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Natural Resources Canada / Ressources naturelles Canada

GEOLOGICAL SURVEY OF CANADA — COMMISSION GÉOLOGIQUE DU CANADA

Canada

MARGINAL NOTES

TERTIARY

Eocene

Endako Group (EE)

In the Endako map area the group consists primarily of basalt flows and minor fragmental deposits. The flows are generally between 6 to 12 m thick and are defined by breccias at their base and top and by vesicle-rich zones. Locally, they are columnar jointed.

North of the Endako River, the unit consists mainly of hyaloclastic basalt, and overlies a possible trachyandesite and a dacite assigned to the Ootsa Lake Group. The unit is greater than 200 m thick and its lower contact with the andesite was not observed. The hyaloclastite consists of fragments of dark grey basalt, with a resinous lustre, in a recessive, brown and grey weathering matrix of similar composition. It weathers in rounded forms. The fragments vary from 1-80 cm across, are subrounded to subangular, and vary in volume from 30 to 70% of the rock. Locally, it contains white and apple-green agate-filled, irregular shaped interstices. Parallel, slightly more recessive, 5-10 cm thick zones of fine-grained hyaloclastite appear to follow depositional layering. A similar hyaloclastic unit is exposed to the southeast in the Fraser Lake map area (93K/2) on the north side of Fraser Lake.

Flows of the Endako Group, exposed along the north shore of Francois Lake, consist of variably vesicular, dark grey, aphanitic to plagioclase- and pyroxene-phyric basalt. These basalt flows are presumed to be in angular unconformity with Ootsa Lake Group dacites and rhyolite flows and nonconformable with Francois Lake plutonic suite granodiorite.

Ootsa Lake Group (EOL)

The Ootsa Lake Group consists of dacite, rhyodacite, andesite, rhyolite and minor conglomerate and sandstone. The stratigraphic order of the rock types varies from place to place, and it is unclear whether there is a consistent pattern of mafic to felsic transition upsection as seen elsewhere (e.g., Diakow and Koyanagi, 1998). It is clear that the Ootsa Lake Group ranges from mafic to felsic in composition here, as it does in other areas (Drobe, 1991; Wheeler and McFeely, 1991) and from recent work in the Nechako NATMAP project to the south in the Nechako River map area (R.G. Anderson and L. Snyder, pers. comm., 1997; Anderson and Snyder, 1998). Biotite Ar-Ar ages from nearby localities within the Ootsa Lake Group are 50 ± 0.5 Ma (M. Villeneuve, pers. comm., 1997).

Rhyodacite/rhyolite unit (EOLa): Rhyodacite and rhyolite of the Ootsa Lake Group are found throughout the Endako map area, generally as members in more intermediate composition volcanic sequences. Local dykes of quartz-feldspar porphyry rhyolite are included in this unit. The rhyodacite and rhyolite weather tan or cream and are mostly light grey to white on fresh surfaces. They commonly host euhedral to subhedral phenocrysts of plagioclase, K-feldspar and quartz (1-4 mm, 3-25%) and locally biotite.

Textures of these rocks include the common massive form and local flow-bands, breccias and welded tuffs. In places the felsic volcanic rocks are columnar jointed. Breccia fragments range in size from 1-15 cm, are randomly dispersed, matrix supported and display felsic to intermediate compositions. Columnar joints were found in each of the dykes, and perpendicular to the contacts.

Conglomerate and sandstone unit (EOLb): Conglomerate and sandstone of the Ootsa Lake Group are found on the north- and south-facing slopes of the hill south of the electrical transmission corridor at the west end of the map area. They are well exposed on the access road to the communications towers on the top of that hill. The conglomerate and sandstone are interbedded in 1-2 m thick units and, in total, may form a 20-40 m thick sequence.

The conglomerate is purple-grey and contains 0.2-5 cm subrounded and oblate clasts of basalt, chert, jasper, granite, and rhyolite. The matrix consists of silt to sand-size grains derived from basalt and chert. In most places, the sandy matrix of the conglomerate and the sandstone appear to have been derived from a basalt or andesitic lapilli tuff. The conglomerate is underlain and overlain by rhyolite, andesite and Savory dacite.

