



LEGEND

HELIKIAN	Hd	DIABASE AND GABBRO (MACKENZIE DYKES)
HELIKIAN	Hr	THELON FORMATIONS POLYMYCTIC CONGLOMERATE, PEBBLY SANDSTONE, QUARTZ SANDSTONE
HELIKIAN	Aqm	QUARTZ MONZONITE TO GRANITE EQUIGRANULAR TO PORPHYRYTIC, SPINE AND FLUORITE BEARING
HELIKIAN	Ag	PORPHYRYTIC GRANITE, WHITE TO PINK, COARSE GRAINED; IN PART INCLUDES WHITE FLUORITE INTRUSIONS
HELIKIAN	AyLp	MAFIC SYENITE, QUARTZ SYENITE, MASSIVE, MEDIUM TO COARSE GRAINED; INTERLACED UNITS (Ays, AysL, AysLp) LAMPROPHIRE DYKES AND SILLS (AysL)
HELIKIAN	Aqmd	METASEDIMENTARY ROCKS (PROBABLE EQUIVALENTS OF THE AMER GROUP, FINE TO MEDIUM-GRAINED AND WELL FOLIATED g - QUARTZITE, m - QUARTZ-MUSCOVITE SCHIST, n - HORNFELDED SEDIMENTARY ROCKS, c - CARBONATE AND SLATE)
HELIKIAN	AAts	FELDSPATHIC SANDSTONE, CALCAREOUS ARGOSSE, INTERBEDDED ARGOSSE-SILTSTONE-SLATE-MUDSTONE, MINOR GREYWACKE, PHYLLITE, AND SCHIST
HELIKIAN	Agbb	GABBRO
HELIKIAN	Ams	MUDSTONE-SLATE-PHYLLITE GREY TO BLACK, IN PART PYRITE AND GRAPHITE BEARING
HELIKIAN	Ac	CARBONATE, DOLOMITIC LIMESTONE, INTERCALATED WITH CHERT; TRIMOLITE-PHLOGOPITE SCHIST, AND WACKE
HELIKIAN	Af	FELDSPATHIC QUARTZITE; CROSS-BENDED AND BRECCIATED
HELIKIAN	Aic	IMPURE CLASTIC ROCKS; LITHIC ARENITE, QUARTZ-MUSCOVITE, QUARTZ-BITITE, QUARTZ-GRAPHITE-SCHIST, BROWNISH MUDSTONE, SILTSTONE (Aci; MAFIC SCHIST, AS, PHYLLITE - IN 66G)
HELIKIAN	AaB	ORTHOGONAL QUARTZITE, WHITE, RED, AND GREEN-QUARTZITE, MINOR SANDSTONE, QUARTZITE, POSSIBLE TO CONGLOMERATE, AND INTERCALATED MICACIOUS QUARTZITE; s - RED-HEMATITIC BRECCIA
HELIKIAN	AaC	POLYMYCTIC PEBBLE TO CONGLOMERATE
HELIKIAN	Aa	PHYLLITE, MUSCOVITE-SCHIST, AND FELDSPATHIC SANDSTONE
HELIKIAN	AvA	METAVOLCANIC ROCKS INTERMEDIATE TO BASIC (AVs); MINOR FELSIC INTRUSIVES AND AMPHIBOLITE (AVi) (NTS 66H)
HELIKIAN	As	BIOTITE SCHIST, PARAGNEISS, MINOR QUARTZ-FELDSPATHIC METASEDIMENTARY ROCKS AND GNEISSES
HELIKIAN	Aub	MAFIC TO ULTRAMAFIC ROCKS (GABBRO, PERIDOTITE, LOCALLY DEFORMED AND ALTERED TO CHLORITE SCHIST, IN PART OLDER THAN AVs)
HELIKIAN	Ag	GRANITE MASSIVE TO WELL FOLIATED, HOMOGENEOUS, COARSE GRAINED; COMMONLY CATACLASTIC AT THE MARGINS
HELIKIAN	Agd	GRANODIORITE, MEDIUM GRAINED, WELL FOLIATED AND CATACLASTIC; CONTAIN INCLUSIONS OF MAFIC ROCKS AND QUARTZITE
HELIKIAN	Aqmd	AUGEN (K-FELDSPAR) GNEISS, QUARTZ DIORITE TO QUARTZ MONZONITE COMPOSITION; MASSIVE TO WELL FOLIATED, IN PART MYLONITIC
HELIKIAN	adi	UNDIFFERENTIATED FOLIATED GRANITOID ROCKS, QUARTZ DIORITE TO GRANITE COMPOSITION, PORPHYRYTIC TO ALPATIC
HELIKIAN	agn	K-FELDSPAR AUGEN GNEISS, CONTAIN INCLUSIONS OF OLDER MAFIC ROCKS
HELIKIAN	a	MAFIC SCHIST AND AMPHIBOLITE (NTS 66G)
HELIKIAN	Agk	METASEDIMENTARY ROCKS; ACTINOLITE-CHLORITE SCHIST, METAGRAY WACKE, AND INTERCALATED SLATE AND DOLOMITIC (Agh); STRONTOALCATE, DOLOMITIC, INTERBEDDED CHERT, SILTSTONE (Agi)
HELIKIAN	m	GARRY LAKE COMPLEX; LAYERED GNEISS COMPLEX CONSISTING OF QUARTZ-FELDSPAR-BIOTITE GNEISS, PORPHYROBLASTIC (K-FELDSPAR) AUGEN GNEISS, GRANODIORITE, TONALITE, AND GRANITE GNEISS; MINOR AMPHIBOLITE AND METAGABBRO; INTRUDED BY YOUNGER PLUTONIC ROCKS
HELIKIAN	iq	WHITE OR THOQUARTZITE, FINE GRAINED AND RECRYSTALLIZED, IN PART CONTAIN QUARTZ-PEBBLE CONGLOMERATE, QUARTZ-MICA SCHIST AT THE BASE, AND INTERCALATED WITH BLACK-PHYLLITE AND SCHIST HORIZONS
HELIKIAN	Agk	GREYWACKE, CHLORITE SCHIST, IRON FORMATION, AND MINOR LAMINATED CHERT AND CARBONATE
HELIKIAN	au	ULTRAMAFIC ROCKS; BASALTIC AND PERIDOTIC KOMATIITES, SPINIFEX TEXTURED FLOWS; MINOR FELSIC, METAVOLCANIC AND LAYERED VOLCANIC SEDIMENTARY ROCKS TOWARDS THE TOP OF THE SEQUENCE
HELIKIAN	amv	METAVOLCANIC ROCKS; RHYOLITE PORPHYRY, FELSIC TO INTERMEDIATE-TYPE AND FLOWS, AND SHALLOW INTRUSIVE ROCKS; MINOR METAGABBRO SILLS AND DYKES
HELIKIAN	ama	MEGACRYTIC, LAYERED AND/OR BANDED GNEISS, TONALITE GNEISS, GARNET-BIOTITE PARAGNEISS, AMPHIBOLITE (Am)
HELIKIAN	agn	GRANULITE, GARNET-BIOTITE PARAGNEISS, MAFIC SCHIST, MINOR AMPHIBOLITE, INTRUDED BY GRANITOID ROCKS (AVs, AVi, AVsL, AVsLp)

