CANADA

DEPARTMENT OF MINES AND RESOURCES

MINES AND GEOLOGY BRANCH

BUREAU OF GEOLOGY AND TOPOGRAPHY

GEOLOGICAL SURVEY

LEGEND

BASIN OF GREAT SLAVE LAKE

PROTEROZOIC (LATE PRECAMBRIAN)

ET-THEN SERIES

12 — *PREBLE FORMATION:* sandstone, quartzite

GREAT SLAVE GROUP

8 — *KAHOCHELLA FORMATION:* shale, slate, argillite, limestone, tuff, breccia, agglomerate, andesite

7 — *SOSAN FORMATION:* conglomerate, sandstone, quartzite

UNION ISLAND GROUP

10 — Limestone, shale, argillite, lava

9 — Granite, granodiorite and allied rocks; age relative to Great Slave and Union Island groups unknown

ARCHEAN (EARLY PRECAMBRIAN)

3 — Granite, granodiorite and allied rocks

1 — Greywacke, arkose, quartzite, rhyolite, trachyte, and derived schists

2 — Biotite and biotite-hornblende gneiss and schist derived from 1 and containing much granitic material

REGION INLAND FROM GREAT SLAVE LAKE

PROTEROZOIC (LATE PRECAMBRIAN)

POST-NONACHO

11 — Granite, granodiorite and allied rocks

NONACHO SERIES

6 — Arkose, quartzite; some slate, greywacke and conglomerate

5 — Slate, greywacke; some arkose, quartzite

4 — Conglomerate; some quartzite, arkose

9 — Granite, granodiorite and allied rocks; age relative to Nonacho series unknown

ARCHEAN (EARLY PRECAMBRIAN)

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Geological boundary (defined, assumed)

Bedding (inclined, vertical)

Fault (defined, assumed)

Pronounced escarpment probably indicating a fault

Giant quartz vein Q.V.

Rock outcrop where observed

Portage P.

Lake and stream (position approximate)

Rapids R.