Andesitic sequence (EOLc): Mafic volcanic sequences of the Ootsa Lake Group are exposed throughout the map area, and are most abundant to the west. The sequences consist mainly of andesite and basalt, and include some interlayered dacite and rhyodacite. Massive aphanitic to finely crystalline plagioclase-phyric andesite and basalt weather grey to dark grey and are olive grey, locally mixed with purple, on fresh surfaces. An easily accessible example of the basalt is exposed along the north side of Highway 16, east of Fort Fraser in the Vanderhoof map area (93K/1). That rock has been dated at 49.6 Ma with whole rock K-Ar (Mathews, 1988). Andesite forms the basal part of the Ootsa Lake Group near Priestly and appears to be part of the dacite-rich sequences north of the Tchesinkut River, in the southwestern part of the map area.

South of the forest service road, north of Shovel Creek, fracture-cleaved andesite weathers grey to dark grey and is olive-grey on fresh surfaces. It contains 2-4% euhedral feldspar phenocrysts that could be potassium feldspar. The well preserved crystals are translucent and free of alteration; chlorite or epidote are common in other of the andesite porphyry units. The rock also contains minor amounts of biotite (0.5-1.5 mm).

A section along Sheraton Creek exposes the contact between the andesite unit and an overlying feldspar-porphyry dacite crystal tuff. The top of the andesite unit consists of several meters of ash, breccia, tuff and lahar with cobble and smaller size fragments floating in the ash and tuff matrix. Those volcaniclastic rocks grade upwards over a metre thickness to the dacite tuff sequence.

Savory dacite (EOLs): Along Savory Ridge and to the west, north of Tchesinkut River, an extensive plagioclase-phyric dacite unit dominates the Ootsa Lake Group. The dacite weathers tan and is light olive, mauve-green or grey on fresh surfaces. Plagioclase phenocrysts are euhedral to subhedral and range in size from 2-15 mm and occupy 5 to 20% of the rock. Biotite, where present, ranges in size from 2-8 mm and occupies up to 8% of the rock.

Locally, the dacite is interlayered with dacite lapilli tuff. It generally has a closely spaced fracture cleavage. Savory dacite has interbeds of rhyolite and rhyolite breccia and conglomerate. The conglomerate exposed in the lower part of the section on the south flank of Savory Ridge has subangular clasts of dacite, rhyolite and basalt.

Hicks Hill dacite (EOLh): The Hicks Hill dacite occurs in various parts of the map area and is particularly well exposed on Hicks Hill, near Richmond Lake, east of Priestly, and along the forest service road north of Shovel Creek. Similar rocks can be found directly to the south in the Nechako River map area (R.G. Anderson, pers. comm., 1997).

The rock consists of plagioclase, hornblende and biotite phenocrysts in an olive aphanitic matrix. Phenocrysts occupy approximately 30% of the rock. Plagioclase (2-9 mm, 15%) is euhedral and generally partially altered to epidote, chlorite and clays. Hornblende (1-5 mm, 6-9%) is acicular, and commonly aligned along variably oriented surfaces. In many places the hornblende cores are preferentially altered, leaving elliptic hollows on weathered surfaces. The biotite (0.5-1.5 mm, 1-5%) is euhedral and varies from fresh to partially chloritized. At Hicks Hill and some other localities, the dacite is layered, as defined by 2-5 cm recessive zones separated by 25-40 cm more resistant layers. Hornblende is aligned parallel to the layering and locally outlines outcrop scale undulatory surfaces.

Hicks Hill dacite is interpreted as a crystal tuff and flow sequence. It appears in places to be gradational to andesite porphyries that contain coarser crystalline plagioclase and variable amounts of hornblende and biotite.

JURASSIC

Late Jurassic to Early Cretaceous

Dyke rocks (lJFql and lJFd): Aphanitic to feldspar- and/or quartz- phyric intermediate to felsic dykes occur in the area; only larger exposures are shown on the map. Dykes which cut pre-Early Cretaceous plutonic units could be either comagmatic with those older units or related to younger Eocene to Tertiary volcanism. The body of unit lJFd, which crosses the Endako River north of Endako mine, consists at its northwest end of dark pink to red aphanitic to feldspar-phyric (2-5mm) rhyolite, quite similar in appearance to pre-ore dykes that are exposed in the Endako mine open pit. As exposed on roads cutting its southeast end, this body of unit lJFd consists of very fine grained beige to grey feldspar-phyric (2-5mm) dacite. The body of unit lJFd east of Burns Lake consist of a similar dacite. North of Francois Lake the dyke consists of altered potassium feldspar granodiorite.

