DESCRIPTIVE NOTES

latitude and 66 05 and 67 00 longitude (see location map insert), covers an area of approximately 2300 sq. km. It includes portions of NTS sheets 21 O/1, 2, 7 and 8 and all or portions of New Brunswick Mineral Resources 1:15,840 geological maps sheets K10, 11; L8, 9, 10, 11; M8, 9, 10, 11; and N9, 10 and 11. Additional outcrop data compiled from these sheets has been included on this map (see list of sources below map). Due to the poor quality of outcrop in the map area, it was necessary to map float which was thought to be close to outcrop. This data plus recent vertical gradient aeromagnetic maps of the area (Geological Survey of outlining geological units and locating and extrapolating geological contacts. Many new logging roads, which greatly improve access in this area, have been included on this map, however, locations of roads which postdate the 1985 airphotos employed in this study are approximate. Also, the locations of isotopic age dates and geochemical samples have been plotted on this map.

The study area is in large part heavily forested, covered by a variable thickness of glacial drift and characterized by relatively poor outcrop. The oldest rocks exposed in the area are part of the lower Tetagouche Group, a thick sequence of shale, greywacke and quartzite, which is overlain by bimodal volcanic rocks. An Arenig shallow water, shelly fauna (Fyffe, 1976b) and conodonts (Nowlan, 1981) from metasediments just below the felsion volcanics of the Bathurst Camp indicate a pre-Middle Ordovicia age for the lower Tetagouche Group. Recent U-Pb zircon ages (R.W. Sullivan, pers. com. 1988) place the top of the lower Tetagouche Group at no younger than 466 Ma (Middle Ordovician). These lowe Tetagouche Group rocks were intruded by a suite of Ordovician age (Bevier, 1988) granitic rocks prior, to regional metamorphism and polydeformation. The age of deformation of the Tetagouche Group is still a matter of debate (see Fyffe, 1982; van Staal, 1987). Subsequently, Siluro-Devonian clastic sediments and bimodal volcanics, which underlie the northwestern part of the map-area, were deposited. All these rocks were intruded by a number of Silurian age (Bevier, 1988) plutonic suites which range in composition from mafic to felsic.

OT) consists mainly of dark grey to black shaley siltstone with areas of argillaceous quartzite (OTs) and some mafic (OTm) and felsic (OTf) volcanic rocks. Geological data on the volcanic rocks in the eastern part of the map area was mainly compiled from the provincial 1:15, 840 geological maps. At the southern end of the north and east of Popple Depot, Helmstaedt (1970) recognized three penetrative generations of folds, at least two of which were nterpreted to be pre-Upper Silurian in age. Though clearly defined metamorphic aureoles in Tetagouche Group rocks adjacent to either deformed Ordovician or undeformed Silurian plutons are rare, observed contacts suggest that Silurian granites postdate the main phase (F1) and probably also later phases of deformation (F2 and F3) of the Tetagouche Group.

into six main units, most of which trend in a northwest to southeast direction, parallel to regional structural trends. Their width to length ratios suggest they have undergone extensive lattening. Deformation is often quite variable with slightly to moderately foliated granite bordering strongly mylonitized zones Though muscovite in these granites is concentrated along foliatio planes and is probably not primary, its presence plus that of character for most of these granites. From north to south the six

The older granites in the area (unit Og) have been subdivided

Popple Depot granite (Ogp): This granite, which forms talus or the slopes north and northeast of Popple Depot, is a reddish pink to beige, fine-grained, mafic-poor biotite granite. Its fine-grained nature, the presence of abundant granophyric textures and pegmatitic clots suggest that it is a high level intrusive. (ii) Meridian Brook granite (Ogm): Extending east-west for about 3 km across the middle of the map area, this is an orange to

beige, medium- to coarse-grained, equigranular, biotite-muscovite granite. South of Tilley Ridge and east of Mount Mitchell, unit

Ogm includes a reddish brown to grey, fine-grained, in places

nclusion-rich tonalite. A U-Pb zircon age of 470+/- 1 Ma has been obtained from this body (Bevier, 1988). Brook granite by a screen of metasediments, the Sweat Hill granite is a similar size body of quartz and feldspar porphyritic, biotite-muscovite granite. Portions of this granite have clotty patches of tourmaline. At its west end, primary textural variation ranging from a coarse-grained, nearly equigranular granite to a high-level porphyry have been mapped out. In contrast, a gradational change from a nearly massive coarse-grained granite to a chloritic feldspar-augen schist occurs along a 5 km, north-south road which transects the eastern end of the body. (iv) Serpentine River granite (unit Oge): The Serpentine River granite is a fine- to coarse-grained, dark pink to beige, biotite-muscovite granite. Along a north-south road, which transects the west end of the body, this granite changes from being weakly to strongly foliated, increases in grain size and changes from being equigranular into a feldspar-porphyroblastic phase (subunit Ogeb). The southern portion of this granite various from medium- to fine-grained (aplitic). A U-Pb zircon age of 455+12/-9 Ma has been obtained from this unit (Bevier, 1988).