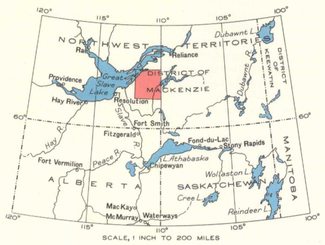
Marsh

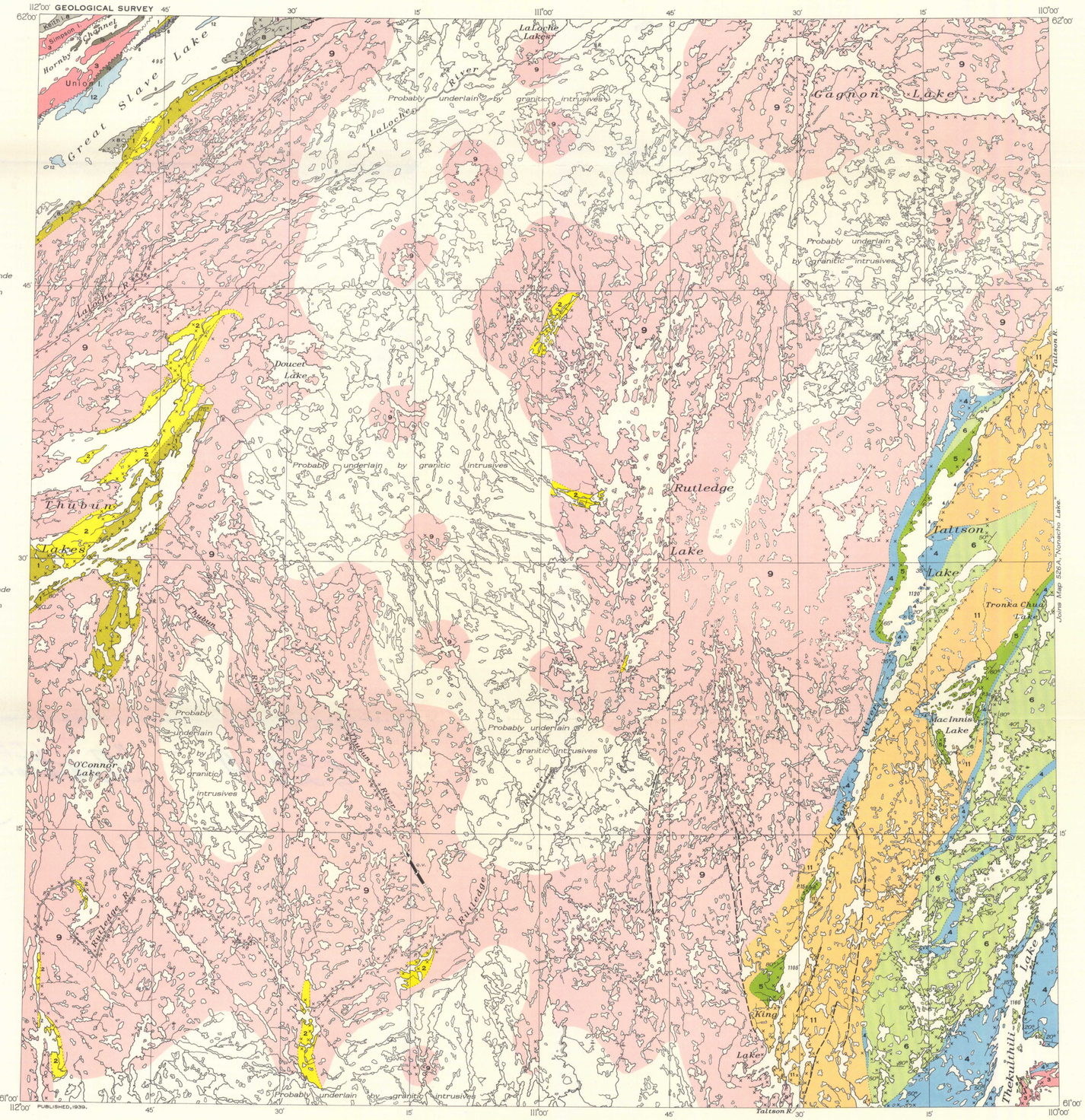
Sand bar

Height in feet above Mean sea-level 1120'

Geology by J. F. Henderson, 1936; the islands in Great Slave Lake from Map 377A, published in 1936.

Base-map compiled by the Topographical Survey, 1937, from aerial photographs taken by the Royal Canadian Air Forces Cartographic by the Drafting and Reproducing Division, 1939.





PUBLISHED, 1939.

MAP 525A

TALTSON LAKE

DISTRICT OF MACKENZIE

NORTHWEST TERRITORIES

Scale, ~~253,440~~ or 1 inch to 4 Miles

Miles 0 4 8 12

Approximate magnetic declination, 31° to 36° East.

ACCESS

The northwestern part of the area may be reached by canoe from Great Slave lake by ascending the LaLoche and Thubun rivers. The southern part may be reached from Fitzgerald on Slave river by way of the Leland lake and the Taltson and Rutledge rivers or from Camsell Portage on Lake Athabaska by way of Tazin and Thekulthili rivers. The route from Lake Athabaska is the easier but both routes are difficult and include many portages. The area may be reached by airplane from Fitzgerald or Lake Athabaska in a little more than one hour.

PHYSICAL FEATURES

The country presents an even skyline when viewed from the air or from the tops of the higher hills. In detail, however, the topography is extremely rugged with rough, rocky hills rising precipitously from muskeg or lake to elevations of 200 to 300 feet. The bedrock has been swept clean of overburden by glaciation and with the exception of small swampy areas the surface is almost continuous rock outcrop. The country is well wooded but the trees are small and stunted. Large areas have been burned over within the last 40 years.

GENERAL GEOLOGY

The oldest rocks are a group of metamorphosed sediments and acid volcanic flows (1) that outcrop along the shore of Great Slave lake and the Thubun lakes 15 miles to the south. These sediments and volcanics may be of the same age as the Tazin series of Lake Athabaska and the Yellowknife group of the north shore of Great Slave lake. The sediments are predominantly arkose and greywacke with some quartzite. Acid lavas are interstratified with the sediments along the shore of Great Slave lake but no volcanic flows were observed within the Thubun Lake area. The sediments grade into biotite and biotite-hornblende gneisses and schists (2) containing much granitic material in the form of lit-par-lit injections, and dykes and irregular bodies. The gneisses and schists in turn, with increasing amounts of granitic material, grade into rocks that are predominantly granite. The granitic rocks between Great Slave lake and Thubun lake contain much incompletely assimilated sedimentary gneiss and schist.

Granitic intrusives (3) that are definitely older than the Nonacho sediments outcrop at the southeast end of Thekulthili lake where they are unconformably overlain by conglomerate and quartzite. The granite west of Taltson lake is probably also older than the Nonacho sediments. The pre-Nonacho granitic intrusives vary in composition from granite to granodiorite with here and there more basic facies. They are, in general, light grey to pink, medium to coarse grained rocks with granitic texture and containing 15 to 35 per cent quartz. The pre-Nonacho granite cannot be differentiated with certainty from the post-Nonacho granite except along and near contacts with the Nonacho sediments where the unconformable relations can be observed.

The Nonacho sediments rest unconformably on the older group of granitic intrusives from which they were, in part, derived. They are composed of conglomerate, slate and greywacke, and arkose and quartzite. One type grades into another and beds and lenses of conglomerate and of slate occur throughout the arkose and quartzite. The conglomerate (4) occurs at or near the base of the series and is rarely absent where the sediments rest on the older granite. In general, the conglomerate is several hundred feet thick and in places is at least 2,000 feet thick. The greater part of the conglomerate consists of closely packed, well rounded, pebbles varying from 1 to 6 inches in diameter. Granite, granite-gneiss, and vein quartz make up 50 to 60 per cent of the pebbles. The remaining 40 to 50 per cent are composed largely of fine to medium grained, grey to buff weathering impure quartzite with a smaller proportion fine grained, red to purple weathering quartzite. The matrix of the conglomerate is a medium to rather coarse grained arkose or arkosic quartzite. Sandy, cross bedded arkosic beds and lenses from a few inches to several feet in thickness are numerous throughout the conglomerate. The lenticular and pocket-shape of the sandy interbeds, the common cross bedding and the sudden changes in strike and dip even in the same outcrop indicate that much of the conglomerate was deposited with steep and varying initial dips. West of Taltson lake and along the west shore of Taltson river the conglomerate is characterized by the almost total absence of pebbles other than of granite and allied rocks. Near the base this type of conglomerate consists of closely packed, angular, granite fragments from 1 to 2 feet in diameter in an arkosic matrix composed in large part of small granite fragments.