Francois Lake plutonic suite

New U-Pb and Ar-Ar ages indicate that the Francois Lake plutonic suite crystallized in two pulses, 157-154 Ma and 148-145 Ma; the Glenannan phase, plus its subphases, belong to the first pulse and the Endako phase, plus its subphases, and the Casey phase were emplaced during the second pulse (M. Villeneuve, pers. comm., 1997).

Casey phase (LJFC): The Casey phase is exposed only south of the Endako River valley, bordering the Endako phase on its northeast side. Texturally and compositionally similar plutonic rocks north of this valley, which were previously included by Kimura et al. (1980) within this phase, are now interpreted as a subunit of the Glenannan phase. The Casey phase consists of fine- to medium-grained, dark pink, granophyric biotite granite or aplitic granite. Small miarolitic cavities are relatively common. Portions of this unit contain dark pink potassium feldspar and ovoid quartz-eye phenocrysts. Biotite is commonly oxidized or chloritized. An intrusive contact was observed northeast of Savory Ridge between younger Casey phase and the Endako phase country rocks. The Casey phase has been dated as 145.0 ± 0.5 Ma using U-Pb zircon (M. Villeneuve, pers. comm., 1997; Villeneuve et al., 1997).

Endako phase (LJFE): The Endako phase forms an northwest-southeast elongate body in the south-central portion of the map sheet. This unit consists of coarse-grained, dark pink to orange, biotite-hornblende granodiorite to granite, subporphyritic with K-feldspar (0.1-1 cm). Except within the open pit, where it is the ore host for the Endako Molybdenum deposit, it is remarkably fresh with unaltered mafic minerals and a paucity of veining.

Francois subphase (LJFEf): The Francois subphase of the Endako phase is exposed adjacent to the Endako phase, north of Francois Lake. This subunit consists of purple to red, medium-grained, equigranular, biotite (±hornblende) granodiorite to granite. Although relatively equigranular compared to the Endako phase, where fresh, it contains the same distinctive orange K-feldspar. Exposures of this subunit, adjacent to and northwest of Francois Lake, are moderately to strongly altered; alteration imparts a pervasive brick red to red brown colour to most of the feldspar and complete replacement of mafic silicates by chlorite. In the most strongly altered portions, chalky white, euhedral plagioclase grains stand out on weathered surfaces. This subunit is interpreted to be a 'marginal' or higher-level equivalent of the Endako phase.

Relationships between the Francois subphase and Endako phase are well exposed within a kilometre of the eastern and southern sides of the Endako mine settling pond. In this area, the contact is marked by a gradational textural change over a short distance (<0.25 km), but no obvious bulk compositional change or change in alteration of feldspars or mafic minerals; ie. the Francois subphase in this area looks like medium-grained Endako phase. As well, alteration of the Francois subphase is not associated with the inferred contact between it and the Endako phase, but is developed 0.5 km or greater distance from that contact.

Sam Ross Creek subphase (LJFEsr): The Sam Ross Creek subphase is found on the northern slopes of Savory Ridge, east of Sam Ross Creek. This subunit consists of dark red to purple, medium- to coarse-grained, strongly miarolitic granite with cavities 1-3 cm in size. It exhibits similar pervasive alteration to the Francois subphase, and, like that subphase, it contains chalky white plagioclase grains. The abundant miarolitic cavities are lined by euhedral quartz and feldspar. A hill less than a kilometer to the west of this unit, on the west side of Sam Ross Creek, (which on this map is included within unit eJH), could represent high-level intrusive rather than extrusive rocks, as they lack obvious flow banding or bedding.

They consist of dark red brown, white plagioclase-phyric (0.1 - 0.3 cm), rhyolitic rocks. These fine-grained felsic rocks are cut by common pyrite-bearing fractures.

Based on its appearance and distribution, the Sam Ross Creek subphase is interpreted as a higher level, and/or water oversaturated equivalent of the Francois subphase, which itself is thought to bear a similar relationship to the Endako phase. It is possible that the rhyolitic rocks located just west of the Sam Ross Creek subphase could be comagmatic, and not part of the older Hazelton Group unit (eJH). If so, the distribution of these units is suggestive of a higher level of exposure within the Endako phase and its subphases from southeast to northwest, away from the Endako Mine.