coarse-grained, weakly to strongly foliated biotite-muscovit granite. The northeast portion of the body, which is outside the map area, varies from granitic to quartz monzonitic i deformed. Adjacent to the North Pole Stream granite, unit Ogu is cut by quartz veins and displays fracture-related alteration. U-Pb zircon age of 458+16/-1 Ma has been obtained from this unit (vi) Fox Ridge granite (unit Ogf): This biotite-muscovite granite is characterized by feldspar augen up to 4 cm in diamater the commonly exhibit rapakivi mantling. The type section of the granite, which is described by Fyffe and Pronk (1985), is locat outside the map area to the southeast of Trousers Lake. A U-Pk

(v) Mullin Stream Lake granite (unit Ogu): This granite, which

extends northwest and northeast of Mullin Stream Lake parallel

to the regional structure, is a pink to orange, medium- t

zircon age of 452+15/-1 Ma has been obtained from this area All these granites are very felsic. Units Ogp, Ogm, Oge and Ogu are lithologically very similar. Some additional bodies o Ordovician granites (Og) have not been given individual names. The small bodies north and northwest of Mullin Stream Lake closely resemble unit Ogu. Another small body to the west of Mullin Stream Lake at the edge of the North Pole Stream granite, is a dark grey, fine-grained unit which has small feldspar phenocryts. It is thought to represent a high level intrusion.

sequence of northeast to southwest striking, sedimentary bimodal volcanic rocks of Siluro-Devonian age. The sediments (unit Ss) include quartzites, fine to coarse, poorly sorted, conglomerates, siltstones and shales . The basalts (unit Sm) ar amygdaloidal with epidote filled vesicules and fractures. The felsic volcanics (unit Sf) include flow-banded to massive, beige, brown and red rhyolites and fragmental tuffs. The Mount Elizabeth intrusive complex and the Redstone Mountain granite, both of which have given Silurian ages, clearly intrude this sequence. However, granite grades to high-level, subvolcanic porphyry adjacent t which look like possible volcanic equivalents of this granite. Based on fossil evidence, higher stratigraphic levels of this sequence are of Devonian age.

south of Trousers Lake has been described by Fyffe and Pron 1985), is a pink to scarlet, medium-grained biotite-amphibol granite which is very similar to map unit SEag. Associated with it re dykes and bodies of diabase and gabbro (unit SRd). Based alteration of this granite in close proximity to the North Pol Stream granite, unit SRg is thought to slightly predate unit SPg. A Rb-Sr whole rock isochron age of 409+/-25 Ma for this granite is reported by Fyffe and Pronk (1985). Based on this study, it seems appropriate to rename the Mount Elizabeth granite (Fyffe et al., 1981), the Mount Elizabeth intrusive complex, for it includes a number of apparently contemporaneous igneous suites. These have been grouped into mafic suite (unit SEm), an eastern peraluminous (unit SEpg) and a western alkaline (unit SEa) granite suites.

group of rocks. One substantial medium- to coarse grained troctolite body, the Portage Brook troctolite (unit SEMP), contains plagioclase, olivine, two pyroxenes, brown amphibole, opaques and apatite, and has locally well-developed banding. Contact relationships between this gabbro and other mafic and felsi intrusive phases have not been observed. The Goodwin Lake intrusion (unit SEmG), located on the southeast side of the complex, consists entirely of cumulate rocks ranging from norite and gabbro t peridotite (Paktunc, 1988). The other mafic intrusive rocks (uni SEmd) include fine- to medium- grained, plagioclase porphyriti and equigranular ophitic textured diabase, medium- t coarse-grained amphibole-clinopyroxene- biotite gabbro and minor areas of diorite to quartz diorite adjacent to granit intrusions. A small area of medium-grained, biotite quartz diorite around Blue Ledge Lake, southeast of Popple Depot, has been included in unit SEmd. Field relationships between younger granitic rocks (unit SEpo and SEa) and mafic intrusive rocks suggest that they are contemporaneous. Such features as cuspate, irregular contacts with chilled margins of mafic against felsic rocks, pillowed mafic rock granitic rock and evidence of interaction between the two different composition melts to produce intermediate or hybrid composition rocks are interpreted as reflecting magma-mixing. A fe felsic dykes have been noted cutting gabbroic rocks, but no mafic dykes have been observed to cut granitic rocks. portion of the Mount Elizabeth complex consists of compositionally and texturally homogeneous, pink and white quigranular, fine- to coarse-grained biotite granite which ontains traces of muscovite. A small body porphyritic biotite granite occuring to the south of Mount Mitchel compositionally similar. Also, there is a restricted are djacent to Mount Elizabeth where the granite is more biotite- rich granodiorite). A U-Pb monazite age of 418+/-1 Ma has been obtained Though it did not prove possible to locate contacts between the eastern and western granitic suites, contacts between both granite suites and mafic intrusive rocks suggest they a contemporaneous. If there is only one age of mafic intrusion, the

