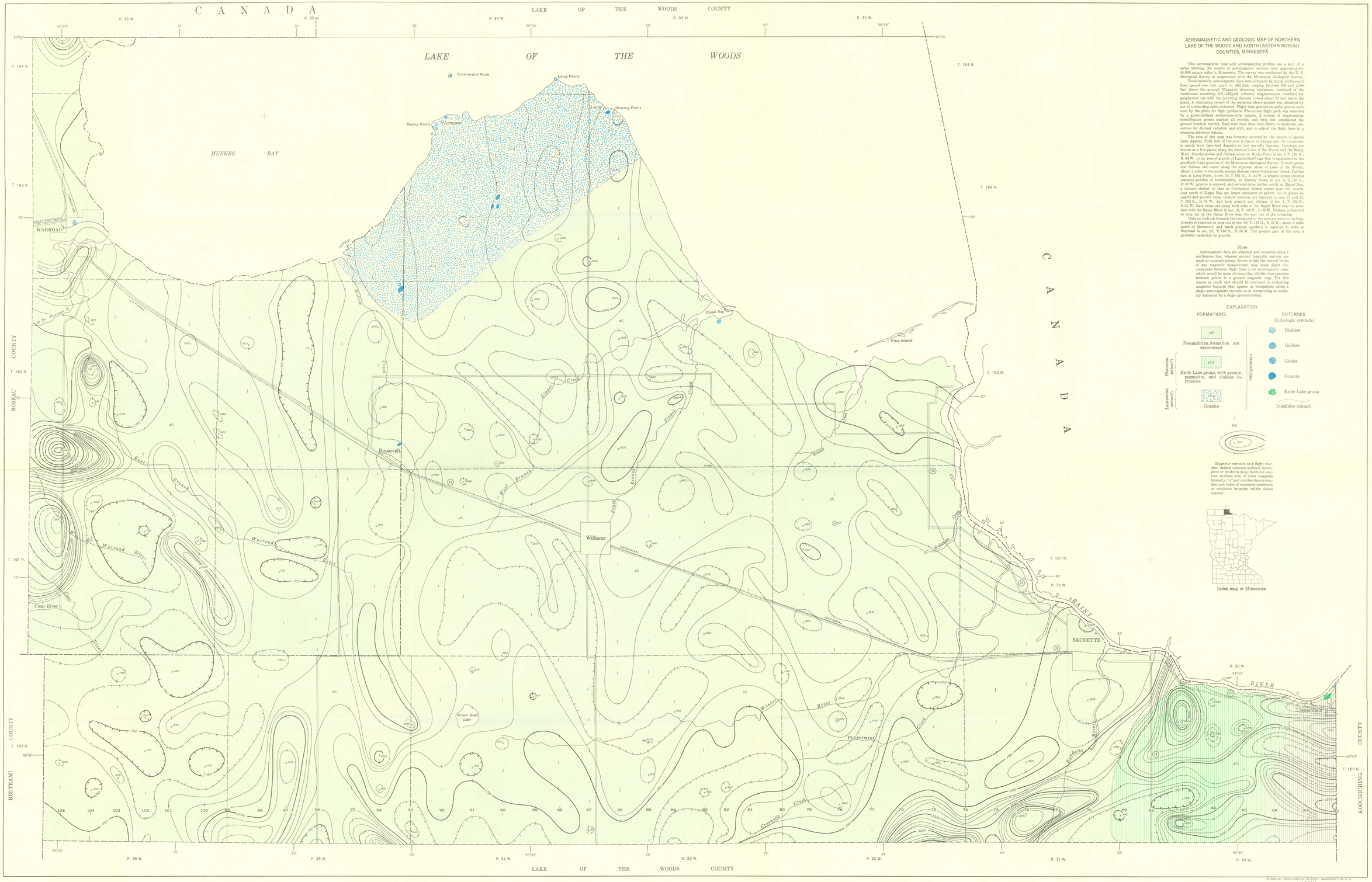
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
THOMAS B. NOLAN, DIRECTOR

PREPARED IN COOPERATION WITH
THE MINNESOTA GEOLOGICAL SURVEY
G. M. SCHWARTZ, DIRECTOR

GEOPHYSICAL INVESTIGATIONS
MAP GP 128



AEROMAGNETIC AND GEOLOGIC MAP OF NORTHERN LAKE OF THE WOODS AND NORTHEASTERN ROSEAU COUNTIES, MINNESOTA

This aeromagnetic map and accompanying profiles are a part of a series showing the results of aeromagnetic surveys over approximately 45,000 square miles in Minnesota. The survey was conducted by the U. S. Geological Survey in cooperation with the Minnesota Geological Survey.

