# Canada







**Hesources** 

## THE TECTONIC EVOLUTION OF THE TALTSON MAGMATIC ZONE: A RECONNAISSANCE STUDY **BY H.H. BOSTOCK** MARGINAL NOTES

#### Metasedimentary rocks

No stratigraphic order implied; overlapping geochronology data, coupled with varying degrees of metamorphism and variable metasedimentary assemblages reflecting possible facies changes make regional correlations problematic. Uncorrelated clastic rocks (presumed Paleoproterozoic age)

Quartzite: possibly correlated with units further to the west (Buffalo Terrane?), exposed at Taltson River, western margin of Deskenatlata granodiorite; white weathering, clean, unstratified, purplish white quartzite containing clusters or single pebbles of white quartz, purple-white quartzite and rare grey flinty quartzite. Local pebble lenses dip west.

Conglomerate, uncorrelated, Star Lake, Kidder Lake, and Hill Island localities possibly Nonacho outliers; polymictic conglomerate, predominantly granite and white vein quartz pebble, with local concentrations of fine-grained mafic igneous pebbles as well as siltstone chips; rounded and angular pebbles in sandy, chloritic and sheared matrix; beds commonly 10 cm inches thick but some granite blocks reaching 60 cm. Local graded beds and scour marks.

Clastic rocks: uncorrelated, some outliers possibly Nonacho, east of Hill Island; sandstone, quartizte to conglomerate, with minor greywacke and siltstone beds. Grey-green, green, buff, cream, and pink. Pebbles up to 5-7 cm common, local rare occurrences of clasts up to 30 cm. Pebbles predominantly guartz, sandstone and siltstone, with some feldspar shards. Local crossbedding, graded beds, laminations and rhythmic layering. Slate horizons, locally schistose or, strongly lineated HILL ISLAND METASEDIMENTARY ASSEMBLAGE

Hill Island metasedimentary assemblage: predominantly bedded laminated mudstone to massive siliceous siltstone several metres thick, ± tourmaline. Local graded beds suggest turbidite deposition; minor coarse-grained sandstone layers, up to 1 metre with common feldspar grains; local iron sulfide-bearing mudstones, and garnet-bearing calcareous siltstone arranged **p{msHL** in boudin-like lenses or concretions parallel to bedding. Abrupt top reversals and rare exposed fold noses suggesting nearisoclinal folding. Sporadic presence of cordierite and absence of identified alumino silicates suggests rocks have reached amphibolite facies and may reflect potassium metasomatism related to Natael granite emplacement at the southern end of the belt. Greywacke U-Pb (zircon) 2133.8 ± 8 maximum age of deposition, west side of Hill Island Lake.

Hill Island schist: discontinuous north-south 40 km long belt of muscovite-chlorite-biotite-quartz-plagioclase schist with local garnet, andalusite, and staurolite; local sillimanite proximal to mylonite zones; more northern schists are less deformed and are lithologically similar to the greywacke-mudstones to the west of Hill Island Lake (pPmsHL).

#### RUTLEDGE RIVER BASIN

Pelitic to quartzitic paragneiss was deposited in the Early Proterozoic Rutlegde River Basin which closed after the emplacement of 2.44-2.27 Ga granites in the western Rae Province (Bostock and van Breemen, 1994); closure was followed by highgrade metamorphism that preceded but was unrelated to, the Taltson granites. Local graded beds are the only recognizable sedimentary structures. Minor amounts of calc-silicate rocks, bands of mafic volcanic rocks, and rare marble are also present (Thubun Lakes). Sillimanite ± andalusite + cordierite + potassium feldspar indicate the minimum grade attained was upper amphibolite facies, while local assemblages of quartz-plagioclase-orthopyroxene show that regionally lower granulite facies was reached. In the Rutledge Lake area two granulite facies paragneiss suites, the Mama Moose and the Rutledge River were recognized by Culshaw (1984). The Mama Moose is characterized by discontinuous positive aeromagnetic anomalies that crudely define a narrow belt projecting southward from Rutledge Lake suggesting that these rocks are regionally significant, and represent two temporally distinct stratigraphic (potentially allochthonous) units or a possible facies contrast related to the margin of a minor volcanic belt (Mama Moose complex) within the regional paragneiss (Rutledge Lake complex).

Rutledge River paragneiss: fine- to medium-grained, severely deformed, banded- to rarely-bedded paragneiss unit characterized by pelitic, quartzitic or calcsilicate zones within biotite - quartz - feldpar gneiss. Commonly amphibolite grade, but ranging from greenschist facies (Hill Island) to locally granulite. Occurring predominatnly as tectonic rafts, screens, and segments within Taltson granitoid plutons, sporadically within the Taltson Basement Complex, and rarely within the Nonacho Basement complex. Distinguished from Nonacho Group sedimentary rocks by metamorphic grade, absence of sedimentary features, and location as the two metasedimentary packages have not been observed in contact with each other. Interlayered often with minor mafic volcanic and calc-silicate rocks as well as granitic layers. Sillimanite - K-feldspar - cordierite assemblages widespread ± garnet ± andalusite; ± orthopyroxene in more mafic components; rusty weathering common and n places disseminated iron sulphides form gossan zones. Characteristic syngenetic tourmaline throughout the study area may be correlative to the tourmaline-rich on-strike sediments of the Waugh Lake Group, northeastern Alberta. Paragneiss, Thubun Lake U-Pb (zircon) 2153.4  $\pm$  1.3 Ma to 2044.4  $\pm$  1.5 Ma population providing maximum age of deposition (#26); second population U-Pb (zircon) 1904.7 ± 1.2 Ma (#27), U-Pb (monazite) 1904.4 ± 1.0 Ma (#28), and 1906.9 ± 1.1 Ma (#28), providing minimum age of deposition / oldest metamorphic growth. Quartzite band within paragneiss, Tsu Lake U-Pb (zircon)  $2142.7 \pm 2.4$  Ma to  $2059.8 \pm 2.3$  Ma population (#29), interpreted as maximum age of deposition.

Mama Moose paragneiss: a discontinuous 225 km long belt of migmatite to banded gneiss; commonly upper amphibolitegranulite facies with quartz - K-feldspar - cordierite - sillimanite - biotite - magnetite assemblages, garnet not common, rare plagioclase, trace green hercynite, corundum exsolution textures observed; tourmaline and graphite are absent; characteristically dark fresh surface. Commonly interleaved with orthopyroxene-bearing metabasite, rarely with granitic bodies. U-Pb (zircon) 2152.5 ± 1.1 Ma maximum age of deposition with ca. 2133 Ma as best estimated age based on population cluster (#22); U-Pb (zircon, monazite) 2079.6 ± 1 Ma minimum age of deposition (and oldest dated metamorphic growth) (#25); U-Pb (monazite, zircon) ca 2077 (#23) to 2056 (#24) Ma age of metamorphic crystal growth or monazite closure temperature after peak of granulite facies metamorphism.

### **ARCHEAN? - PALEOPROTEROZOIC** (Stratigraphic order not implied; uncorrelated rocks of various ages)

Felsic dyke: diorite to granodiorite dyke, locally pegmatitic, often contains mafic schlieren, plagioclase sometimes stained

pink, ± chlorite; trending 10°, ~ 5 km long, located in Nonacho basement rocks west of Taltson Lake. Felsic volcanic: quartz - feldspar - chlorite schist with volcanic banding (compositional variations) and channel fill features preserved; rusty zones with possible garnet; at least 2km in length; at times remnant poikioblastic texture visible; quartz is flattened; absence of boudins. Mapped as single occurrence in Slave batholith.

Amphibolitic bodies of varying ages and compositions; massive to well-foliated to gneissic; occurs throughout map area, includes amphibolitic to dioritic and quartz dioritic gneiss, northern Thubun Lakes area.

Marble, calcareous siltstone: laminated and interlayered; grey, white to pink marble and calcareous grey siltstone with local biotite-tremolite-chlorite rich bands; strongly folded, local epidote nodules, crystalline actinolite and garnet. Thubun Lake area. | Metagabbro: small bodies - largest up to 2 km, medium-grained, granular, slightly foliated and lineated, variable proportions O gb of plagiosclase, hornblende and orthopyroxene ± biotite; undetermined age; occuring near Deskenatlata Lake, Pilot Lake, <sup>1</sup> and Hill Island areas.

Diorite: quartz, biotite and hornblende metadiorite, grading into gabbro; undetermined age. Occuring as widely distributed single, irregular shaped bodies, commonly 100-200 metres, or as elongated bodies up 7.5 km, in northern Slave granite. Smaller bodied diorites comprise mafics up to 30%, with mafic rich zones or schlieren (up to 75%); more gabbro-rich bodies contain pyroxene; often chloritized; dark grey, to grey-green; fine- to medium-grained; foliated, generally intrudes surrounding granitic rocks and often crosscut by granitic dykes. Elongate bodies are fine- to medium-grained, pink to tan to dark grey, massive to strongly foliated, with flattened quartz; variable mafic content with biotite  $\pm$  hornblende up to 15%.

Granodiorite: undifferentiated and uncorrelated; includes the porphyritic to xenolithic, biotite-hornblende, foliated and locally chloritized granodiorite bodies east and southeast of Hill Island and an agmatitic, foliated leucogranite to granodiorite, locally chloritic and xenolithic, fault-bounded block north east of Fort Smith.

Granite: undifferentiated and uncorrelated; includes granite to monzogranite to syenogranite; pink to white, medium- to coarse-grained, locally porphyritic to xenolithic, weakly foliated bodies east, and south east of Hill Island as well as the O{gr/// amazonite-rich occurrences at Portman Lake, the Nonacho unfoliated, fine-grained granite to quartz monzogranite, and the northern Taltson, Great Slave Lake Shear Zone, massive to strongly foliated, fine- to coarse- grained granite to monzogranite bodies. Syenogranite outcrop east of Hill Island and north of Salmon Lake, representative of many small granitotid bodies, UPb (zircon) age  $2394 \pm 2$  Ma (#33).

Of grgd Granite to granodiorite: undifferentiated granitoid bodies; mixed and gradational units of granite (APgr) to granodiorite (APgd), east and southeast of Hill leland (APgd), east and southeast of Hill Island.

Mixed gneisses: Hetrogeneous gneiss, augen gneiss, masssive- to weakly-foliated, meso to leucocratic, ranging to strongly-O{gn foliated meso to melanocratic gneiss with many xenoliths. Some recognizable protoliths (megacrystic granitoids); includes Hill Island mixed gneiss with mafic remnants.