ARCHAIC	iq	WHITE OR THOQUARTZITE, FINE GRAINED AND RECRYSTALLIZED, IN PART CONTAIN QUARTZ-PEBBLE CONGLOMERATE, QUARTZ-MICA SCHIST AT THE BASE, AND INTERCALATED WITH BLACK-PHYLLITE AND SCHIST HORIZONS
ARCHAIC	Agk	GREYWACKE, CHLORITE SCHIST, IRON FORMATION, AND MINOR LAMINATED CHERT AND CARBONATE
ARCHAIC	au	ULTRAMAFIC ROCKS; BASALTIC AND PERIDOTIC KOMATIITES, SPINIFEX TEXTURED FLOWS; MINOR FELSIC, METAVOLCANIC AND LAYERED VOLCANIC SEDIMENTARY ROCKS TOWARDS THE TOP OF THE SEQUENCE
ARCHAIC	amv	METAVOLCANIC ROCKS; RHYOLITE PORPHYRY, FELSIC TO INTERMEDIATE-TYPE AND FLOWS, AND SHALLOW INTRUSIVE ROCKS; MINOR METAGABBRO SILLS AND DYKES
ARCHAIC	ama	MEGACRYTIC, LAYERED AND/OR BANDED GNEISS, TONALITE GNEISS, GARNET-BIOTITE PARAGNEISS, AMPHIBOLITE (Am)
ARCHAIC	agn	GRANULITE, GARNET-BIOTITE PARAGNEISS, MAFIC SCHIST, MINOR AMPHIBOLITE, INTRUDED BY GRANITOID ROCKS (AVs, AVi, AVsL, AVsLp)