Total-intensity aeromagnetic data were obtained by flying north-south lines spaced one mile apart at altitudes ranging between 900 and 1,100 feet above the ground. Magnetic detecting equipment consisted of the continuous recording AN/ASQ-3A airborne magnetometer modified for geophysical use with the detecting element towed about 75 feet below the plane. A continuous record of the elevation above ground was obtained by use of a recording radio altimeter. Flight lines plotted on aerial photos were used by the pilots for flight guidance. The actual flight path was recorded by a gyrostabilized continuous-strip camera. A system of simultaneous identification points marked all records, and strip film established the ground location control. East-west base lines were flown to facilitate correction for diurnal variation and drift, and to adjust the flight lines to a common arbitrary datum.

The area of this map was formerly covered by the waters of glacial Lake Agassiz. Fully half of the area is marsh or swamp and the remainder is nearly level lake-bed deposits or low gravelly beaches. Outcrops are known at a few places along the shore of Lake of the Woods and the Rainy River. Granite gneiss and diabase occur on Rocky Point in sec. 5, T. 161 N., R. 34 W., in an area of granite of Laurentian(?) age that is equivalent to the pre-Knife Lake granites of the Minnesota Geological Survey. Granite gneiss and diabase also occur along the adjacent shore of Lake of the Woods. About 2 miles to the north, similar diabase forms Cormorant Island. Farther east at Long Point, in sec. 35, T. 164 N., R. 34 W., a granite gneiss outcrop contains patches of hornblende. At Stormy Point, in sec. 6, T. 161 N., R. 33 W., granite is exposed, and several miles farther south, at Zippel Bay, a diabase similar to that at Cormorant Island occurs near the mouth. Just south of Zippel Bay are larger exposures of gabbro cut at places by quartz and granite veins. Granite outcrops are reported in sees. 21 and 22, T. 161 N., R. 34 W., and both granite and diabase in sec. 1, T. 162 N., R.35 W. Slate crops out along both sides of the Rapid River near its junction with the Rainy River in sec. 12, T. 160 N., R. 30 W. Diabase is reported to crop out on the Rainy River near the east line of the township.

Data on bedrock beneath the remainder of the area are scant or lacking. Granite is reported to crop out in sec. 36, T. 162 N., R. 35 W., about 5 miles north of Roosevelt; and black granite (gabbro) is reported in wells at Warroad in sec. 29, T. 163 N., R. 36 W. The grassir part of the area is probably underlain by granite.

Note

Aeromagnetic data are obtained and compiled along a continuous line, whereas ground magnetic surveys are made at separate points. Errors within the normal limits of any magnetic measurement may cause slight discrepancies between flight lines in an aeromagnetic map, which would be more obvious than similar discrepancies between points in a ground magnetic map. For this reason as much care should be exercised in evaluating magnetic features that appear as elongations along a single aeromagnetic traverse as in interpreting an anomaly indicated by a single ground station.

EXPLANATION

FORMATIONS

PRECAMBRIAN

- pC — Precambrian, formation not determined
- Harronian (?) period — Knife Lake group, with granite, pegmatite, and diabase intrusions
- Laurentian (?) period — Granite

OUTCROPS (Lithologic symbols)

- Diabase
- Gabbro
- Gneiss
- Granite
- Knife Lake group
- Indefinite contact

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Magnetic contours with flight traverse; dashed contours indicate incomplete or doubtful data; hachured contour encloses area of lower magnetic intensity; "x" and number denote location and value of measured maximum or minimum intensity within closed contour.

Index map of Minnesota

Base from Minnesota Department of Highway maps

AEROMAGNETIC AND GEOLOGIC MAP OF NORTHERN LAKE OF THE WOODS AND NORTHEASTERN ROSEAU COUNTIES, MINNESOTA

TOTAL INTENSITY AEROMAGNETIC CONTOURS RELATIVE TO ARBITRARY DATUM

By
J. L. Meuschke, K. G. Books, John R. Henderson, Jr., and G. M. Schwartz

Scale 1:63 360

1 ½ 0 1 2 3 4 Miles

Contour interval 50 and 250 gammas

Aeromagnetic survey flown 1000 feet above the surface

1957

SHEET 1 OF 2

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.
M-R 3760
Aeromagnetic survey 1949 and 1951

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For sale by U. S. Geological Survey, price , price $ 100 per set