Glenannan phase (LJFG): The Glenannan phase occupies a large proportion of the eastern half of the map area. This unit consists of coarse- to very coarse-grained, white and pink, biotite (±hornblende) granite to granodiorite which is feldspar subporphyritic to porphyritic (crystal sizes of 0.5-4 cm but usually 0.5-2.5 cm). It is generally massive, unaltered and compositionally uniform over large areas. Northwest of Cheskwa Lake, the unit is medium-grained, seriate and miarolitic and grades to druzzy (highly miarolitic), patchy pegmatitic biotite aplite of the Tatin Lake subphase; both units contain disseminations and miarolitic fillings of sulphides (Py ± Cpy).

Tatin Lake subphase (LJFGt): The Tatin Lake subphase of the Glenannan phase outcrops over a significant area north of the Endako River valley, in the central to eastern portion of the map area. This subunit mostly consists of beige to pink, fine- to medium-grained, equigranular to K-feldspar subporphyritic, biotite granite. In the area south of Tatin Lake, this subunit is more texturally and compositionally variable. In addition to texturally-variable biotite granite, beige to grey, fine- to medium-grained, equigranular, hornblende-biotite and biotite-hornblende granodiorite also occur. South of Tatin Lake, internal contacts were observed between texturally different plutonic lithologies. For example, contacts were noted between fine- and medium-grained variants and equigranular and feldspar subporphyritic variants. Some contacts were outlined by fringes of unidirectional pegmatite-aplite growths.

The Tatin Lake subphase was previously mapped by Kimura et al. (1980) as part of the Casey phase. However, south of Tatin Lake, observed contacts of the Tatin Lake subphase and Glenannan phase included both sharp intrusive contacts, the finer grained Tatin Lake subphase being younger, and gradational contacts, the Glenannan phase becoming less coarse-grained, less porphyritic and more felsic over less than 0.25 km. North of Tatin Lake, a sharp intrusive contact was observed between younger Tatin Lake subphase and the Glenannan phase. Along a logging road northeast of Cheskwa Lake, a gradational contact was observed between these units.

Hanson Lake subphase (LJFGh): The Hanson Lake subphase, which forms a rectangular body in the northeast corner of the map sheet, consists of grey to white, coarse- to medium-grained, feldspar-porphyritic hornblende-biotite granodiorite to quartz monzonite. In places, it has a fine-grained matrix in which hornblende and quartz are also phenocrysts. It was previously mapped by Kimura et al. (1980) as Cretaceous and distinct from the Glenannan phase but its intrusive relationships with the Glenannan phase suggests it is a subunit.

The contact between the Hanson Lake subphase and Glenannan phase appears to be a gradational change in which K-feldspar and plagioclase become prominent phenocryst phases, quartz becomes less abundant and mafic minerals become more abundant.

Middle and Late Jurassic

Stag Lake plutonic suite

Sheraton phase (mJSSh): The Sheraton phase, which is exposed in the northwest corner of the map area, consists of grey, medium- to coarse-grained, K-feldspar subporphyritic biotite-hornblende granodiorite to quartz diorite. It is locally weakly foliated and cut by common epidote-lined fractures bordered by pink alteration selvages.

Taltapin phase (mJSTa): The Taltapin phase underlies a restricted area adjacent to and east of the Tintagel phase, in the centre of the map area. This unit consists of grey to black, fine- to medium-grained, equigranular, hornblende-biotite diorite to quartz diorite. It is commonly slightly foliated and contains areas with abundant fine-grained mafic inclusions. Some inclusions are angular, most have ovoid and cuspate margins, suggestive of disaggregation of one magma by another coexisting magma. This unit is commonly cut by epidote-lined fractures.

Tintagel phase (mJSTi): The Tintagel phase, which occupies a relatively small area north of Hicks Hill, in the west-central portion of the map area, consists of pink, medium-grained, equigranular leucocratic granite. Its minor mafic minerals (biotite?) are pervasively altered to chlorite and it is crosscut by abundant fractures filled with epidote and quartz. This phase and the Taltapin phase are closely spatially associated, exhibit similar fracture-related alteration and may be contemporaneous.

Stellako phase (mJSS): The Stellako phase outcrops adjacent to both sides of the Endako River valley on the west side of the map sheet. This unit consists of an equigranular variety of grey, fine- to medium-grained, biotite-hornblende quartz diorite to granodiorite and a brown to greenish, medium-grained, plagioclase-phyric, hornblende-biotite quartz monzonite with plagioclase grains 0.2-0.6 cm in size. Associated with the subporphyritic quartz monzonite is a grey to black, equigranular diabase characterized by fractures containing epidote and chlorite. The granodiorite contains small ovoid fine-grained mafic inclusions and is cut by chlorite-lined fractures bordered by selvages of mafic minerals altered to chlorite.