This open file consists of three 1:250,000 scale preliminary geological maps (Amer Lake, 66H; Deep Rose Lake, 66G; Parts of Pelly Lake, 66F) and accompanied by a marginal legend, and a comprehensive list of references. Field mapping in the Amer Lake map area was undertaken by Heywood, Tippett, Tella, and Anney during 1976, 1978, and 1979; in the Deep Rose Lake and Pelly Lake map areas by Tella, Thompson, Ashton, and James during 1982 and 1983 field seasons. Preliminary studies of mapping were reported previously (Heywood, 1977; Tella, 1983; Tella and Heywood, 1978, 1983; Tella et al., 1983, 1984; Tippett and Heywood, 1978). This compilation of geological information incorporates additional data (published and unpublished) for topical studies undertaken in the region by several other workers (Annesley, 1983, 82; Ashton, 1981, 1982; Barrett et al., 1978; Jackson, 1983; Knox, 1980; Patterson, 1981; Patterson and Barrett, 1979; Smith, 1984) at scales ranging from 1:15,000 to 1:50,000. Persons interested in detailed aspects of geology and structure should consult the references supplied. Pertinent references for updating map areas are included in an overview of outstanding geological problems.

Granulite, garnet-biotite paragneiss, mafic schist and minor amphibolite (Unit Agn) appear to be the oldest rocks in the Amer Lake (66H) area. Unit Amv, structurally above unit Agn, consists of migmatites, layered or banded orthogneiss, garnet-biotite paragneiss, and minor amphibolite. Rocks within the Garry Lake complex (AVs), exposed in the northeastern part of the Deep Rose Lake map area (66G), are in part correlative with the rocks of Unit Amv. The oldest supracrustals in the region (66H) consist of metamorphosed layered rocks, commonly intermediate to mafic volcanic rocks (Amv), greywacke, chlorite schist, banded iron formation, and minor chert and carbonate (Agk), and quartzite (Ag). Zircon fractions from a mafic porphyry (Amv) in the Amer Lake map area yielded a 15-Pb upper concordia intercept age of 2801 ± 20 Ma, suggesting an Archaean age for some of the supracrustals in the region. Considerable controversy exists among geologists as to the age of gneisses (Ag) in the southeastern part of the Amer Lake map area (66H) and similar rocks exposed further to the south and southeast (Schultz Lake, 66G; Baker Lake, 96D). Alugh Wright (1967) assigned an early Proterozoic age to the above rocks, Schuch et al. (1982) and Taylor (in press) assigned an Archaean age to the quartzites in the Baker Lake schistose Lake map area on the basis of their lithological similarities to the Archaean Prince Albert Group (Schuch and Hubbert, 1977). Recent studies in the Amer Lake map area by K.E. Ashton confirm an Archaean age for these quartzites (Ashton, personal communication, 1984). There the zircon fractions from a granite (Ag) that locally intrudes the quartzite (Ag) yielded a late Archaean age (16-Pb isotopic age) of Ashton, personal communication, 1984. Associated with these supracrustals are spinifex textured komatiitic rocks (Au) which are in part known to be extensive in the Komatiities form relatively thick units that are both underlain and overlain tholeiitic rocks (Annesley, 1983). These rocks are assumed to be Archaean in age (on the basis of their field, petrographic, and chemical characteristics (Annesley, 1981)).