Granulite: granitic to tonalitic granulite to granulite-grade gneissic bodies of uncertain protolith; occuring as small bodies and inclusions (up to 6.5 km); quartz, plagioclase, hypersthene and ilmenite-magnetite bearing, ± biotite ± K-feldspar, rarely garnet; medium- to medium-fine grained; occurs within and along the margins of the late Taltson granites and isolated occurrences in Hill Lake and Vandyck Lake area and also includes the charnokitic granite at Rutledge Lake.

Mylonite: pink, grey to brownish, sometimes white or greenish, aphanitic rocks with smeared-out quartz lenses that contain ounded and locally rotated K-feldspar clasts. May be finely banded; quartz veining often present proximal to faults. Amphibolite inclusions and shlieren locally present in mylonite margins. Smaller zone contacts are sharp, contacts between mylonite and adjacent gneiss or granite are often undefined or gradational. Present in Nonacho cobbles. Sheared monzogranite, eastern edge of shear zone, east of Benna Thy Lake, U-Pb (zircon) 2334 +22/-18 Ma age of emplacement, providing maximum age for major sinistral shear (#30).

Mylonitized to brecciated granitic rocks: buff-grey, grey-green to pink mylonite with recognizeable granitic protolith, also ncludes banded and augen granitic gneiss; often brecciated; pink bands of fine-grained granite common; pink to white feldspar lenses usually 2-4 mm, lenses and stringers of white quartz; thin whispy mafic bands (predominantly biotite), often chloritized; sugary texture. Includes Great Slave Lake Shear Zone, northern Taltson magmatic zone, and Lady Grey Lake mylonites, Hill Island brecciated granite and gneiss as well as a distinct unit of augen gneiss, west shore Star Lake. 💼 Mafic to granitic, gneissic migmatite: includes major amphibolite bands and smaller bodies of metagabbro, as well as minor metasediments. At Gagnon Lake, inclusion melanges bearing rounded anorthosite and metamorphosed ultramafic xenoliths lithologically similar to the Berrigan Lake complex, and at Dempsey and Vandyck Lake, agmatitic and gneissic migmatite.

### **ARCHEAN - PALEOPROTEROZOIC**

Rae Interface (boundary between Taltson Magmatic zone and western Rae Province) Nonacho Basement Gneiss Complex / Domain: defined as predominantly Paleoproterozioc with recorded Archean inheritance, resting upon and/or comprising of re-worked fault blocks of Rae Province upon which the remnants of the Nonacho Group lie unconformably, or by which the Nonacho Gp lies in fault contact with; to the west bound by the Allan Shear zone, and to the east by a regional north-south trending aeromagnetic discontinuity. Includes the Nonacho, Berrigan and Yatsore blocks which are thought to have moved as a largely sinistral, westward fault array, into the eastern margin of the TMZ during a later pahse of Slave-Rae indentation. Consists of remnants of massive, foliated or banded, medium-to fine-grained plagioclase-rich, hornblende diorite to quartz diorite, inclusions and/or schlieren of amphibolite, medium-grained, foliated- to massive- granitoid rocks with varying composition from granodiorite to granite and often charnokitic; perthitic microcline present in granitoid rocks in varying proportions and may form megacrysts up to 2 cm within gneiss. Greenschist facies epidote, chlorite and sometimes muscovite are accompanied locally by prehnite and carbonate, and more rarely, pumpellyite; trace zircon and apatite. Intruded by small bodies and dykes of aplite and pegmatite. Notable absence of regional paragneiss (pPpgM and pPpgR). Quartz diorite gneiss U-Pb (zircon) age 2400 ± 10 Ma south of Thekulthili Lake (#31); agmatitic phase, granodioritic body, intruding mafic rocks, west of Taltson Lake, U-Pb (zircon) 2294 ± 5 Ma age of emplacement (#32).

Taltson Basement Complex: Defined as predominantly Paleoproterozioc with recorded Archean inheritance, resting upon and / or comprising of re-worked complexly deformed fault blocks of Rae Province, shear-bound by the Allan Shear zonewest, the Yatsore block-north, the Tazin shear zone-northeast, a regional north-south trending aeromagnetic discontinuityeast, and to the south deformed by Leland, Allan, and Colin Lake shear zones. Granitoid to dioritic igneous rocks and mixed gniess with zircon ages ranging from Archean to 2300 Ma, interlayered with mylonite, paragneiss (pPpgR) and minor biotitenornblende gneiss. Slightly to strongly foliated, altered, and display variable northerly trends; locally up to granulite facies, with sillimanite - cordierite - K-feldspar ± garnet; orthopyroxene is found in mafic rocks. Contains early Rae granitic augen gneiss (pPgrR, Yatsore Lake)  $2270 \pm 4$  Ma (#18).

— <del></del>	anticline	₽	overturned synform
N	syncline		fault
P	overturned syncline		major shear

#### INTRODUCTION

The Taltson Magmatic zone project was conceived in 1978 to provide modernized reconnaissance geological background to assist prospecting for uranium that had recently expanded northwestward from the Uranium City area as a result of increased interest in uranium for fission powered electricity generation. At that time, the western margin of the Churchill Province had not been generally recognized as a Paleoproterozoic plate margin, the Thelon-Taltson tectonic zone.

proterozoic western Rae Province, referred to in this synthesis as the 'Internal Rae Province (IRP). It is separated from the TMZ by a north - south zone called the Taltson - Rae Interface (T-RI). The three north-south zones, TMZ, T-RI, and IRP are shown in Figure 2 in red.



Figure 1. Regional tectonic map of northwestern North America (Berman and Bostock, 1997, after Hoffman, 1988a)

The project involved the reconnaissance (1:250,000 scale) mapping of the northern part of TMZ and its eastern margin (T-RI) with the Rae Province, north of 60°N. The initial summer's field work (1979) was conceived as a regional familiar ization year that would also provide a basis for future plans. Two 2-man camps, each equipped with inflatable rubber boats were based on a succession of lakes and moved every week by float plane. In the summers of 1980, 1981 and the second half of 1985, the Precambrian rocks of the Fort Smith (75D), Little Buffalo River (85H) and part of Fort Resolution (85A) were mapped. With the aid of helicopter set-outs, ground traverses were run east-west across the regional strike at 4 to 8 km intervals. Boats were also used to cover lake shore where the best exposures were typically available. This provided optimal representative coverage. In 1983, 1985 and 1986 through to 1989, and 1991, field mapping procedures reverted to two man fly camps, with minor helicopter reconnaissance, and the Taltson Lake sheet (75E), the southeast corner of the Snowdrift sheet (75L) and a western part of the Hill Island Lake sheet (75C) were completed. Field work benefited substantially through cooperative field camps with S. Hanmer in 1983 and subsequent field excursions in 1985 and 1986 during which Bostock was introduced to the modern use of kinematic indicators. In 1997 a helicopter was used to collect a suite of geochronology samples, primarily in the north-south Arch Lake granite-Gagnon granite corridor (Fig. 3).

BEDROCK GEOLOGICAL OVERVIEW

The Taltson Magmatic zone's boundaries were initially defined by Ross et al., (1991) on the basis of aeromagnetic patterns and the study of samples recovered from drilled oil-well bottoms. Some TMZ features are not well exposed but are distinguishable on the accompanying aeromagnetic map (Fig. 2). The TMZ north of 60° N (this synthesis) can be divided into three roughly north-south chronological segments (TMZ map, Sheet 1): 1) the early Taltson western wedge-shaped ca. 1986 Ma Deskenatlata granodiorite, 2) a middle Taltson N-S trending Slave-type foliated ca. 1955 Ma monzogranite, and 3) which is in turn intruded by a number of Late Taltson granitoid bodies - the largest being the central Konth batholith (ca. 1938 Ma) and the eastern margin Arch Lake granite (ca. 1938 Ma). The Late Taltson granites also include several smaller plutons - Natael, Othikethe Falls, Gagnon (thought to be a continuation of the Arch Lake pluton), Benna Thy (ca.1937 to 1906 Ma), and a post -Taltson magmatic Thekulthili Stock (ca. 1813 Ma).

The Taltson-Rae Interface is an elongate roughly arcuate zone and comprises two domains or complexes. The more northern Nonacho Basement Domain (NBD) consists of the Rae-Province fault-bounded Berrigan Lake and Yatsore blocks, the fault-controlled Nonacho Block and the Nonacho Basin sequence that overlies it. The second domain, the Taltson Basement Complex (TBC) consists largely of deformed granitoid rocks and mixed gneiss with zircon ages ranging from Archean to ca. 2300 Ma and includes the 'Rae' granites, Borrowes Lake augen gneiss 'granite', and Thoa metagabbro as well as Rutledge paragneiss segments, the latter being noticeably absent in the NBD. Accompanying the TBC is a suite of eastern early granodiorites which occur mostly south of the study area. This interface can be seen by a magnetically-defined southward ineament that south of the study area comes in contact with the Tazin Shear zone, pinching out the T-RI, and marking the eastern margin of the TMZ (Fig. 2).

The segment of eastern Rae Province (IRP) north of 60°N consists of a southern Nolan block and the Nonacho basement domain in the north. While this synthesis focuses on the TMZ and T-RI as these comprise most of the study area, four isolated areas within and along the margins of the Nolan block were also mapped: central Nolan, Whirlwind and Portman Lakes (2 separate areas), the western margin, Vandyck Lake, and the northern margin, Grampus Lake. This compilation includes the Nolan block geology, although it is largely uncorrelated.

Four distinct metasedimentary packages occur in the study area: 1) An older predominantly pelitic to semipelitic paragneiss with minor volcanic rocks of the Rutledge River Basin Complex (2.3-2.2 to 1.97 Ga); it occurs as inclusions or mapable remnants throughout most of the exposed TMZ and in the eastern T-RI. The complex comprises f two units: an older, possibly allochthonous Mama Moose, (p{pgM) pelitic unit 2.33 to 2.09 Ga, (minimum age) and the Rutledge River (p{pgR) (1.97 Ga maximum age) often tourmaline-rich paragneiss, pervasive throughout the study area and may be correlative to the tourmaline-rich on-strike sediments of the Waugh Lake Group, northeastern Alberta.

2) The tectonically isolated Hill Island (p{msHL, p{scHL) north-south lying metasediments. These comprise an upper greenschist-facies greywacke-mudstone unit that is flanked by a tectonite zone to the east, separating it from a belt of predominantly chlorite-sericite ± garnet schist; locally, where undeformed, is lithologically similar to the metasediments to the west. 3) The younger minimally metamorphosed, coarse- to fine-clastic rocks of the Nonacho Group (p{N) (Aspler 1984a, b; Aspler and Donaldson, 1984); which are constrained with 1907 and 1827 Ma, minimum and maximum ages. This basin sequence, excluding several possible uncorrelated isolated outliers ( $p\{cg, p\{c\}, generally rests unconformably upon southwesterly to$ southward-trending fault blocks of Rae basement in the north-west corner of the T-RI, with displacement of these fault blocks occurring during Nonacho deposition. 4) A small unit of quartizte (p{q) in the extreme west of the study area thought to belong to a younger western sedimentary seauence.

