

- LEGEND**
- 8 Massive, fine- to medium-grained, pink, leucocratic granite
 - 7 Massive to slightly foliated, fine- to medium-grained granodiorite and quartz monzonite
 - 6 Porphyroblastic and porphyritic granodiorite, quartz monzonite, and granite
 - 5 Foliated, medium- to coarse-grained quartz diorite, granodiorite, and minor syenodiorite; 5a, massive
 - 4 Gabbro, diorite; probably of several ages; 4a, ultramafic rocks
 - 3 Iron-formation, interbedded with 1 and 2
 - 2 Sedimentary rocks; derived schists and gneisses; in part probably older than 1
 - 1 Volcanic rocks, amphibolite, and undifferentiated mafic intrusions; 1a, includes abundant, undifferentiated metasedimentary rocks

- Heavily drift-covered area
- Sand
- Geological boundary (approximate, assumed)
- Limit of geological mapping
- Bedding (inclined, tops known)
- Pillowed volcanic layers (inclined, overturned)
- Foliation (inclined, vertical, dips unknown)
- Lineament, structure trend (from aerial photographs)
- Joints (inclined, vertical)
- Glacial striae (direction of ice-movement known)
- Drumlin, drift ridge
- Esker crest
- Glacial-lake beaches, kame terraces (from aerial photographs)
- Major moraine
- Area of small moraines
- Abandoned mine

Geology by J. A. Donaldson, 1960

Cartography by the Geological Survey of Canada, 1961

Trail or portage

Abandoned power line

Stream (position approximate)

Marsh, muskeg

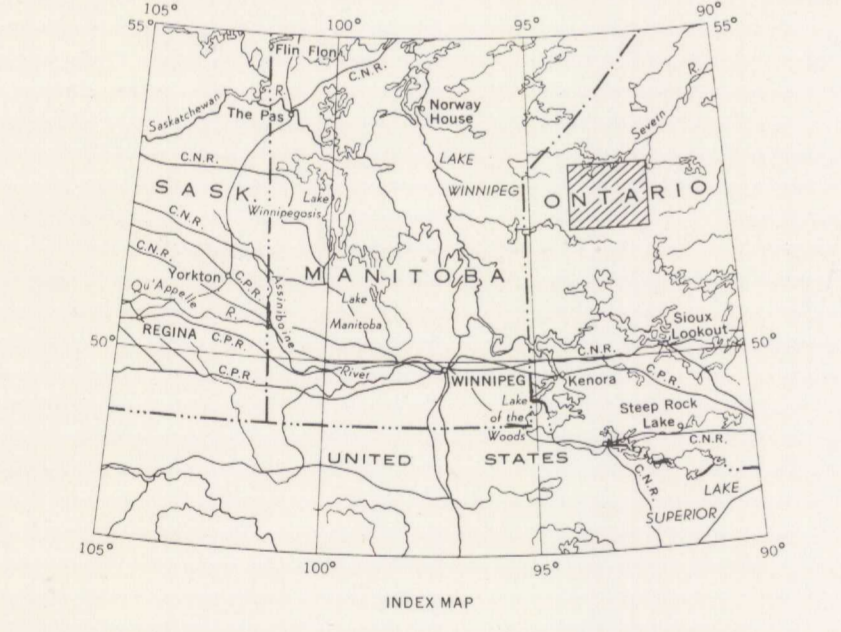
Falls and rapids

Height in feet above mean sea-level

Base-map prepared by the Surveys and Mapping Branch, 1951

Approximate magnetic declination, 4° 13' East

Air photographs covering this area may be obtained through the National Air Photographic Library, Topographical Survey, Ottawa



DESCRIPTIVE NOTES

The map-area can best be reached from Red Lake, 75 miles south of McInnes Lake, or from Pickle Lake, 115 miles southeast of MacDowell Lake. McInnes, Flanagan, Dawson, Roseberry, MacDowell, and Kishikas Rivers are good canoe routes, but few other rivers and streams are navigable. Most waterways in the area belong to the Severn River system which drains northeast to Hudson Bay. Shorelines of Northwind, Cellist, and Whiteloom Lakes are flooded because of two dams on Flanagan River.

Glacial striae record only one major glaciation, with ice-movement towards the southwest. Ground moraine is thick south and east of MacDowell River, and sand outwash covers much of the bedrock in the south-central part of the map-area, but elsewhere outcrops are relatively abundant. Calcareous varved clays occur in low areas north of North Spirit Lake, and particularly good sections are exposed on the shores of Sandy, Favourable, Northwind, and Whiteloom Lakes. Pebbles and cobbles of Palaeozoic limestone are locally abundant in drift near Northwind Lake and Rathouse Bay.

Meta-basalt and meta-andesite compose most of map-unit 1. They are fine-grained, greyish green to dark green amphibole-plagioclase rocks, commonly containing minor amounts of epidote, sphene, quartz, magnetite, and pyrite. Fine-grained amphibolites, consisting almost entirely of blue-green hornblende, are included in this map-unit. Acid volcanic rocks occur northeast of North Spirit Lake and east of Northwind Lake.