The slates and greywackes (5) are fine to medium grained, grey to black weathering rocks. The weathered surface along the lake shores is rough, uneven, and pitted due to the weathering out of the less resistant beds and lenses. Much of the slate contains lenses of arkose from a fraction of an inch to 3 to 4 feet in thickness. Much material, classed as greywacke, is intermediate in composition and grain size between arkose and slate. Cross bedding is common in the sandy lenses and ripple marks are well preserved, usually on the top side of sandy beds overlain by fine muds or silts. Near contacts with the younger granite the slates have been altered to light coloured, silvery phyllites and fine micaceous schists injected along the schistosity by many small quartz veinlets, which, as the granite is approached become pegmatitic in character.

The arkoses and quartzites (6) are buff to light-grey weathering rocks of fine to medium grain. In general the beds are massive and several feet in thickness. Slaty argillaceous beds from less than 1 inch to 1 foot or more in thickness occur interbedded with the massive arkose and quartzite. The arkose and quartzite contain many isolated pebbles of granite and vein quartz. Lenses and pocket-like masses of conglomerate are also abundant. The lenses pinch out within a few feet along the strike but tend to be developed most abundantly along certain horizons. Cross bedding, ripple marks, and gradation in grain size are characteristic of the arkose and quartzite throughout. Many of the argillaceous beds show mud cracks filled with sandy material. Intraformational conglomerates or breccias have been widely developed by the breaking up and jumbling together of partly consolidated and cracked argillaceous beds and the incorporation of the fragments in the overlying nearly contemporaneous sandy beds. Near contacts with the younger granite, as east of King lake, the quartzite and arkose have been baked to a fine grained, glassy, pink rock that weathers bright pink to red as compared with the more sombre buff and grey of the unaltered quartzite and arkose.

The Nonacho sediments lie in open, gently plunging, northeasterly trending folds except near contacts with the younger granite where the folding is closer and the beds in places are overturned. Within the wide troughs of the larger synclines the dip of the beds varies from almost horizontal to 50 degrees.

The Nonacho series occurs in the southeast and may be of the same age as the lower part of the Great Slave group as developed in the northwest in that part of Great Slave lake embraced by the map-area. Only the two lower formations of the Great Slave group are present. The Sosan formation (7) consists of sandstone and quartzite, locally with conglomerate at the base. The Kahochella formation (8) consists largely of argillites, laminated limestones and volcanic rocks. The volcanic rocks are well developed along the shore of Great Slave lake where some of the flows show good pillow structure.

The Union Island group (10) is of unknown age relation to the Great Slave group but, like it, is older than the Et-then series. The base of the group is well exposed on Union Island where dolomite, holding angular blocks and small fragments of disintegrated granite, rests on an old, brecciated granite surface. The dolomite is stratigraphically overlain by interbedded vari-coloured dolomites, red argillite, and black slate.

The younger granitic rocks (11) that intrude the Nonacho sediments are similar in appearance to the pre-Nonacho granites. Large areas are underlain by granitic rocks (9) whose age relative to the Nonacho sediments is unknown. In general, the granitic intrusives are light grey to pink weathering, medium to coarse grained, granitic textured rocks containing 15 to 35 per cent quartz.

The Et-then series of coarse clastic sediments occurs in the part of Great Slave lake lying within the map-area. Conglomerate generally forms the base of the series but within the limits of the area sandstone and quartzite of the Preble formation, which normally overlies the conglomerate, forms the base of the series. The sandstone and quartzite are coarse, feldspathic rocks exhibiting excellent cross-bedding and ripple marks. The beds are nearly horizontal except in the vicinity of faults where dips are up to 70 degrees. These faults are of great magnitude and commonly strike northeasterly. They have displaced the Et-then series and all older rocks. The Et-then series is correlated with the Athabaska series at Lake Athabaska.

Rusty weathering, dark grey basic dykes generally showing diabasic texture and ranging in composition from diorite to gabbro, cut the Nonacho sediments and granite of both ages. Near Thekulthili lake the dykes are fairly numerous and several more than 100 feet in width were observed.

ECONOMIC GEOLOGY

Very little of the area has been prospected at all thoroughly and no deposits of economic importance have so far been found. Quartz veins are numerous in the early sediments and lavas and in the Nonacho sediments. In veins containing metallic minerals the most common sulphides are pyrite, chalcopyrite and galena.

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