Tourmaline-bearing rocks have been documented in two main rock types within the TMZ, granitoid rocks and syngenetic meta-sedimentary units that were likely remobilized during Taltson magmatism (Rutledge River paragneiss and Hill Island metasediments). These occurrences form a large zone, or "trajectory" and include rocks from Thubun Lake to Hill Island Lake and to south of the study area (Waugh Lake, Alberta). Tourmaline was not found in the older Mama Moose paragneiss therefore helping to distinguish between the two paragneisses and giving credence to the possibility that Mama Moose was allochthonous. As tourmaline is thought to be a potential regional target indicator for several types of ore deposits a table was compiled containing occurrences from field observations as well as those identified through examination of over 3000 thin sections (Bostock, 2000); locations are shown here as Figure 4.



Figure 3. Geochronoloy samples taken in northern Taltson Magmatic Zone (Bostock, unpublished)



The Paleoproterozoic Taltson Magmatic zone (TMZ) comprises a magmatic arc of some 200 km in width that extends roughly 700 km southward from the Great Slave Lake shear zone (GSLSZ) to the Snowbird tectonic zone (Fig. 1). Only its northeastern 20 percent is free of Paleozoic and Pleistocene cover. The northern extension of TMZ, the ThelonTectonic zone, deformed and offset by the Slave-Rae collision, extends north to Prince of Wales Island forming a magmatic arc of approximately 1700 km strike-length (Hoffman, 1988a). To the east, beyond this present study, lies the Archean - Paleo-



Figure 4. Tourmaline distribution in northern Taltson Magmatic Zone showing NW-SE belt (Bostock, 2000).



#### SURFICIAL GEOLOGICAL OVERVIEW

The area covered north of 60°N is characterized by rolling glacially polished rock surface. Topographic variances within the study area are reflected in the thickness and character of the Pleistocene cover, which is mostly thin or absent in the central mapped region between the Slave flood plain and the 110 E° meridian but increases further east in the IRP. Westerly trending eskers are locally interrupted by sand planes in this central area, and northerly trending dunes of fine sand are widespread to the southeast. At the western margin, many outcrops are overlain by a few meters of fine-grained silt suggesting the presence of one or more ephemeral post glacial lakes, and cylindrical pot holes up to ~ 3m in diameter were found in the bedrock surface near Little Deskenatlata Lake, suggesting active water flow above the present active stream valleys. Glacial striae and scattered chatter marks suggest ice flow at ~260°, whereas near Great Slave Lake some striae divergence to the north suggests drawdown in this direction.

#### SCOPE OF WORK and ACKNOWLEDGEMENTS

The work consists of reconnaissance mapping, geochronology, geothermometry, and petrography of the TMZ in the Canadian Northwest Territories north of 60°N and south of Great Slave Lake. This study relates and relies on the field work and the works of Riley (1960), Langenberg (1983), Godfrey (1986), and McDonough et al. (1995a; 2000) in southern TMZ, Alberta. The aeromagnetic data for this study were taken from the national database and decorrugated by Warner Miles of the Regional Geophysics section of the Geological Survey of Canada. The bouguer gravity data were also supplied from the database through him. H. Bostock is further indebted to the many capable university students who participated in field mapping and geochronology of the northern TMZ. These included senior mapping assistants: Ken Ashton, 1979; William Love, 1980; Pierre Pilot, 1981; Nora Haan, 1981; Ross Stevenson, 1983, 1985; Peter Manojlovic, 1995; Paul Moore, 1986; Martin van Kranendonk 1986; John Ferguson, 1987; and Owen Steele, 1987. Junior assistants: Jean-Luc Poev, 1979; Johannes Thiessen, 1979; Michael Hamilton, 1980; Edward Woods, 1980; Francois Tremblay, 1980; Guy Lavergne, 1980; Mario Justino, 1981; Jennifer Bates, 1981; Bertram Brasard, 1981; Todd Hamilton, 1983; Donald Watanabe, 1983; Garry Grant, 1983; Paul Thompson, 1985; David Brotherton, 1985; Desmond Mozer, 1985; Susan Keddie, 1986; Brvan Rovko, 1986; Douglas MacKenzie, 1986; Steven Davies, 1987; Leslie Jessop, 1987; Robert Spark, 1987; Robert Stevens, 1988; and Ronald Scott, 1991. Two cooks provided excellent meals for helicopter operations: Jennifer Goodwin, 1980, 1981; and Janice Shields, 1985.

Special mention goes to students who undertook research studies related to this project. William Love examined, described and interpreted the petrography, and high grade mineral assemblages of the paragneiss and Konth granite, east of Tsu Lake (BSc thesis, Lakehead University). Nora Haan studied the structure and petrography of the Taltson Basement Complex (TBC) west of Hill Island showing that sinistral strike-slip shear had occurred along a northerly trending shear zone (BSc thesis, University of Ottawa). Ross Stevenson studied an amazonite (Pb-rich alkali feldspar) occurrence at Portman Lake immediately southeast of the project area (Stevenson et al., 1989, Master Thesis, McGill University). Desmond Mozer examined the local geothermobarometry of the Rutledge River paragneiss at O'Connor Lake, and suggested that temperatures of ~ 700°C at pressures ~ 3.8 kb corresponding to upper amphibolite-granulite facies were reached (BSc, Queen's University). Robert Spark used structural data collected by himself and other mappers during the1986 and 1987 field seasons in the Thubun Lakes area and suggested that rocks forming the core of the Thubun Lakes area had been displaced southwestward along the south margin of GSLSZ as a result of the Slave-Rae indentation (4th year term report, University of Waterloo). Jennifer Squance (1999) undertook a bachelor's thesis study at the University of Ottawa directed toward three-dimensional modeling of the northern TMZ. Jennifer used published gravity and magnetic maps together with determination of magnetic properties and specific gravity of hand samples to construct a series of profiles across the central part of the Konth granite pluton. Her work showed that although the Slave and Konth plutons were not distinguishable by this method, the Deskenatlata granodiorite was recognizably distinct. The granodiorite surface was found to dip gently eastward beneath the Konth and Slave plutons. A maximum depth to granodiorite was determined along the east margin of the Konth pluton.

#### COMPILATION PROCESS

This digital release has been compiled posthumously on behalf of Dr. H. Bostock. It is an attempt to accurately reflect Dr. Bostock's geological ideologies and concepts, and to take advantage of his precise observation skills and attention to detail; it does not include geological studies completed by other individuals (unless identified as sources used by Dr. Bostock himself, example Hoffman, 1988) during or post compilation. Areas included in this compilation (TMZ map, this synthesis): 1) The southern section (60° to 61°N) was mapped in 1979, 1980 and 1981 and was released as the Geology of the Fort Smith area, Open File 859. This release includes a map at 1:250 000 scale and accompanying notes. This area was revisited in 1985, and again in 1991 but the latter as heli-traverse focusing on sample collection as well as conflict resolution. Compilation mylars reflected an updated Fort Smith map sheet synthesis; no accompanying legend or notes were found. 2) Several areas were mapped via fly camps, east of the Fort Smith boundary (110°W); no maps or publications were released from this area except through Stevenson's amazonite occurrence, Porter Lake, (Stevenson and Martin, 1988). Unpublished documents contain descriptive notes/text from these areas. 3) Hill Island, to the east of Fort Smith, was mapped in 1981, 1983, and 1991, and lead to several publications reflecting field work and the evolving synthesis for this region (Bostock, 1981, 1983, and 1991). 4) In 1983, 1985, 1988 the northern section - (61° to 62°N) was mapped, and this led to the synthesis of the Geology of the altson Lake Map sheet. This map was never officially released and only existed as hard copy with no accompanying legend. Several geochronology papers dating major plutonic and sedimentary events were released (Bostock and van Breemen, 1987; Bostock, 1988; Bostock and Loveridge, 1988; Bostock, 1989; Bostock et al., 1991; Bostock and van Breemen, 1992; Bostock

et al., 1992; Bostock et al, 1994; and van Breemen and Bosctock, 1994) and data covering the Nonacho basin (Aspler 1985a and b; Aspler and Donaldson 1984) were also used. 5) An area west of 112°W to the Slave River mapping the extent of the Deskenatlata batholith. 6) An area north of 62°N with the Great Slave Lake shear zone as the most northern boundary. The latter was based largely on Hanmer (1987) and Hoffman's (1988b) mapping, but augmented by several cross strike traverses. In the course of this project approximately 16,530 observational station sites were logged, and a robust dataset was developed.

It includes approximately: 17,500 rock type/lithological descriptions, 26,000 structural and 500 kinematic indicator measurements, 2000 Pleistocene measurements and descriptions, 200 economic mineral observations, 200 radiometric measurements, and as well an uncalculated amount of metamorphic mineral counts tabulated for specific lithologic units, rock types, or terrains. Approximately 11,400 geological samples were collected for type localities, thin section analysis, mineral identification, chemical analyses, paleomagnetic determinations, structural reference (oriented samples) and economic reference.

Descriptive observation notes with accompanying pre-assigned numerical codes were collected and entered into field notebooks (Figures 5 and 6). At the computer lab, a person using a card punch (an output device that punches holes in cards under computer control) entered all of the data, which was in turn read into the computer, storing it in database format-this included numerical codes (key below, Fig.5) and all of the accompanying field description notes. For a hard copy, the database (codes and notes) was then "dumped" or printed onto 11 x 15 inch computer paper (Fig. 7), and assembled into books sorted by for example Region (Taltson), Year (1980), Geologist (Bostock), unique station number and accompanying subject matter (Fig. 7). All paper records and retained samples are now stored at the Geological Survey of Canada (GSC, Ottawa) and can be accessed by contacting the GSC and referring to H.H. Bostock years 1979 - 1997. Later, this database was exported to a personal computer in spread sheet format (codes only). The spread sheet data was then migrated to a GIS for this compilation. All primary data (spread sheets with numerical codes and observational measurements) was recovered for this synthesis except for lithological data; approximately 17500 'rock type' codes were hand entered into the database, along with condensed descriptions for Nonacho or Nonacho-type sediments, code 29, and Tazin, or Tazin-like sediments, code 13 (note: the latter were coded in the field as 'Tazin' but were not compiled as 'Tazin' at a later date).