Schists and gneisses of sedimentary origin are the most abundant rocks of map-unit 2. They consist mainly of quartz, biotite, and plagioclase, with or without cordierite and/or garnet. Quartzite, argillite, and conglomerate are abundant south of North Spirit Lake. At least some quartzites were derived from sandstones composed of well-sorted, well-rounded quartz grains cemented by silica and calcite, but shearing has fractured many of the grains and increased the apparent matrix to grain ratio so that the rocks now resemble greenstones. Graded bedding, cross-bedding, and ripple-like structures probably formed by soft-sediment deformation are locally well preserved. Thin beds of crystalline limestone are exposed on the west shore of Northwind Lake, along Setting Net Creek, and on the south shore of Hewitt Lake.

Iron-formation (3) typically consists of alternate magnetite-rich and quartz-rich layers less than 1 cm. thick. Banded ferruginous chert outcrops on the north shore of Hewitt Lake, and many slaty beds within map-unit 2 are slightly magnetic.

Massive, mesocratic to melanocratic, medium- to coarse-grained diorite and gabbro (4) form plugs and sill-like bodies of various ages. Ultramafic rocks (4a) include massive, dark green serpentine on the east shore of McInnes Lake, and mottled, brown-weathering, greenish black amphibole-serpentine bodies in the vicinity of Horsby Lake.

Of the granitoid rocks, medium- to coarse-grained, grey to pinkish grey quartz diorite, and syenodiorite (5) show the most distinct foliation. These rocks contain 10 to 40% hornblende and biotite, 40 to 60% plagioclase, 0 to 30% potash feldspar, 0 to 20% quartz, and minor sphene, epidote, magnetite, and apatite. Massive rocks of equivalent composition (5a) are less abundant. Euhedral crystals of potash feldspar characteristic of map-unit 6; they commonly show Carlsbad twinning and are as much as 2 inches long. The large potash-feldspar crystals are, in most outcrops, randomly oriented, coincident with that of map-unit 5, suggesting porphyroblastic growth controlled by pre-existing foliation. A massive variety, which was not separately mapped, probably a phase of the equigranular granite (8). More than a quarter of the area is underlain by fine- to medium-grained granodiorite and quartz monzonite (7). These rocks are composed of 30 to 50% plagioclase, 10 to 30% quartz, 20 to 50% potash feldspar, and 0 to 20% hornblende and biotite. They are greyish white to pinkish white and commonly show faint foliation. Granite (8) is typically pink, fine-grained, massive, and contains few or no mafic minerals. A white, pegmatitic variety is abundant north of Nekik Lake.

The rocks of units 5 to 8 show an increase in the potash-feldspar-to-plagioclase ratio, a decrease in mafic content, and (with the exception of 5a) a decrease in intensity of foliation. These trends suggest large-scale granitization, but the existence of at least some granite melt is indicated by the abundance of apatite and pegmatite dykes identical in composition to unit 8.

Attitudes within the belts of sedimentary and volcanic rocks indicate tight folding about axes generally parallel with the trends of the belts. In the North Spirit belt, where pillows and primary sedimentary structures are well preserved, both northwest- and northeast-trending synclinal axes can be traced. Fold-like trends in granite south of Setting Net Lake suggest granitization of a belt that formerly was continuous between Favourable and North Spirit Lakes. No major faults were recognized, but shearing in through Bearhead Lake may mark the location of a large fault. Regional joints and possibly some faults show as strong lineaments in aerial photographs. Northwest- and northeast-trending joints are most prominent in outcrops.

Gold and silver are associated with galena, sphalerite, and pyrite at the abandoned Berens River Mines, Roche Mines Ltd. is currently re-examining this property. Gold occurs with pyrite and arsenopyrite in the North Spirit-MacDowell belt, and chalcocite occurs in fracture zones along the west-central shore of McInnes Lake.

About 20% of the map-area has been mapped and described by the Ontario Department of Mines, and aeromagnetic maps for the entire area are now available.

¹ Bateman, J. D., 1938: Geology of the North Spirit Lake Area; Ont. Dept. Mines, vol. 47, pt. 7.

1938: Recent Developments in the Favourable Lake Area; Ont. Dept. Mines, vol. 47, pt. 7.

Hart, M. E., 1929: Geology of the Area Between Favourable Lake and Sandy Lake, District of Kenora; Ont. Dept. Mines, vol. 38, pt. 2.

Satterly, J., 1938: Geology of the Sandy Lake Area; Ont. Dept. Mines, vol. 47, pt. 7.

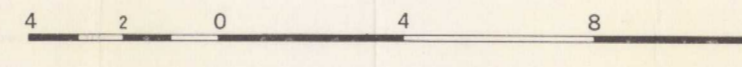
1939: Geology of the Windigo-North Caribou Lakes Area; Ont. Dept. Mines, vol. 48, pt. 9.

Geol. Surv., Canada, Aeromagnetic Maps; Geophysics Papers 856, 857, 858, 859, 866, 867, 868, 869, 876, 877, 878, 879, 886, 887, 888, 889.

MAY 19 1961

MAP 50-1960
GEOLOGY
NORTH SPIRIT LAKE
KENORA DISTRICT
ONTARIO

Scale: One Inch to Four Miles = $\frac{1}{253,440}$ Miles



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MAP 50-1960
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