New U-Pb and Ar-Ar ages from this phase indicate crystallization of the Stag Lake suite occurred between 171 and 163 Ma (Villeneuve et al., 1997).

Early Jurassic

Hazelton Group

Undifferentiated Hazelton Group (eJH): This unit is dominated by plagioclase porphyry flows, and includes undifferentiated rocks of the volcanic and sedimentary facies.

Volcanic facies (eJHa): Hazelton Group dacite, andesite and basalt flows are dark olive-grey to dark grey, with bladed phenocrysts of plagioclase (1-7mm, 15-30%). They are poorly exposed and border Francois and Haney lakes. To the south these rocks are mainly fragmental consisting of lapilli to pebble breccia and tuff (Anderson et al., 1998).

Sedimentary facies (eJHb): Sedimentary rocks of Hazelton Group are derived from mafic volcanic sources and have textures gradational between epiclastic and volcaniclastic. They are thin to medium bedded, feldspar rich and contain variable amounts of pyroxene.

Late Triassic to Early Jurassic

Boer plutonic suite

Stern Creek phase (LTS): Stern Creek phase of the Boer suite underlies a narrow band on the far northeastern corner of the map area and is better exposed to the east and north. It consists of foliated biotite and hornblende diorite and granodiorite. Locally the rock has a gneissic texture, can have potassium feldspar phenocrysts and varies significantly in texture and composition on the outcrop scale (Whalen and Struik, 1997).

A new U-Pb age from the Stern Creek phase of the Boer plutonic suite within the Fraser Lake sheet (cf., Whalen and Struik, 1997), indicates this component of the Boer suite is Late Triassic in age (M. Villeneuve, pers. comm., 1997).

Boer phase (LTJB): The Boer phase, which is exposed mainly northwest of the Endako River valley, consists of dark grey, hornblende (±biotite) diorite to quartz diorite. Grain size varies from coarse to medium and it is generally weakly foliated. Hornblende displays a distinctive stubby euhedral habit. The phase is cut by fractures lined by epidote and bordered by <1 cm wide selvages in which feldspars have a pink colour and mafic minerals, especially biotite, are altered to chlorite.

REFERENCES

Anderson, R.G. and Snyder, L.D.
1998:
Jurassic to Tertiary volcanic, sedimentary and intrusive rocks in the Hallett Lake area, central British Columbia; in Current Research 1998-A; Geological Survey of Canada, p. 135-144.

Anderson, R.G. Snyder, L.D., Resnick, J. and Barnes. E.
1988:
Geology of the Big Bend map area, central British Columbia; in Current Research 1998-A; Geological Survey of Canada, p. 145-154.

Diakow, L.J. and Koyanagi. V.
1988:
Stratigraphy and mineral occurrences of Chikamin Mountain and Whitesail Reach map areas; in Geological Fieldwork 1987; British Columbia Ministry of Energy, Mines and Petroleum Resources, Paper 1988-1, p. 115-168.

Drobe, J.R.
1991:
Petrology and petrogenesis of the Ootsa Lake Group in the Whitesail Range, west-central British Columbia; MSc thesis, Queens University, Kingston, Ontario, 220 p.