* 00	00	A state to a state of the state		
*	00	00-09 ANCILLIARY DAT	400	10-39 LITHOLOGIES
+ CG 40-49 STRUCTURE	00	50-59 INDEX MINERALS	00	60-69 SAMPLES
*00 7C-75 PLEISTOCENE	00	76-79 ECONOMIC	00	80-89 KEY LITHOLOGIES
+00 90-99 MISCELLANEOUS	60	DETAILED EXPLANATION		
4	-		00	OI DATE, TRAVERSE NO.
*CO , PURPUSE OR LOCATION	N00	OF TRAVERSE	00	07 HISTORICAL INFO
+ 00 CABINS, CAMPR, PORTAG	600	ES, APCHEOLOGY.	00	03 TOPOGRAPHY: GUUD
+ CO CAMP SITES, HEIGHT DE	500	FALLS, RAPIDS, ICE	00	04 XILD LIFEI BEARS
*00 WOLF, WOLVERINE, MOO	500	F, FOX, HARE	00	05 PERSONNELI INDIAN
* CO S. PROSPECTORS, COMP.	400	NY OFFICIALS	00	06 ACCIDENT PEPUPIS
*00 10 GRANDDIDRITE (KOS'	100	FR COMPLEX	00	1 ITHOLOGIUS
+CO 11 GRANITE (KOSTER C	300	MPLEX		ng - bbang + lt Ens
*00 12				UT= no per si uns
+00 13 PRE-NONACHO GROUP		(TAZIN EQUIVALENTS)		
0	00	14		
•	00	15 AMPHIBULITE ACCMAT	1.00	TE. VEINED CHEISS
	00	17 CONNELTE EACTEE	100	SNEISSES
	00	11 ORPHOLITE PAULOS	00	AUGEN GNEISS
	00	19 BANDED CHETCE		NOVEN UNLIDE
	00	20 MSV 11 PAINTLY FO	11.00	MESD TO LEUCOCRATIC
	00	CNEISS CI 10 DE LES	500	21 STRONGLY FOL MISO
ID MELANOCOATTO CHET	SAA	S. MANY ZENDS FTC	00	22 MASSIVE GRANITE-07
+00 MONZONITE		and Erios ric	00	23 MEGACRYSTIC GRANIT
AGO E TO GRANDDIDITIE			00	24 DIORITE QZ-DIORITE
*00 GABBBD			00	25 ULTRAMAFICS. SYENT
.CO TE. ANORTHOSTIE			00	26 PEGMATITE
			00	27 DIABASE DYKES-
•	00	SPARRON DYNES		*
+00 28 MYLONITE, BRCC	00	= Rat River QZTE (one	only	)
*CO 29 NONACHO GRP			-	
0.0 0.0				
· · · · · · · · · · · · · · · · · · ·				
•00 31 -Deskenatlata GRDT				
•00 31 -Deskenatlata GRDT •00 32 Gagner Grit				
•00 31 - Deskendlata GRDT •00 32 Gagner Grot •00 33 Arch Lake GRIT				
00 31 - Deskenetlata GRDT 00 32 Gargern Grif 00 33 Arch Lake GRIT	00	34		
00 31 -Deskenstlate GRDT 00 32 Gazan Grit 00 33 Arch Lake GRIT	00	34		
00 31 - Deskendlata GRDT 00 32 Gagann Grot 00 33 Arch Lake GRIT	000000	34 35		
00 31 - Jeskendlata GROT 10 32 Gaugen Grot 10 33 Arch Lake GRUT	000000000000000000000000000000000000000	24 35 36 Benna Thy GRUT		
00 31-Jeskendlata GROT 00 32 Gragon Grit 00 33 Arch Lake GRIT	00 00 00 00	34 35 36 Bennia Thy GRUT 37		
00 31 - Jeskendlata GROT 00 32 Gaugum Grit 00 33 Arch Lake GRIT	00 00 00 00	34 35 36 Benna Thy GBUT 37 38 39 Par GBUT	0.0	
00 31 - Deskenatlata GROT 00 32 Gargan Grat 00 33 Arch Lake GRUT	00 00 00 00	34 35 Berna Thy GRUT 37 38 39 Ros. GRN T	00	STRUCTURAL MEASUREMENT
00 31 - Jeskendlata GROT 00 32 Gagam Grit 00 33 Arch Lake GRIT 00	00 00 00 00	34 35 36 Berna Thy GRUT 37 38 39 Rose GRUT	00	STRUCTURAL MEASUREMENT
00 31 - Joskenstlata GRDT 00 32 Gragan Grit 00 33 Arch Lake GRIT 00 15 00	00 00 00 00	34 35 36 Benna Thy GRUT 37 38 39 Rad GRN T	00	STRUCTURAL MEASUREMEN'S
00 31 - Deskendlata GRDT 00 32 Gragen Grit 00 33 Arch Lake GRIT 00 15 00 15 00 15		34 35 36 Berna Thy GRUT 37 38 39 Ros. GRN T 42 SCHISTUSTIY	00	STRUCTURAL MEASUREMEN'S
CO 31 - Joskenstlata GRDT CO 32 Gramm Grit CO 33 Arch Lake GRIT CO TS CO SO 41 BANDING LAYEPING SO 44 JOINTS		34 35 36 Berrie Thy GRUT 37 38 39 Rose GRUT 42 SCH1STUSTTY 45 LINEATIONS	00	STRUCTURAL MEASUREMENT 40 BEDS 48 CLEAVAGE 46 FEID AXES
CO CO CO CO CO CO CO CO CO CO		34 35 36 Benna Thy GRUT 37 38 37 Fac GRN T 42 SCHISTUSITY 45 LINEATIONS 46 VEIXS	000000000000000000000000000000000000000	STRUCTURAL MEASUREMENT 40 BEDS 48 CLEAVAGE 46 FOLD AXES 49 FAULTS
CO CO CO CO CO CO CO CO CO CO		34 35 36 Benna Thy GRNT 37 38 37 Ros. GRNT 42 SCHISTOSITY 45 LINEATIONS 46 VETYS 51 PYE JEFE	000000000000000000000000000000000000000	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 40 FOLD AXES 49 FAULTS 52 SILLMANIJE, MUSC
CO CO CO CO CO CO CO CO CO CO		34 35 36 Benna Thy GRUT 37 38 37 Ros GRN T 42 SCHISTUSITY 45 LINEATJONS 46 VEINS 51 PYEDSENE 54 CONDERLIE	00 00 00 00 00 00	STRUCTURAL MEASUREMENT 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-LIMENTE
CO 32 Gragan Grit CO 32 Gragan Grit CO 33 Arch Lake GRIT CO IS CO IS CO CO IS CO CO IS CO CO CO CO IS CO CO CO CO CO CO CO CO CO CO	00 00 00 00 00 00 00 00 00 00 00	34 35 36 Bénna Thy GRUT 37 38 39 Ros GRNT 42 SCHISTOSITY 45 LINEATIONS 46 YEINS 51 PYEDREE 54 COMOLERITE 57 FEUDPITE	00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 48 CLEAVAGE 46 FOLD AXES 49 FAULTS 25 SILLIMANIJE, MUSC. 55 MAGNETITE-LLMENITE 56 STAFFITE
CO CO CO CO CO CO CO CO CO CO	00 00 00 00 00 00 00 00 00 00	34 35 36 Benna Thy GRUT 37 38 39 Ros. GRUT 42 SCH15TUSITY 45 LINEATIONS 46 VETVS 31 PYED2FLE 54 COMDERTIE 57 FEDDRIFE	00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANIJE, MUSC. 55 MAGNETITE-LLMENITE 56 URAPHIJE
CO CO CO CO CO CO CO CO CO CO	00 00 00 00 00 00 00 00 00 00 00	34 35 36 Benna Thy GRUT 37 38 37 Rae GRN T 42 SCHISTUSITY 45 LINEATIONS 46 VEINS 51 PYEDSENE 54 CONDENTIE 57 FLUDEITE 57 FLUDEITE SAMPLES	00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN' 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-ILMENITE 56 GRAPHITE
CO 31Beskendlata_GRDT CO 32 Gagam_Grit CO 33 Arch Lake GRIT CO CO CO CO CO CO CO CO CO CO	00 00 00 00 00 00 00 00 00 00 00	34 35 36 Benna Thy GRNT 37 38 39 Ros GRNT 42 SCHISTUSITY 45 LINEATIONS 46 VETYS 51 PYEDERE 54 CONDERTIE 57 FLORITE 57 FLORITE 54 CONDERTS 54 CONDERTS	00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-ILMENITE 56 GRACHITE 61 OPIENTED SPECIMENS
CO BY L-Deskendlata GRDT CO BY Gramm Grit CO BY Gramm Grit CO BY Arch Lake GRIT CO CO CO CO CO CO CO CO CO CO		34 35 36 Berna Thy GRUT 37 38 37 Ros GRN T 42 SCHISTUSITY 42 SCHISTUSITY 43 LINEATJONS 48 VEINS 51 PYEDCHE 54 CONDIGIENTE 57 FLUDPITE SAMPL(5) 50 HAND SUECTIMENS 53 ECUMMIC	00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 40 FOLD AXES 49 FAULTS 50 MAGNETITE-ILMENITE 56 GRAPHITE 61 DPIENTED SPECIMENS 44 CHEMICAL ANALYSES
CO 22 Gragen Grit CO 32 Gragen Grit CO 33 Arch Lake GRIT CO 15 CO 15 CO 15 CO 10 41 BANDING LAYERING CO 10 41 BANDING LAYERING CO 10 41 BANDING LAYERING CO 10 41 BANDING LAYERING CO 10 53 GARET CO 10 HORMLENDE CO 53 GARET CO 54 UNKEDUN CO 55 GARDING LOVERDITE CO 56 GARDING LOVERDON CO CO 65 GARDING LOVERDON CO CO 65 GARDING LOVERDON CO CO 65 GARDING LOVERDON CO CO 65 GARDING LOVERDON CO CO CO CO CO CO CO CO CO CO		34 35 36 Bénna Thy GRUT 37 38 37 Ros GRN T 42 SCHISTUSITY 43 LINEATIONS 44 VEINS 51 PYEDIENE 54 CODDIEPTTE 54 CODDIEPTTE 54 CODDIEPTTE 55 FELDINENE 60 HAND SPECIMENS 53 ECUNOMIC 64 HACKETIC	000 000 000 000 000 000 000 000 000 00	STRUCTURAL MEASUREMEN 40 DEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-ILMENITE 56 GRAPHITE 61 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL
CO 31Deskendlata_GRDT CO 32 Gramm_Grit CO 33 Arch Lake GRIT CO CO CO CO CO CO CO CO CO CO	00 00 00 00 00 00 00 00 00 00 00 00 00	24 35 36 Benna Thy GRUT 37 38 39 Ros GRUT 42 SCHISIUSITY 42 SCHISIUSITY 43 LINEATIONS 46 VENS 51 PYEDREE 54 CONDIENTIE 57 FLUDETTE 57 FLUDETTE 50 FLUDETTE 53 ECONDMIC 66 HACKETTE 69 DINER	000 000 000 000 000 000 000 000	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLTMANIE, MUSC. 55 MAGNETITE-ILMENITE 56 URAPHITE 61 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL
CO 12 Gragen Grit CO 32 Gragen Grit CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 15 CO 15 CO 15 CO 15 CO 15 CO 15 C		34 35 36 Benna Thy GRUT 37 38 37 Ros GRN T 42 SCHISTUSITY 45 LINEATJONS 46 VEINS 51 PYEDSENE 54 CONDIFITE 57 FLUDPITE 53 FCUDPITE 53 FCUDPITE 60 HAND SPECIMENS 63 FCUDVNIC 64 MACKETIC 69 DIMER	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 55 MAGNETITE-ILMENITE 56 DRAPHITE 61 DPIENTED SPECIMENS 44 CHEMICAL ANALYSES 67 FOSSIL PLISTOCENE AND ECONOM
<pre>10 31</pre>	00 00 00 00 00 00 00 00 00 00 00 00 00	34 35 36 Benna Thy GRNT 37 38 39 Ros GRNT 42 SCHISTUSITY 45 LINEATIONS 46 VEINS 51 PYEDERE 54 CONDEPTTE 57 FLUBRITE SAMPLOS 06 MAND SPECTMENS 05 ECONDIC 69 DIHER	000 000 000 000 000 000 000 000 000 00	STRUCTURAL MEASUREMEN 40 DEDS 48 CLEAVAGE 46 FOLD AXES 49 FAULTS 55 MAGNETITE-ILMENITE 56 DRAPHITE C1 DPIENTED SPECIMENS 44 CHEMICAL ANALYSES 67 FOSSIL PLISTOCENE AND ECONOM 70
CO 21CO AGE CO 32 Gramm Grit CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO CO CO CO CO CO CO CO CO CO	00 00 00 00 00 00 00 00 00 00 00 00 00	34 35 36 Berna Thy GRUT 37 38 39 Ros GRN T 42 SCHISTUSITY 43 LINEATIONS 46 VENS 51 PYEDREE 54 COMDIREITE 57 FUDRITE SAMPLES. 60 MAND SPECIMENS 63 ECUMANIC 64 MALVETIC 69 DINER	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANIJE, MUSC. 55 MAGNETITE-LLMENITL 56 GRAPHITE 61 OPTENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL <u>PLISTOCENE AND ECONON</u> 70 71 STRIAE
<pre>10 31bekendlata_GRDT 10 31bekendlata_GRDT 10 32 Guamm_Grdt 10 33 Arch Lake GRUT 10 0 33 Arch Lake GRUT 10 0 41 BANDING_LAYERING 10 41 BANDING_LAYERING 10 41 DANING 10 41 BANDING_LAYERING 10 41 DANING 10 41 BANDING_LAYERING 10 41 BANDING_LAYERING 10 52 GARNET 10 53 GARNET 10 54 GRANDWN 10 55 GADIOWEIPIC_AGE 10 55 GADIOWEIPIC_AGE 10 59 PIEISTOCENE 10 27 FRAILS</pre>		34 35 36 Benna Thy GRUT 37 38 39 Ros GRN T 42 SCHISTUSITY 45 LINEATJONS 46 VEINS 51 PYEDSENE 54 CONDENTIE 57 FLUDRITE 53 ECONNIC 64 MAIN SPECIMENS 63 ECONNIC 64 DINER 73 UNCONSOLIDATED SE	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN'S 40 BEDS 40 CLEAVAGE 46 CLEAVAGE 46 FOLD AXES 49 FAULTS 55 MAGNETITE-ILMENITL 56 DRAPHITE 61 DPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSI <u>PLISTOCENE AND ECONOM</u> 70 STRIAE 74 OFGANIC