Deformed supracrustals of uncertain age (Agk), part consisting of stromatolite bearing units (AVs), occur in the northern parts of the Deep Rose Lake map area (66G). Deformed and metamorphosed phyllosilicates ranging composition from diorite to granite (Agn to Ag) occur throughout the region and, part, represent a basement complex to the deformed and metamorphosed supracrustals of the Amer group (AVs to AVsL). Adjacent to the Amer group strata, zircon fractions from a granite (Ag) 35 km northeast of Saint Lake, NTS 66G) in this basaltic complex yielded a 15-Pb upper concordia intercept age of 2617 ± 20 Ma. Rhyolite sills, paragneiss, and

quartzite-feldspathic metasedimentary gneiss (AVs), and metamorphic rocks and minor amphibolite (AVi), mostly occur structurally below the Amer group in the central portions of the Amer Lake map area (66H) and to a lesser extent structurally above the quartzite (AVs). Although Barrett et al. (1978) and Patterson (1981) consider the metamorphic rocks (AVs) to be part of the Amer group, Heywood (personal communication) and Tella and Heywood (1983) favour a pre Amer group age for these rocks. The early Archaean Amer group strata are dominantly made up of two tectonic sequences - a lower conglomerate-orthoquartzite (AVsL) and an upper feldspathic sandstone-carbonate-siltstone (AVs). The two are separated by a relatively thin transitional clastic sequence consisting of impure clastic rocks (AVsL), feldspathic quartzite (AVsL), carbonate (AVsL), and mudstone-siltstone-sandstone-rhyolite (AVsL). These transitional lithologies are, in part, banded near gabbro sills (AVsL) in the Deep Rose Lake map area (66G). Stratobound uranium mineralization occurs within the upper parts of the transitional sequence. The intensity of deformation within the rocks of the Amer group increases from southwest to northeast with a corresponding increase in metamorphic grade from subgreenschist to lower amphibolite facies. Several north-northeasterly transported thrust sheets have been mapped within the lower Amer group strata.

The Amer group was intruded by a younger suite of late Archaean-early Helikian granite-syenite plutons (AVsLp - AVsLp). Zircon fractions from a syenite intrusion (AVsLp) in 66H yielded a 15-Pb upper concordia intercept age of 1849 ± 18 Ma. Paleohelikian clastic rocks of the Thelon Formation (Hr) unconformably overlie the granitoid basement complex and the Amer group. Northwest trending diabase and gabbro dykes (Hd) record the youngest tectonic activity in the region.

Northeast trending, cataclastic and mylonitic zones and northwest trending brittle faults affect both the basement and the cover rocks. Deformed and regionally metamorphosed granitoid and sedimentary rocks within the Amer and Chantry mylonite zones exhibit deformation textures characteristic of both ductile and brittle deformation modes (Tella and Heywood, 1978; Tella et al., 1983). Field relations and textural aspects indicate at least two periods of movement along the Amer mylonite zone, and K-Ar mineral dates (Table 1) across the zone suggest that the latest movement (with a dextral sense of displacement) may be as young as 1.7 Ga (Tella, 1983). These movements post date the emplacement of late Archaean-early Helikian granite-syenite plutons (AVsLp). The latest movement on the Chantry mylonite zone (66G) was of low angle oblique-slip with an apparent dextral sense of shear (Tella et al., 1984). The tectonic significance of these mylonite zones within the northern Churchill Structural province is currently being investigated.

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Geology of the Amer Lake (NTS 66H), Deep Rose Lake (NTS 66G), and parts of the Pelly Lake (NTS 66F) map areas, District of Keewatin, NWT