(iii) Western Alkaline Granitic suite (unit SEa): The western portion of the Mount Elizabeth intrusive complex contains a spectrum of compositions and is characterized by an apparent clos genetic relationship between mafic and felsic intrusive rocks Though some areas are quite homogeneous, it appears, from both restricted outcrop and float, that portions of this suite are remarkably heterogeneous. Contacts between the various phases have not been observed but they are all tentatively considered to be of similar age. The intrusive phases will be discussed in order of increasing silica content. (a) Hybrid intrusive rocks (unit SEah): There are areas adjacent

is supported by U-Pb ages.

both the granitic suites are of a similar age, a conclusion which

to mafic intrusive rocks where probable interaction between coexisting mafic and felsic magmas has produced hybrid or ntermediate compositions. Most of these are truly mixed rocks i hat they are characterized by partially digested mafic igneous inclusions in a dioritic to granitic composition matrix. b) Syenite (unit SEas): A dark blue green, red brown weathering syenite defines a small body in the middle of the complex an occurs as a marginal phase of the alkaline granite on Mount La Tour. It contains quartz, plagioclase, alkali feldspar, fayalite, hedenbergite, zircon, apatite and opaque minerals. (c) Quartz monzonite (unit SEaq): A beige grey to orange, fine- to medium-grained biotite-amphibole quartz monzonite is a major intrusive phase of the western suite. A notable feature of th ock is euhedral white plagioclase grains which are prominent o weathered surfaces. On the northwest slope of Tilley Ridge, there beige rhyolitic intrusive rock which appear to be late offshoots of the quartz monzonite.

(d) Aplite (unit SEaa): Closely associated with the quartz monzonite, are a number of areas of dark pink to red, very felsic aplite. Some portions have spherulitic textures and contain texturally-late interstitial blue amphibole but no biotite. Other portions consist of equigranular, biotite-bearing aplite which lacks amphibole.

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(e) Alkaline granite (unit SEag): The most abundant phase of the western suite is a scarlet red, medium- to coarse-grained feldspar (ie. hypersolvus granite) and is amphibole-bearing However, there are two feldspar bearing portions east of Mt. Marie d brown biotite aggregates in some samples may be pseudomorphs after fayalite rather than amphibole. On Mount Charnisay, th granite varies to fine-grained miarolitic granite and rhyolitic orphyry. Some felsic dykes, which cut units SEmP and Ss, are lought to be equivalents of the alkaline granite. A sample of this granite gave a U-Pb zircon age of 414+11/-1 Ma (Bevier, 1988) Belt, the North Pole Stream granite (unit SN), is more phase is a medium- to coarse-grained, equigranular to K-feldspar porphyritic, white and pink biotite granite (unit SNg). In the of Big Bald Mountain, this phase is very deeply weathered. south of Big Bald Mountain, there is a body of grey and black, biotite granodiorite (unit SNgd) which contains abundant ly digested metasedimentary inclusions. It is cut by white A similar granodiorite south of Long Lake is actually the northend of the Squaw Lake granodiorite of Fyffe and Pronk (1985). For mplicity, this granodiorite has been included in unit SNgd ntact relationships, like those in the Mount Elizabeth suite between amphibole-bearing diorite and diabase (unit SNd) and t granite (SNg) suggest they are contemporaneous. Cutting the biotite granite (SNg) are bodies of fine- to medium-grained, white, unit SNb) and dark red brown quartz-feldspar porphyry (unit SNp) Some samples of unit SNm contain muscovite pseudomorphs after, and , cordierite. A U-Pb monazite age of 417+/-1 Ma wa cained from a sample of unit SNg collected just about 1/2 km of of unit SNm gave a K-Ar age of 414+/-5 Ma and a Rb-Sr age of 381+/-4 Ma. Another sample of SNm gave a Rb-Sr muscovite age of 425+/-4 Ma and a biotite age of 397+/-4 Ma. These ages indicate that the various phases of the North Pole Stream suite are of similar age. of the map-area. It exhibits considerable textural variation from medium-grained equigranular to seriate and K-feldspar porhyritic. This biotite granite bears a very close resemblance to adjacent granite units SNg and SEpg. All these compositionally similar granites are thought to be the same age and to form a related evaluate the source of Mo, Cu and Zn geochemical stream anolmalies in the area of Bear Lake, 4 km E of Serpentine Lake. Mapping by the author in this area indicated the presence of fracture-related sulphide mineralization with associated alteration cutting foliated felsic granite (unit Oge). In the area of Long Lake, various exploration programs, the most recent and extensive being that of Occidental Petroleum Ltd. between 1971-1974 and 1979-1982, have been carried out to evaluate sphalerite, chalcopyrite and galena in fractured and silicified eralization occurs associated with silicified granite breccia on the SE end of Long Lake. This mineralization is associated with high-level, highly fractionated phases of the North Pole Stream suite. Geological mapping suggests that this area represent the upper level or roof zone of the body whereas deeper levels are exposed to the NE and E. Two mafic intrusive bodies in the map area have been the object of past and current exploration interest for Ni, Cu and Pt+Pd. The Portage Brook troctolite, which is located around Popple Depot at the northern end of the map area, contains probable magmatic-derived sulphide concentrations (pyrrhotite, pentlandite and chalcopyrite) of around 3-5% in some thin anorthosite layers with limited lateral continuity (Paktunc, 1988a). Platinum-group elements are mainly below detection limits. The Goodwin intrusion which is located on the northeast side of the map area, consists of cumulate rocks in which pyrrhotite with subordinate pentlandite d chalcopyrite are widespread. Drilling has outlined in excess 5 million tonnes with 0.34% Cu, 0.28% Ni and 0.03% Co and low