<pre>10 31</pre>		24 35 36 Benna Thy GRUT 37 38 39 Ros GRUT 42 SCHISTOSITY 42 SCHISTOSITY 43 LINEATIONS 46 VENS 51 PYEJCHE 54 CONDIENTE 57 FLUDRITE 53 FCDNUMIC 64 HACNETIC 69 DINER 73 UNCONSOLIDATED SE 75 FCDNUMIC MINERAL	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-ILMENITE 56 CRAFHITE 61 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL <u>PLISTOCENE AND ECONON</u> 70 71 STRIAE 74 OPGANIC 77 ERAILC WITH ECON M
CO 22 Grages Grit CO 32 Grages Grit CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 41 BANDING LAYEPING CO 41 BANDING LAYEPING CO 47 DYKES CO 47 DYKES CO 56 HORMLENDE CO 56 GANET CO 56 UNKEDUN CO 56 CONTENENT CO 77 FRAILCS CO 77 FRAILCS		34 35 36 Benna Thy GRUT 37 38 37 Ros GRN T 42 SCHISTUSITY 42 SCHISTUSITY 43 LINEATJONS 48 VEINS 51 PYEDORE 54 CONDIGIENTE 57 FLUDPITE SAMPL(5) 60 HAND SVECTMENS 63 FCUMMIC 64 MAINETIC 69 DIHER 73 UNCONSOLIDATED SE 75 ECONUMIS MICRAL 74 HEAM-SAY ECONMUL	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN'S 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-LLMENITL 56 GRAPHITE 61 OPTENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL <u>PLISTOCENE AND ECONON</u> 70 71 STRIAE 74 OPGANIC 77 ERATIC WITH ECON M
<pre>00 31Deskendlata GRDT 100 31Deskendlata GRDT 100 32 Gramme Grit 100 33 Arch Lake GRT 100 41 BANDING LAYERING 100 41 BANDING LAYERING 100 47 DIYES 100 47 DIYES 100 47 DIYES 100 52 GANETI 100 52 GA</pre>		34 35 36 Benna Thy GRNT 37 38 39 Ros GENT 42 SCHISTUSITY 45 LINEATIONS 46 VEINS 51 PYEDERE 54 CONDEPTTE 57 FLUDRITE SAMPLS, T 60 HAND SPECTMENS 63 ECONOMIC 64 MALETIC 69 DIHER 73 UNCONSOLIDATED SE 75 ECONOMIC MINERAL 79 HEA4-SAY ECONOMIC	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 DEDS 48 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-ILMENITE 56 DRAPHITE C1 DPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL <u>PLISTOCENE AND ECONON</u> 70 71 STRIAE 74 ORGANIC 77 ERATIC WITH ECON M
CO 32 Gramm Grit CO 32 Gramm Grit CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 15 CO 15 CO 41 BANDING LAYEPING CO 47 DYNES CO 47 DYNES CO 47 DYNES CO 47 DYNES CO 55 GANETIE-PYREHOTIE CO 55 GANETIE-PYREHOTIE CO 55 GANETIE-PYREHOTIE CO 55 GANETIE-PYREHOTIE CO 77 EPATICS CO 77 EPATICS CO 77 COSSAN DE THENCH CO 77 COSSAN DE THENCH CO 77 CASENTIE VIN ED		34 35 36 Benna Thy GRUT 37 38 39 Ros GRNT 42 SCHISTUSITY 42 SCHISTUSITY 43 LINEATIONS 46 VENS 31 PYEDARE 54 CONDITENTE 57 FUDDITE SAMPLES 160 HAND SPECIMENS 53 ECONDMIC 46 NALVETIC 69 DINER 73 UNCONSOLIDATED SE 73 UNCONSOLIDATED SE 74 CONSOLIDATED SE 74 OUARTELTE LATERS	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-LLMENITE 56 DRIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL <u>PLISTOCENE AND ECONON</u> 70 71 STRIAE 74 OFGANIC 77 FRATIC WITH ECON M 82 IPON FOFMATION
CO 31Deskendlata_GRDT CO 32 Guagen_Grtt CO 32 Guagen_Grtt CO 33 Arch Lake GRT CO 33 Arch Lake GRT CO 41 BANDING LAYEPING CO 52 GAINTI CO 53 GAINTI CO 53 GAINTI CO 54 CASIDNEIS CO 70 CO 70		34 35 36 Berna Thy GRNT 37 38 39 Rec GENT 42 SCHISTUSITY 45 LINEATIONS 46 VEINS 51 PYEDERE 54 CONDIERTE 54 CONDIERTE 55 FELORIE 56 HAND SPECIMENS 56 ECUMMIC 66 MALVETIC 69 DINER 73 UNCONSOLIDATED SE 75 ECONOMIC MINERAL 79 HEAM-SAY ECONOMIC 71 OUARTELITE LAYERS 64	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN'S 40 DEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 22 SILLIMANITE, MUSC. 55 MAGNETITE-LLMENITE 56 GRAPHITE c1 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL PLISTOGENE AND ECONON 70 71 STRIAE 74 OFGANIC 77 EPATIC WITH ECON M 82 IPON FORMATION 65
<pre>c0 31bekendlata_GRDT c0 31bekendlata_GRDT c0 32 Gramm_Grtt c0 33 Arch Lake GRT c0 33 Arch Lake GRT c0 c1 BANDING LAYEPING c0 c1 BANDING LAYEPING c0 c4 JOINTS c0 c4 JOINTS c0 c4 JOINTS c0 c5 GRANET c0 c5</pre>		24 35 36 Devia Thy GRUT 37 38 39 Ros GRUT 42 SCHISTUSITY 42 SCHISTUSITY 43 LINEATIONS 46 VENS 51 PYEDARE 54 CONDIENTE 57 FLUDETTE 57 FLUDETTE 50 HARD SPECTMENS 63 CONDMIC 64 HALMETIC 63 OTHER 73 UNCONSOLIDATED SE 75 ECONDUC MINERAL 79 HEAM-SAY ECONOMIC 41 QUARTZITE LAYERS 84	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANIE, MUSC. 55 MAGNETITE-ILMENITE 50 CRAFHITE 61 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL PLISTOCENE AND ECONOM 70 71 STRIAE 74 OPGANIC 77 ERATIC WITH ECON M 82 IPON FOPMATION 85
CO 22 Gramm Grit CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 33 Arch Lake GRIT CO 41 BANDING LAYEPING CO 41 BANDING LAYEPING CO 41 BANDING LAYEPING CO 47 DYKES CO 47 DYKES CO 47 DYKES CO 47 DYKES CO 47 DYKES CO 47 DYKES CO 56 UNKAGUN CO 56 UNKAGUN CO 55 CASICNEIPIC AGE CO 56 UNKAGUN CO 47 CYSAN DENES CO 57 PATICS CO 77 COSSAN DE TEENCH CO 77 COSSAN DE TEENCH CO 77 COSSAN DE TEENCH CO 43 DYNATE VEIN ET CO 43 DYNATE VEIN ET CO 43 DYNATE VEIN ET CO 43		34 35 36 Berna Thy GRUT 37 38 39 Ros GRNT 42 SCHISTUSITY 42 SCHISTUSITY 43 LIAEATJONS 48 VEINS 51 PYEDARE 54 CONDIAINTE 57 FLUDPITE SAMPLIS. 60 HAND SUECIMENS 63 ECUMMIC 64 MANUSELIDATED SE 73 UNCONSOLIDATED SE 73 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 UNCONSOLIDATED SE 75 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 UNCONSOLID	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN'S 40 0605 48 CLEAVAGE 48 CLEAVAGE 49 FAULTS 22 SILLIMANINE, MUSC. 55 MAGNETITE-ILMENITL 56 URAPHINE 41 OPIENTED SPECIMENS 44 CHEMICAL ANALYSES 67 FOSSI <u>PLISTOCENE AND ECONON</u> 70 71 STRIAE 77 ERANIC 77 ERANIC WITH ECON M 82 IPON FORMATION 85 88
CO 22 Gramm Grit CO 31bekendlata GRDT CO 32 Gramm Grit CO 33 Arch Lake GRT CO 33 Arch Lake GRT CO 41 BANDING LAYERING CO 52 GRANTI CO 53 GARNTI CO 54 GRANTI CO 54 GRANTI CO 75 IPATICS CO 75 GRANTI VEIN ED CO 76 GRANTI VEIN ED CO		34 35 36 Benna Thy GRNT 37 38 39 Ros GRNT 42 SCHISTUSITY 45 LINEATIONS 46 VETYS 51 PYEDERE 54 CONDERTTE 57 FLORITE 53 FLORITE 54 CONDERTTE 57 FLORITE 53 FLORITE 54 CONDICATED SE 75 UNCONSOLIDATED SE 75 ECONDIIC 69 DIHER 79 UNCONSOLIDATED SE 79 UNCONSOLIDATED SE 70 UNCONSOLIDATED SE 70 UNCONSOLIDATED SE 71 UNCONSOLIDATED SE 72 UNCONSOLIDATED SE 73 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 ECONOMIC 75 UNCONSOLIDATED SE 76 ECONOMIC 77 UNCONSOLIDATED SE 76 ECONOMIC 77 UNCONSOLIDATED SE 77 UNCONSOLIDATED SE 78 ECONOMIC 79 UNCONSOLIDATED SE 79 UNCONSOLIDATED SE 79 UNCONSOLIDATED SE 70 UNCONSOLIDATE	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMENT 40 96DS 48 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLIMANIFE, MUSC. 55 MAGNETITE-ILMENITE 56 ORAPHITE C1 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL PLISTOCENE AND ECONON 70 71 STRIAE 74 OPGANIC 77 ERATIC WITH ECON M 82 IPON FORMATION 85 80
CO 31Deskendlata_GRDT CO 32 Gramm_Grit CO 33 Arch Lake GRT CO 33 Arch Lake GRT CO 33 Arch Lake GRT CO 33 Arch Lake GRT CO 30 ~1 BANDING LAYEPING CO 42 DINITS CO 47 DINES CC 10 HORNALENDE CO 54 DINITS CO 47 DINES CC 10 HORNALENDE CO 54 DINITS CO 55 GARNET CO 55 GARNET CO 56 GINERDWN CO 65 GARDENENE CO 77 EPATICS CO 77 EPATICS CO 77 EPATICS CO 77 COSSAN HE TEENCH CO 77 COSSAN HE TEENCH C		24 35 36 Benna Thy GRUT 37 38 39 Ros GRUT 42 SCHISIUSITY 42 SCHISIUSITY 43 LINEATIONS 46 VENS 51 PYEDREE 54 CONDITENES 53 ECLODIC 66 HALD SPECIMENS 53 ECLODIC 66 HALDETIC 69 DINER 73 UNCONSOLIDATED SE 74 UNCONSOLIDATED SE 75 ECCNOMIC MINERAL 79 HEAR-SAY ECONOMIC 81 OUARTITE LAYERS 84 90 BLACK-WHITE PHOTO	00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMEN'S 40 BEDS 40 CLEAVAGE 46 FOLD AXES 49 FAULTS 52 SILLTMANIE, MUSC, 55 MAGNETITE-LLMENITE 56 DRAFHITE 61 DRIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL PLISTOCENE AND ECONON 70 STRIAE 74 DEGANIC 77 ERATIC WITH ECON M 82 IPON FORMATICH 83 91 COLOUPED PHOTO
<pre></pre>		34 35 36 Benna Thy GRNT 37 38 39 Rec GENT 42 SCHISTUSITY 45 LINEATIONS 46 VEINS 51 PYEDERE 54 CONDIENTIE 57 FLORETE 56 HAND SPECIMENS 53 SCUNDIC 69 DINER 73 UNCONSOLIDATED SE 74 ECONOMIC MINERAL 79 HEAMSAY ECONOMIC 81 OUARTELITE LAYERS 84 87 MINELLAMEOUS   90 SLACK-WHITE PHOTO 33	00 00 00 00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMENT 40 DEDS 40 DEDS 40 FOLD AXES 49 FAULTS 52 SILLIMANITE, MUSC. 55 MAGNETITE-ILMENITE 56 GRAPHITE C1 OPTENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL <u>PLISTOCENE AND ECONON</u> 70 71 GRGANE 77 ERATIC WITH ECON M 82 IPON FORMATICH 85 88 91 COLOUPED PHOTO 94
00 31 - Jeskendlata GRDT 00 32 - Gesame Grit 00 33 Arch Lake GRT 00 41 BANDING LAYEPING 00 41 BANDING LAYEPING 00 41 BANDING LAYEPING 00 47 DIYES 00 47 DIYES 00 47 DIYES 00 47 DIYES 00 53 GANET 00 53 GANET 00 53 GANET 00 53 GANET 00 54 DIMETRIC AGE 00 57 EPATICS 00 77 EPATICS 00 77 EPATICS 00 77 EPATICS 00 77 EPATICS 00 77 CASSAN DE TRENCH 00 47 CASSAN DE TRENCH 00		24 35 36 Benna Thy GRNT 37 38 37 Ros. GRN T 42 SCHISTOSITY 45 LINEATIONS 46 VENS 51 PYEDERE 54 CONDIERTIE 57 FLURFITE 57 FLURFITE 57 FLURFITE 64 MACNETIC 64 DINER 73 UNCONSOLIDATED SE 75 ECONOMIC MINERAL 79 VENA-SAY ECONOMIC 71 JUANTZITE LAYERS 64 87 MISCELLAMEOUS 90 GLURAWIDLET 10 TENEOUS	00 00 00 00 00 00 00 00 00 00	STRUCTURAL MEASUREMENT 40 BEDS 40 CLEAVAGE 40 FOLD AXES 49 FAULTS 52 SILLIMANIE, MUSC. 55 MAGNETITE-ILMENITE 56 GRAPHITE 61 OPIENTED SPECIMENS 64 CHEMICAL ANALYSES 67 FOSSIL PLISTOCENE AND ECONOM 70 71 STRIAE 74 OPGANIC 77 ERATIC WITH ECON M 82 IPON FORMATION 83 91 COLOUPED PHOTO 94 97 RADIDACTIVE