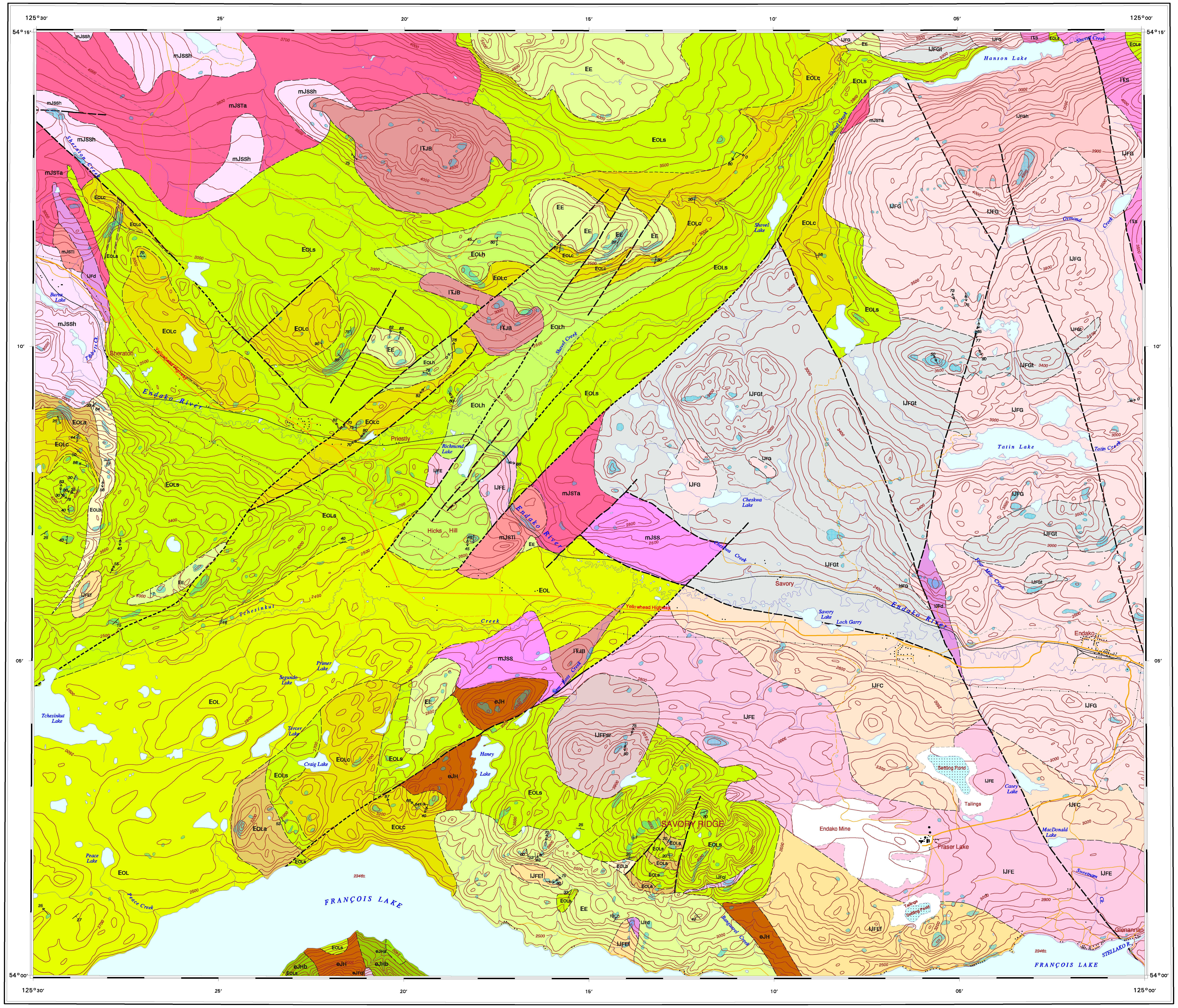
Kimura, E.T., Bysouth, G.D., Cyr, J., Buckley, P., Peters, J., Boyce, R., and Nilsson, J.
1980:
Geology of parts of southeast Fort Fraser and northern Nechako River map areas, central British Columbia; Placer Dome Incorporated, Internal Report and Maps, Vancouver, British Columbia.

Mathews, W.
1988:
Neogene geology of the Okanagan Highland, British Columbia; Canadian Journal of Earth Sciences, v. 25, p. 725-731.

Villeneuve, M.E., Struik, L.C., MacIntyre, D.G., Anderson, R.G., and Whalen, J.B.
1997:
Timing of Eocene and Jurassic magmatism in Nechako Plateau, Central B.C., and relationships to porphyry deposits; Geological Association of Canada, Annual Meeting Abstract, v. 22, p. A154.

Whalen, J.B. and Struik, L.C.
1997:
Plutonic rocks of southeast Fort Fraser map area, central British Columbia; in Current Research 1997-A; Geological Survey of Canada, p. 77-84.

Wheeler, J.O. and McFeely, P.
1991:
Tectonic Assemblage Map of the Canadian Cordillera and Adjacent Parts of the United States of America; Geological Survey of Canada; Map 1712A, Scale 1:2 000 000.