A number of areas with potential for gold mineralization have been recognized. (1) Zones of extensive quartz veining and dyking

occur in Tetagouche Group rocks incorporated in roof pendants in Mount Elizabeth intrusive complex. (2) Along their contact

with the alkaline granite suite (unit SEa), Devonian felsic

alteration haloes. (4) All the deformed granites are cut by major

fluids. A small area of greissen alteration containing traces of

molybdenite was recognized in biotite granite (unit SEpg) of the

shear zones which could have acted as conduits for gold-bearing

volcanic rocks (unit Sf) contain disseminated and fracture-filling itic zones. (3) Deformed granites north and east of Serpentine Lake (unit Oge) are cut by sulphide-bearing veins with associated

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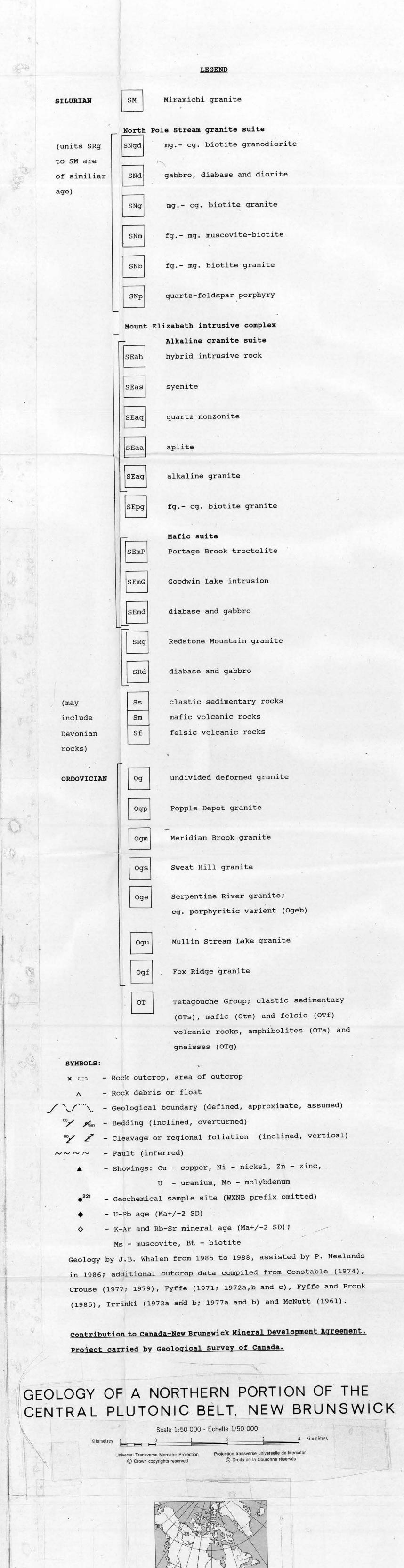
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INDEX MAP - LIEU DE LA CARTE

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