Figure 5. Legend / Code key numerical values



Figure 7. Computer printout from database.

Category Legend (Fig. 5):

0 – 09 Ancillary Data (eg. traverse and historical information description between stations, vegetation cover, wildlife and any communication with industry personnel) 10-39 Lithologies (eg. amphibolite, migmatite, agmatite, granulite facies gneiss, megacrystic granite) 40-49 Structure (eg. banding, layering, schistossity, bedding, faults. fold axes) 50-59 Index minerals (eg. pyroxene, cordierite, fluorite, garnet) 60-69 Samples (eg. hand, thin section, geochronology, economic,

70-79 Pleistocene & Economic (eg. striae, eratics, organic, economic mineral, gossan) 80-82 Key Litihologies (eg. carbonate veining, quartzite layers, iron formation) 90-99 Miscellaneous (eg. traverse summary, ultraviolet, radioactive,

coloured photo, b &w photo, sketch).



Figure 6. Field notebooks with descriptive observations and measurements coded according to Legend/ Code key numerical values



#### MAP SYNTHESIS AND RELATED PROBLEMS

Throughout the project, geology mylar overlays at various scales, but predominantly 1:125,000 km were compiled. Unfortunately, 1-3 different overlays may have been completed for the same area, most likely reflecting different interpretations, new data, and evolving synthesis-these were not labelled chronologically. Some mylars matched various published paper diagrams while other versions matched a different figure. Colours denoting specific rock types were not always consistent from one mylar/region to the next and this was exacerbated because accompanying legends could not be found. There were also problems with map joins. The main sources used were Open File 859, the unpublished Taltson map, and for areas outside of these 2 map boundaries (eg. Hill Island), mylars. Open File 859 and the unpublished Taltson map were checked against the mylars, and where mylars differed from these sources, publications (often Berman & Bostock, 1997) and partially written manuscripts, in tandem with invaluable ground-truthing rock type data and accompanying respective descriptive field notes helped elucidate the differences. The rock type data provided a chronological framework, for instance Open File 859 (Bostock, 1980) differs in areas from this compilation as additional traverses in which new data was collected (1985 & 1991) postdate the publication Open File 859 release date; these areas have now been modified to incorporate the new data and reflect what is presumed to be the "newer' mylar synthesis. The decision-making process for each geology polygon is documented in the "source" column of the geology shapefile; in instances where relative certainty of what the author had intended as the final interpretation was unclear, the alternative or possible geological interpretations

#### LEGEND SYNTHESIS

were also listed.

The only existing legends that encompass the study area (excluding fly camps to the south east) accompany small-scaled regional figures with generalized units, and unfortunately different versions of these have been published (eg. Bostock, 2000; Berman and Bostock, 1997; and Bostock and van Breemen, 1994). For this study, legend synthesis was an iterative process: as geology was compiled and similarities and differences between various rock units of different regions and mylars were recognized, the legend evolved. The primary rock type code was invaluable, for example "29" = "Nonacho sediments" was used to initially code the polygons as "Nonacho Group", but the descriptive field notes and various publications and unpublished papers were summarized and used to differentiate and describe the formation. Descriptions for various other units were compiled from published papers, for example, the Berrigan Lake mafic / anorthositic gneiss was derived from Bostock 1989, and Bostock et al., 1991, whereas Othikethe Falls was derived from Bostock et al., 1991, and augmented by rock type data. This "legend source" metadata is recorded in table 1 under the "source" column. Please note that some units remained uncorrelated (eg. APgr, granite) or isolated units (eg. APfd, felsic dyke).

