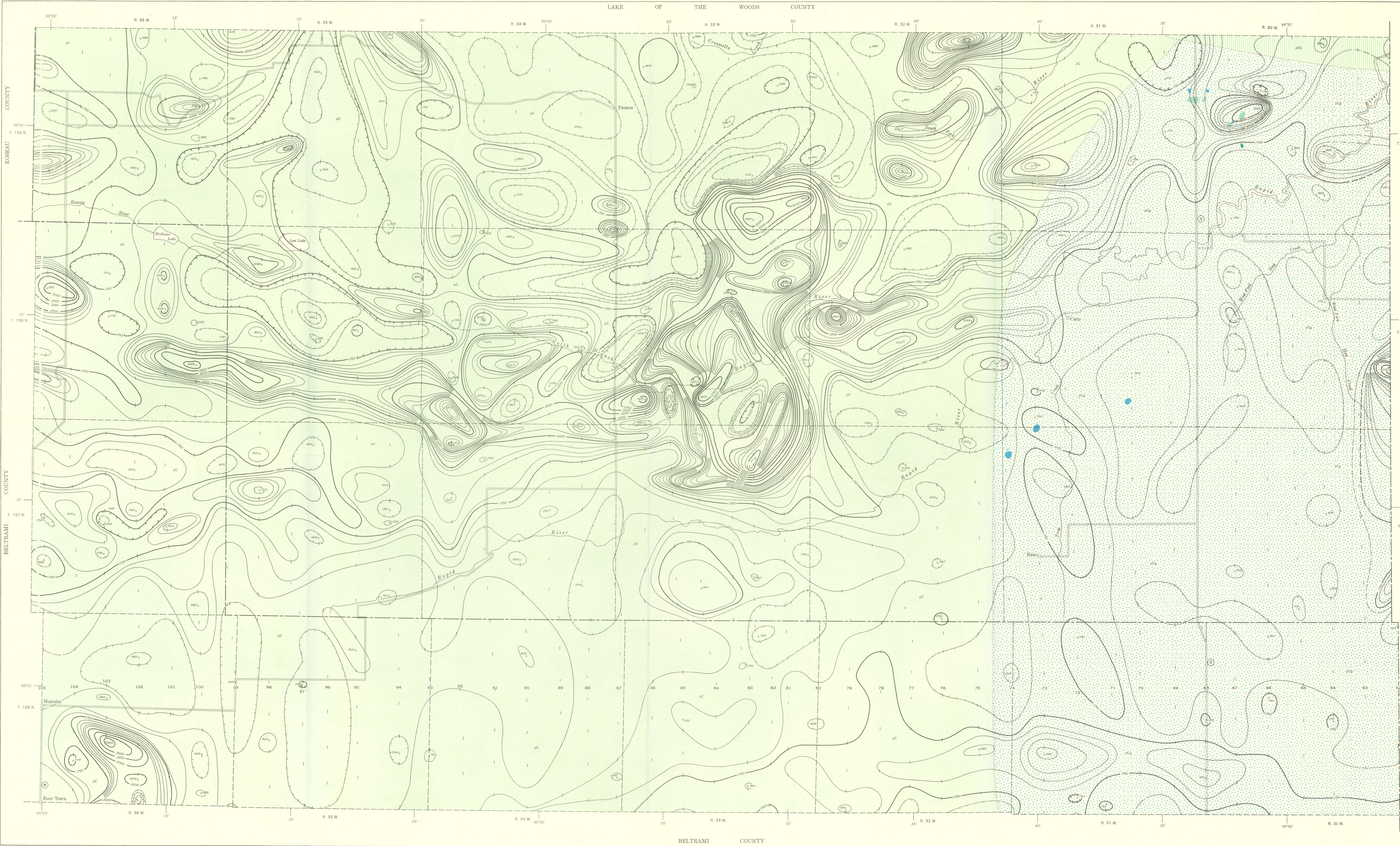




AEROMAGNETIC AND GEOLOGIC MAP OF NORTHERN
BELTRAMI AND SOUTHERN LAKE OF THE WOODS
COUNTIES, MINNESOTA

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 line spaced one mile apart at elevations ranging between 900 and 1100 feet above the ground. Magnetic detecting equipment consisted of the continuous-recording AN-55A-5A 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 line plotted on aerial photos were used by the pilots for flight guidance. The actual flight path was recorded by a ground-stationed continuous-strip camera. A system of simultaneous identification points marked all rivers, 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 line to a common arbitrary datum.

This map area lies entirely within the bed of former glacial Lake Agassiz and covers a large segment of what is known locally as the "Big Bog." A small portion of the land is occupied, but the larger part is administered as State forest land or as a game refuge. The only known outcrops are in the eastern part of the area. A complex of granite, white, pegmatite, and a small amount of magnetic rock forms several outcrops in sec. 1, 17, 18, and 20, T. 159 N., R. 30 W., and in sec. 15, T. 158 N., R. 31 W. Outcrops of granite also occur in sec. 6, T. 157 N., R. 31 W. Some pegmatite and diabase are associated with the granite exposures in the SW 1/4 sec. 6.

Recent discoveries of the M. A. Hanna Co. have shown additional outcrops of diabase and granite in sec. 7 and 18, T. 158 N., R. 30 W., sec. 13, 23, and 24, T. 159 N., R. 31 W., sec. 5 and 24, T. 158 N., R. 30 W., and sec. 4 and 10, T. 157 N., R. 30 W. Knife Lake group with granite is also present in sec. 20, T. 158 N., R. 30 W.

As the region has not been mapped in detail, neither outcrop data nor well information are available to indicate the source of the prominent magnetic anomalies in the northern part of the map area.

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.

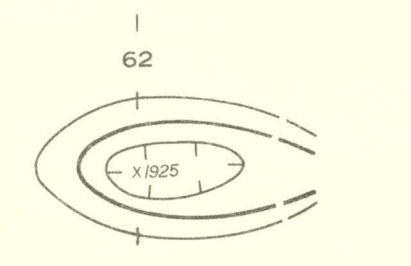
EXPLANATION

FORMATIONS

- pc Precambrian, formation not determined
- Granite, with numerous inclusions of older rocks
- Knife Lake group, with granite, pegmatite, and diabase intrusions

OUTCROPS
(Lithologic symbols)

- Diabase
- Granite
- Granite and diabase
- Granite and schist
- Knife Lake group with granite intrusions
- Indefinite contact



Magnetic contours with flight traverse dashed contours indicate isomagnetic or double-line features. Contour encloses area of lower magnetic intensity. "T" and number denote location and value of measured maximum or minimum intensity within closed contour.

Base from Minnesota Department of Highway maps

AEROMAGNETIC AND GEOLOGIC MAP OF NORTHERN BELTRAMI AND SOUTHERN LAKE OF THE WOODS 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
Contour interval 50, 250, and 500 gammas
Aeromagnetic survey flown 1000 feet above the surface