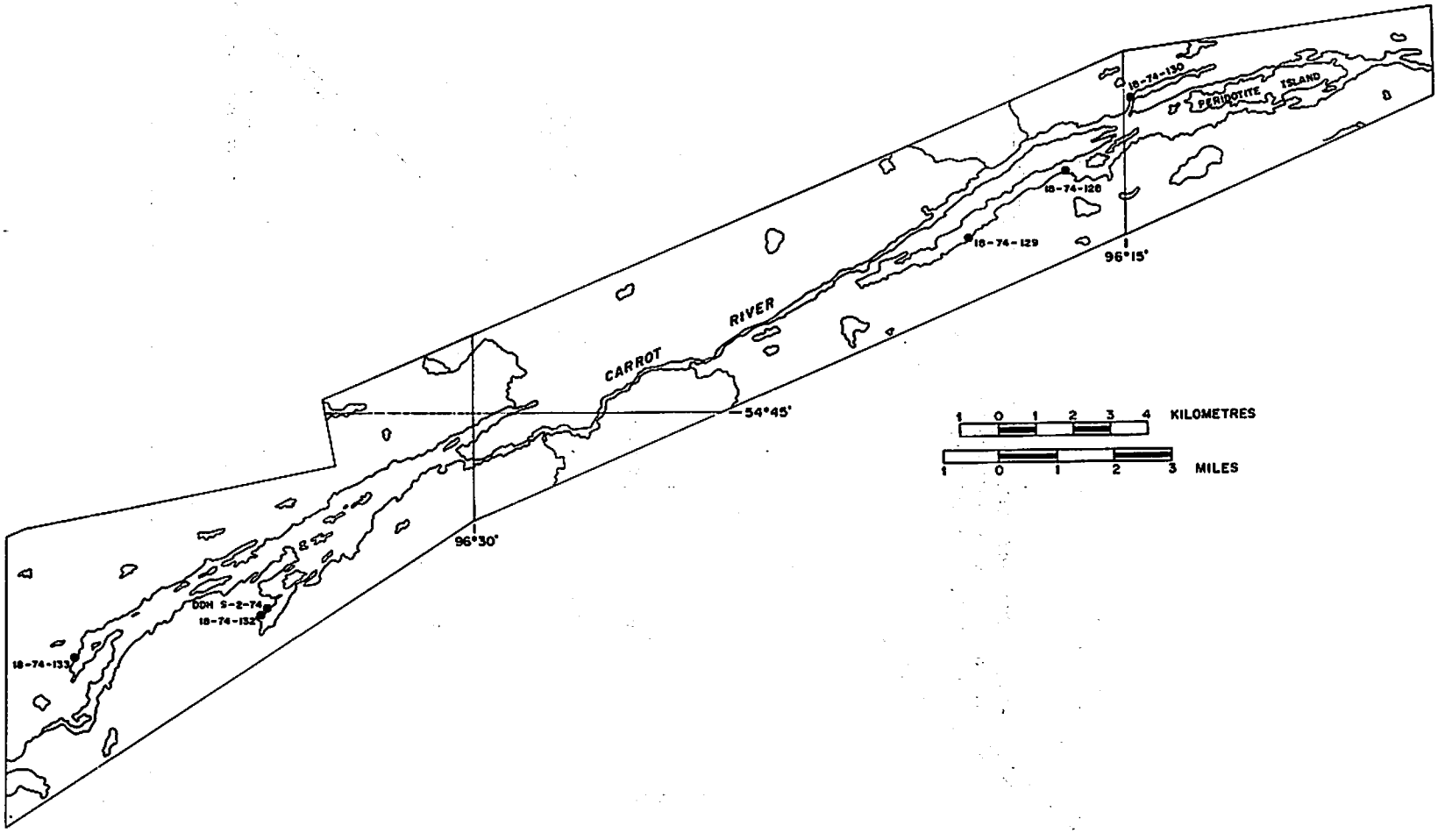


**Figure 9-6. Carrot River area showing sulphide occurrences and diamond drill locations.**

## Table 9-3. Assay results of Carrot River mineral showings

| Sample Number | Latitude UTM Northing | Longitude UTM Easting | Mineralization | Host Rock | Assay lab number | Assay Results oz/ton Au | oz/ton Ag | Per cent Cu | Per cent Ni | Per cent Zn |
|---|---|---|---|---|---|---|---|---|---|---|
| 8-74-128 *(12) | 54°48'12" 6075950 | 96°16'05" 275500 | Pyrite | Shear zone in basalt | M6276 | Nil | Nil | 0.02 | — | — |
| 18-74-129 (13) | 54°47'18" 6074350 | 96°18'28" 273260 | Pyrite | Shear zone in tonalite porphyry | M6277 | Tr. | Nil | Tr. | — | — |
| | | | | | M6278 | Nil | Nil | 0.04 | — | — |
| 18-74-130 (11) | 54°49'9" 6074850 | 96°14'33" 277180 | Pyrite Pyrrhotite | Shear zone in carbonated felsic volcanics | M6279 | Nil | Nil | Tr. | Tr. | — |
| 18-74-132 (15) | 54°41'20" 6064660 | 96°34'57" 255085 | Pyrite Pyrrhotite | Felsic volcanics | M6284 | Tr. | Nil | 0.04 | 0.07 | — |
| | | | | | M6285 | Nil | Nil | 0.06 | 0.06 | — |
| DDH S-2-74 Total 103'10" (15) | 54°41'26" 6064775 | 96°34'47" 255100 | Pyrrhotite Pyrite | Silicified serpentinite in contact with tonalite porphyry | M6390 67'11'-70'10" | Nil | Nil | 0.02 | 0.03 | Tr. |
| | | | | | M6391 76'10"-79'5" | Nil | Nil | 0.02 | 0.05 | Tr. |
| 18-74-133 (16) | 54°41'10" 6063050 | 96°39'13" 251180 | Massive banded pyrite | Andesite | M6286 | Tr. | Nil | 0.03 | — | — |
| | | | | | M6287 | Tr. | Nil | Tr. | — | — |

*Barry, G. S. (1960): "Geology of the Western Oxford Lake-Carghill Island Area"; Man. Mines Br., Publ. 59-2, p. 35

At showing #15 (Barry, 1960) (our station 18-74-132), an EM16 survey disclosed a conductor approximately 2,000 feet (610 m) in length which was drilled with the portable Winkie unit to 104 feet (34 m) (Hole No. S-2-74). The hole penetrated a pillowed basaltic flow sequence which became increasingly garnetiferous with depth. At 68 feet (20 m) serpentinite was encountered which continued to 88 feet (27 m) where the drill penetrated tonalite porphyry. In the serpentinite a mineralized zone of pyrrhotite was encountered. In this zone the pyrrhotite occurs as veinlets and replacement fillings in the serpentinite and is associated with heavy silicification. The tonalite porphyry contains disseminated pyrrhotite and xenoliths of serpentinite. Assay results of the mineralized intersections of the core are given in Table 9-3.

A showing at Max Lake was examined and assayed. The results were not encouraging; only traces of copper, gold and silver were reported.

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