#### SOURCES / PREVIOUS MAPPING IN THE TALTSON MAGMATIC ZONE

Early mapping included: Taltson Lake Map 525A at 1 inch to 4 miles (Henderson, 1939); Fort Smith Map 607A at 1 inch to 4 miles (Wilson, 1940); Hill Island Lake Map 1203A at 1 inch to 4 miles (Mulligan and Taylor, 1968); Nonacho Basin NTGO map 1985-7 at 1:125,000 scale, (Aspler, 1985b); Geology of the Nonacho Basin, PhD thesis, (Aspler, 1985a); Geology of the Thubun Lakes area, GSC Preliminary Map Map 9-1969 at 1: 50,000 km scale, with accompanying report (Reinhardt 1970) Geology, Christie Bay, GSC Map 1122A NTS sheet 75L, at 1 inch to 4 miles (Stockwell et al., 1968); East Arm of Great Slave Lake, GSC Map 1628 at 1: 250,000 scale mapping, (Hoffman 1988) and Great Slave Lake Shear zone, GSC MAP 1740A, 1: 150, 000 scale mapping (Hanmer 1991). Correlative areas south of the study area (60°N) include preliminary 1:250,000 scale mapping of the Fort Fitzgerald Sheet, Alberta, 75M (Riley 1960), with regions remapped at 1:50,000 scale (McDonough et al., 1995; 2000); Geology of the Precambrian Shield in northeastern Alberta, NTS 74M and 74L N 1/2, 1:250,000 scale mapping compiled by Godfrey (1986), based on referenced reports and 1:50,000 mapping.

Sources for individual geological polygons on the map (this synthesis, Sheet 1), refer to the bedrock geology data file in the database, under 'Source''. For geochronology cited in this legend, refer to the Geochronology table (Sheet 1). Complete source information is listed in "Source document for all publications, figures and maps.doc" or in "References" listed below This digital release includes a digital database that contains shapefiles of geological data and spread sheet data (Excel files, primarily mineral counts), scans of georeferenced mylars and maps, scanned figures, unpublished documents, and lists of existing primary data.

#### **Recommended Citation**

and digitizing.

Bostock, H. H. 2014. The Tectonic Evolution of the Taltson Magmatic Zone: A Reconnaissance Study; Geological Survey of Canada, Open File 7683,1 zip file. doi:10.4095/295537. GIS compiled by Deborah Lemkow

Scientifically edited by Deborah Lemkow

Special thanks to Dr. Subhas Tella for critically reviewing the "Overview" manuscript, Dr. Sally Pehrsson for critically reviewing the open file, Andrew McGarvey for digitizing, Rochelle Buenviaje for data entry, and Joshua Boettcher for data entry

REFERENCES (References used in map synthesis-Sheet 1, Legend synthesis, as well as being sited in various unpublished papers)							
Armstrong, J.T. 1988: Quantitative analysis of silicate and oxide materials: Comparison of Monte Carlo, ZAF, and q (r Z) procedures; in Microbeam Analysis, (ed) D.E. Newbury, p. 239-246. San Francisco Press, San Francisco.	DeWolf, C.P., Belshaw, N.,and O'Nions, R.K. 1993: A metamorphic history from micron-scale 207Pb/206Pb chronometry of monazite. Earth Planetary Science Letters v. 120, p. 207-220.	Reinhardt, E.W. 1970: Geology ofThubun Lakes, District of Mackenzie; Geological Survey of Canada, Preliminary Map 9-1969; 1 sheet.					
Aspler, L.B. 1985a: Geology of the Nonacho Basin (Early Proterozoic) Northwest Territories; unpublished Ph.D. thesis, Carleton University, Ottawa, 384 p.	1974: The Geology of the Ena Lake Area (West Half), Saskatchewan; Saskatchewan Department of Mineral Resources Report 142, pp. 1-26.	Riley, G.C. 1960: Fort Fitzgerald, West of Fourth Meridian, Alberta; Preliminary Map 12-1960. 1 sheet.					
Aspler, L.B. 1985b: Geological maps of Nonacho Basin; Northwest Territories Geology Division, Indian Affairs and Northern Development Canada, Yellowknife, Open File, 1985-7.	<ul> <li>1973: The Oxidation of Almandine and Iron Cordierite; Canadian Mineralogist, v. 11, p. 991-1002.</li> <li>Gibb, R. A. and Thomas M.D.</li> <li>1977: The Thelon front: A cryptic suture in the Canadian Shield? Tectono-</li> </ul>	Ritts, B.D. and Grotzinger, J.P. 1994: Depositional facies and detrital composition of the Paleopro- terozoic Et-Then Group, N.W.T., Canada: sedimentary response to intracratonic indentation; Canadian Journal of Earth Sciences, v. 31, p. 1763–1778.					
Aspler, L.B. 1988: Stratigraphy and Structure of Tent Outlier, Nonacho Basin, District of Mackenzie; in Contributions to the Geology of the Northwest Territories, v. 3, p. 1-12.	physics, v. 38, p. 211–222 Godfrey, J.D. 1986: Geology of the Precambrian Shield in northeastern Alberta; Alberta Research Council, Map EM180, 1 : 250 000 scale.	Ross, G.M., Parrish, R.R., Villeneuve, M.E., and Bowring S.A. 1991: Geophysics and geochronology of the crystalline basement of the Alberta Basin, western Canada. Canadian Journal of Earth Science, v. 28, 512-522.					
Aspler L.B. and Donaldson, 1984: Oblique-Slip Sedimentation and Deformation in Nonacho Basin (Early Proterozoic), Northwest Territories, Canada: American Associa- tion of Petroleum Geologists, Abstract, Bulletin 68, p. 449.	Goff, P., Godfrey, J.D, and Holland, J.G. 1986: Petrology and geochemistry of the Canadian Shield of northeastern Alberta; Alberta Research Council Bulletin 51.	Schärer, U. 1984: The effect of initial 230Th disequilibrium on young U–Pb ages: the Makalu case, Himalaya; Earth and Planetary Science Letters, v. 67, p. 191–204					
Banks, C.S. 1980: Geochronology, General Geology and Structure of the Hill Island Lake – Tazin Lake Areas; University of Alberta, MSc.Thesis.	Grew, E.S., Hiroi, Y., and Shiraishi, K. 1990: Högbomite from the Prince Olav Coast, East Antarctica: An exam- ple of oxidation-exsolution of the complex magnetite solid solution? American Mineralogist, v. 75, p. 589-600.	Slack, J.F. 1982: Tourmaline in Appalachian-Caledonian massive sulphide deposits and its exploration significance; Institution of Mining and Metallurgy, Trans					
Berman, R.G. and Bostock, H.H. 1997: Metamorphism in the northern Taltson magmatic Zone, Northwest Territories; The Canadian Mineralogist, v. 35, p. 1069-1091. Bingen, B. and van Breemen, O.	Grover, T.W., Pattison, D.R.M., McDonough, M.R., and McNicoll, V.J. 1997: Tectonometamorphic Evolution of the Southern Taltson Magmatic Zone and Associated Shear Zones, Northeastern Alberta; The Canadian Mineralogist, v. 35, p.1051-1061.	actions 91, section B; p. B81-B89. Slack, J.F., Herriman, N., Barnes, R.G. and Plimer, I.R. 1984: Stratiform tournalines in metamorphic terranes and their geologic significance; Geology v. 12 p. 713-716.					

Bingen, B. and van Breemen, O. 1998: U-Pb monazite ages in amphibolite- to granulite-facies orthogneiss reflect hydrous mineral breakdown reactions: Sveconorwegian Province of SW Norway; Contributions to Mineralogy and Petrology, v. 132, p. 336-Bostock, H.H.:

zone. Geological Survey of Canada Open File 3905; 15 p. 1992: Local geological investigations in Hill Island Lake Area, District of Mackenzie, Northwest Territories; in Current Research Part C, Geological Survey of Canada, Paper 92-1c. p. 217-223. 1989: The significance of ultramafic inclusions in gneisses along the eastern margin of the Taltson Magmatic Zone, District of Mac-kenize, N.W.T; in Current Research, Part C, Geological Survey of Canada, Paper 89-1C, p. 49-56. 1988: Geology of the north half of the Taltson Lake map area, Dis trict of Mackenzie; in current Research, Part C, Geological Survey of Canada, v. 88-1C, p. 189-198. 1987: Geology of the south half the Taltson Lake map area, Disct of Mackenzie; in Current Research Part A, Geological Surve of Canada, Paper 87-1a. p. 443-450. 1986: Reconnaissance Geology of Precambrian Rocks of the Fort Resolution, Taltson Lake, and Fort Smith Areas, District of Mackenzie, in Current Research, Part A, Geological Survey of Canada

Paper 86-1A, p. 35-42. 1984: Preliminary Geological reconnaissance of the Hill Island ake and Taltson Lake areas. District of Mackenzie: in Current Research, Part A, Geological Survey of Canada, Paper 84-1a, p. 165-170

west Territories. Geological Survey of Canada, Open File 859 1 map, accompanying report 51 p. 1982b: Geology of Fort Smith map area (East Half) District of Mackenzie; in Current Research Part A, Geological Survey of Canada, Paper 82-1A. p. 419-420.

of the Churchill Province; in Current Research, Part B, Geological Survey of Canada, Paper 81-1B, p.73-82. 1980: Reconnaissance Geology of the Fort Smith-Hill Island Lake Area, Northwest Territories; in Current Research Part A, Geological Survey of Canada, Paper 80-1A, p. 153-155.

1979 to 1991 and accompanying rock type dataset. Bostock, H.H. and van Breemen, O 1994: Ages of detrital and metamorphic zircons and monazites fro a pre-Taltson magmatic zone basin at the western margin of the Rae Province. Canadian Journal of Earth Science, v. 31, p. 1353-1364. Bostock, H.H. and van Breemen, C 1992: The timing of emplacement, and distribution of the Sparrow

diabase dyke swarm. District of Mackenzie. Northwest Territories: in Radiogenic Age and Isotopic Studies: Report 6. Geological Survey of Canada Paper 92-2, p. 49-55. Bostock, H.H. and Loveridge, W.D

1988: Geochronology of the Taltson Magmatic Zone and its eastern cratonic margin, District of Mackenzie; in Radiogenic Age and Isotopic Studies: Report 2, Geological Survey of Canada, Paper 88-2, p. 59-65 Bostock, H.H., van Breemen, O., and Loveridge, W.D. 1991: Further geochronology of plutonic rocks in the northern Taltson Magmatic Zone, District of Mackenzie, N.W.T; in Radiogenic Age and Isotopic Studies: Report 4, Geological Survey of Canada, Paper 90-2,

Bostock, H.H., van Breemen, O., and Loveridge, W.D 1987: Proterozoic geochronology in the Taltson Magmatic Zone, N.W.T. in Radiogenic Age and Isotopic Studies: Report 1, Geological Survey of Canada, Paper 87-2, p. 73-80. Chacko, T., Creaser, R.A., and Poon, D. 1994: Spinel + quartz granites and associated metasedimentary enclaves from the Taltson magmatic zone, Alberta, Canada: a view into the root

zone of a high temperature S-type granite batholith. Mineralogical Maga zine, v. 8A, p. 161-162. Charbonneau, B.W. 1991: Geophysical signature geochemical evolution and radioactive min eralogy of the Fort Smith radioactive belt. Northwest Territories, Canada in Primary radioactive minerals (The textural patterns of radioactive mir eral paragenetic Associations), ed. M. Cuney, E. von Pechmann, J Rimsaite, F. Simova, H. Sørensen and S.S. Augustithi; Theophrastus

Publications S.A., Athens, Greece, p. 21-47 Charbonneau, B.W., and Harris, D.C 1993: Cu-Ni-Mo-PGE-Au-rich mafic inclusions in the Fort Smith (Konth) granite, Northwest Territories; in Current Research, Part C; Geological Survey of Canada, Paper 93-1C, p. 53-59.

1984: Rutledge Lake, Northwest Territories: A section across a shear

belt within the Churchill Province; in Current Research, Part A, Geologi

cal Survey of Canada, Paper 84-1A, p. 331-338.

Mineralogist, v. 35, p.1051-1061. 1991: Geology, Great Slave Lake Shear Zone, District of Mackenzie Northwest Territories, Geological Survey of Canada, "A" Series Map 1740A, 1 sheet.

Hanmer, S., Bowring, S., van Breemen, O., and Parrish, R. 1992: Great Slave Lake shear zone, NW Canada: mylonitic record of arly Proterozoic continental convergence, collision and indentation Journal of Structural Geology, v. 14, p. 757-773. Hanmer, S., Williams, M., and Kopf, C.

and Early Proterozoic tectonics of the western Canadian Shield; Canadian Journal of Earth Sciences, v. 32, p. 178-196. 1939: Taltson Lake, District of Mackenzie, Northwest Territories

Geological Survey of Canada,"A" Series Map 525A, 1 sheet. 1986: Theoretical phase relations involving cordierite and garnet re-

visited: the influence of oxygen fugacity on the stability of sapphrine and spinel in the system Mg-Fe-Al-Si-O. Contributions to Mineralalogy and Petrolology, v. 92, p. 363-367. Hodges, D.J. and Manoilovic, P.M.

sits in high grade metamorphic rocks, Snow Lake, Manitoba; Journal of Geochemical Exploration, v. 48, p. 201-224. 1988a: United Plates of America. Annual Review, Earth Planetary

1988b: Geology and Tectonics, East Arm of Great Slave Lake, Northwest Territories; Geological Survey of Canada, "A" Series Map 1628A,

1995: Zincian staurolite in the Dry River South volcanic-hosted massive sulfide deposit, northern Queensland, Australia: an assessment of its usefulness in exploration; Applied Geochemistry, v. 10, p. 329-336.

955: O'Connor Lake (west half) District of Mackenzie, Northwest Territories. Geological Survey of Canada, Preliminary Map 55-9,1 sheet.

1962: The Geology of the Thainka Lake Area (East Half), Saskatchewan; Saskatchewan Department of Mineral Resources, Report No. 71, p. 1-26. Koster, F. and Baadsgaard, H. 1970: On the Geology and Geochronology of Northwestern Saskatchewan: Tazin Lake Region; Canadian Journal of Earth Sciences, v. 7, p.

983: Polyphase deformation in the Canadian shelf of northeastern Alberta; Geological Survey of Alberta, Bulletin 045, 43 p. McDonough, M.R. and McNicoll, V.J.

997: U-Pb age constraints on the timing of deposition of the Waug Lake and Burntwood (Athabasca) groups, southern Taltson magmatic zone, northeastern Alberta; in Radiogenic age and isotopic studies: Report 10; Geological Survey of Canada; Current Research 1997-F, McDonough, M.R., McNicoll, V.J., Schetselaar, E.M., and Grover, T.W.

2000: Geochronological and kinematic constraints on crustal shortening and escape in a two-sided obligue-slip collisional and magmatic orogen aleoproterozoic Taltson magmatic zone northeastern Alberta. Canadian Journal of Earth Sciences, v. 37, p. 1549-1573. McDonough, M. R., McNicoll, V.J., and Schetselaar, E.M. 95: Age and kinematics of crustal shortening and escape in a two

sided oblique-slip collisional and magmatic orogeny, Paleoproterozoi on magmatic zone, northeastern Alberta; in Alberta Basement Transects Workshop v. 47; G.M. Ross editor, University of British Columbia, Vancouver, British Columbia, p. 264-308. McNicoll, V.J., Theriault, R.J., and McDonough, M.F 2000: Taltson basement gneissic rocks: U-Pb and Nd isotopic cor

straints on the basement to the Paleoproterozoic Taltson magmatic zone, northeastern Alberta; Canadian Journal of Earth Sciences, v. 37 Mulligan, R. and Taylor, F.C.

1969: Geology, Hill Island Lake, District of Mackenzie; Geological Survey of Canada, "A" Series Map 1203A; 1 sheet. Oliver, N.H.S., Dipple, G.M., Cartwright, I., and Schiller, J. 1998: Fluid flow and metasomatism in the genesis of the amphibolite-

facies, pelite-hosted Kanmantoo copper deposit, South Australia; American Journal of Science, v. 298, p. 181-218. 1990: U–Pb dating of monazite and its application to geological problems.

Canadian Journal of Earth Sciences v. 27, p. 1431-1450. Pehrsson, S.J., van Breemen, O., and Hanmer, S. 1993: Ages of diabase dyke intrusions, Great Slave Lake shear zone, Northwest Territories; in Radiogenic Age and Isotopic Studies: Report 7, Geological Survey of Canada Paper 93-2, p. 23-28.

© Her Majesty the Queen in Right of Canada, as represented by the Minister of Natural Resources Canada, 2014 doi:10.4095/295537

This publication is available for free download through GEOSCAN (http://geoscan.nrcan.gc.ca/).

**OPEN FILE** Publications in this series DOSSIER PUBLIC have not been edited; they are released as submitted y the author. 7683 Les publications de cette GEOLOGICAL SURVEY OF CANADA SMMISSION GÉOLOGIQUE DU CANADA elles sont publiéees telles que soumises par l'auteur 2014 SHEET 2 OF 2 FEUILLET 2 DE 2

1993: Metamorphic Phase Equilibria and Pressure-Temperature-Time

986: Zincian spinel and staurolite as guides to ore in the Appalachians

999: Gravity and magnetic constraints for the 3-D structure of the Talt-

son Magmatic Zone, NWT, Canada. BSc Thesis, University of Ottawa.

1985: Implications of amazonite to sulphide-silicate equilibria; unpub.

988: Amazonitic K-feldspar in granodiorite at Portman Lake, North

west Territories: Indications of Low f(O2), Low f(S2) and rapid uplift.

1968: Geology, Christie Bay, District of Mackenzie, Northwest Terri-

ories; Geological Survey of Canada, "A" Series Map 1122A; 1 sheet.

1992: Nd Isotopic Evolution of the Taltson Magmatic Zone, Northwest

Territories, Canada: Insights into Early Proterozoic Accretion along the

Western Margin of the Churchill Province; Journal of Geology; v. 100, p.

994: Nd Isotopic Evidence for Paleoproterozoic pre-Taltson Magmatic

Basement Transects Workshop, University of British Columbia, v. 37, p.

961: Geology, Firebag River area, Alberta and Saskatchewan. Geologi-

959: The analysis of aluminum and sodium in igneous rocks by induced

994: Age of emplacement of Thoa metagabbro, western margin o

Rae Province, Northwest Territories: Initiation of rifting prior to Taltso

magmatism? in Radiogenic Age and Isotopic Studies: Report 8; Geold

993: Detrital ages and source areas of single zircons from meta-

sedimentary enclaves within Taltson Magmatic Zone and from Nonacho

Basin, Rae SubProvince; Geological Association of Canada and Mineral

1992: Geochronology of granites along the margin of the northern Talt-

son Magmatic Zone and western Rae Province, Northwest Territories, in

1994: Partial melting of Al-metagreywackes. Part I: Fluid-absent experi-

ments and phase relationships. Contributions to Mineralogy and Petro-

Villeneuve, M.E., Ross, G.M., Thériault, R.J., Miles, W., Parrish, R.R.

993: Geophysical subdivision and U-Pb geochronology of the crystalline

basement of the Alberta Basin, Western Canada; Geological Survey of

1961: Geology of the Waugh Lake metasedimentary complex, north-

1991: Hercynite-quartz granulites: phase relations and implications for

941: Fort Smith, District of Mackenzie, Northwest Territories; Geolo-

crustal processes. European Journal of Mineralogy, v. 3, p. 367-386.

eastern Alberta: MSc. University of Alberta, 89 p.

gical Survey of Canada, "A" Series Map 607A; 1 sheet

Radiogenic age and isotopic studies: Report 5, Geological Survey of

ogical Association of Canada Program with Abstracts, v. 18 p. A-105.

gical Survey of Canada, Current Research 1994-F, p. 61-68.

an Breemen, O., Bostock, H.H., and Loveridge, W.D.

an Breemen, O, Bostock, H.H., and Aspler,

radioactivity; MSc Thesis, University of Manitoba; 88 p.

Zone (1.99-1.90 Ga) rifting of the western Churchill Province: Alberta

Stockwell, C.H, Brown, I.C., Barnes, F.Q., and Wright, G.M.

nd Scandinavian Caledonides; Canadian Mineralogist, v. 24, p. 147-163.

Paths; Mineralogical Society of America. 799 p.

Spry, P.G. and Scott, S.D.

ISc Thesis, McGill University, 311 p

cal Survey of Canada, Map 16-1961.

van Breemen, O. and Bostock, H.H.

Canada, Paper 91-2, p. 17-24.

Vielzeuf, D. and Montel, J.M.

logy, v. 117, p. 375–393.

Canadian Mineralogist, v. 26, p. 1037-1048.

Stevenson, R.K. and Martin, R. I

267-269.

2000: Tourmaline occurrences in the northern Taltson Magmatic 1995: Striding-Athabasca mylonite zone: implications for the Archean 1993: Application of litho-geochemistry to exploration for deep VMZ depo-Sciences, v. 16, p. 543-603. 1982a: Geology of Fort Smith area, District of Mackenzie, North Huston, D.L. and Patterson, D.J. Irwin, A.B. and Prusti, D.B. 1981: A granite diapir of batholithic dimensions at the west margir Jnpublished field books, figures, documents and mylars – Langenberg, C.W.