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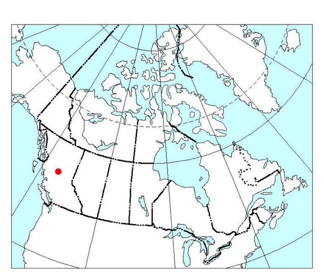

LOCATION MAP

Geology by J. Armstrong, R. Boyce, P. Buckley, G.D. Bysouth, J. Cyr, N. Grainger, M. Hrudey, A. Justason, E.T. Kimura, R. L'Heureux, J.M. Letwin, J. Nilson, J. Peters, L.C. Struik, and J.B. Whalen

Geological compilation by L.C. Struik and J.B. Whalen

Digital cartography by S.P. Williams, H.J. Zabaneh, and Z.M.S. Mawani

Digital base map from Geomatics Canada published at the same scale, converted from NAD 83. Generalized and modified by the Geological Survey of Canada.

Copies of the topographic version of this map may be obtained from the Canada Map Office, Natural Resources Canada, Ottawa, Ontario K1A 0E9

Any revisions or additional geological information known to the user would be welcomed by the Geological Survey of Canada

OPEN FILE 3630

BEDROCK GEOLOGY

ENDAKO

BRITISH COLUMBIA

Scale 1:50 000 - Échelle 1/50 000

Kilometres 1 0 1 2 3 4 Kilomètres

Transverse Mercator Projection
CM 125°15´, Scale Factor 1
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Projection transverse de Mercator
M.C. 125°15´, facteur d'échelle 1
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Magnetic declination 1998, 22°56´ East, decreasing 8.7´ annually. Readings vary from 22°49´E in the SE corner to 23°03´E in the NW corner of the map.

North American Datum 1927

Elevation in feet above mean sea level

Contour interval 100 feet

Published 1998

93 K/5	93 K/6	93 K/7
93 K/4	93 K/3 OF 3630	93 K/2
93 F/13	93 F/14	93 F/15

NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

LEGEND

TERTIARY
EOCENE

- **EE** — *ENDAKO GROUP: andesite, basalt; flows, breccia, vesicular, amygduloidal, tuff, hyaloclastite, lahar*

OOTSA LAKE GROUP (EOL - EOLh)

- **EOL** — *undifferentiated EOLa - EOLh*
- **EOLa** — *rhyodacite, rhyolite; flows, breccia, tuff, locally flow banded; includes some felsic subvolcanic intrusives*
- **EOLb** — *conglomerate, siltstone*
- **EOLc** — *andesite, basalt, dacite; includes some undifferentiated Ootsa Lake Group units*
- **EOLs** — *SAVORY: dacite, rhyodacite and minor andesite and rhyolite*
- **EOLh** — *HICKS HILL: dacite with phenocrystic biotite, hornblende, plagioclase*

MESOZOIC
LATE JURASSIC
FRANCOIS LAKE SUITE (lJFql - lJFGh)

- **lJFql** — *quartz latite porphyry*
- **lJFd** — *leucocratic porphyritic granite dykes*
- **lJFC** — *CASEY PHASE: granite, granodiorite*
- **lJFE** — *ENDAKO PHASE: biotite ± hornblende granite to granodiorite*
- **lJFEf** — *FRANCOIS SUBPHASE: biotite granite to granodiorite*
- **lJFEsr** — *SAM ROSS CREEK SUBPHASE: miarolitic granite*
- **lJFG** — *GLENANNAN PHASE: biotite granite and granodiorite, porphyritic*
- **lJFGt** — *TATIN LAKE SUBPHASE: biotite granite, hornblende granodiorite*
- **lJFGh** — *HANSON LAKE SUBPHASE: biotite granodiorite to quartz monzonite*

MIDDLE - LATE JURASSIC
STAG LAKE SUITE (mJSSh - mJSS)

- **mJSSh** — *SHERATON PHASE: biotite-hornblende granodiorite to quartz diorite, subporphyritic*
- **mJSTa** — *TALTAPIN PHASE: hornblende-biotite diorite to quartz diorite*
- **mJSTi** — *TINTAGEL PHASE: granite, chloritized*
- **mJSS** — *STELLAKO PHASE: biotite-hornblende quartz diorite to granodiorite*

LATE TRIASSIC-MIDDLE JURASSIC
HAZELTON GROUP (eJH - eJHb)

- **eJH** — *feldspar porphyry andesite, greywacke*
- **eJHa** — *dacitic, andesitic and basaltic flows and breccias; minor rhyolite*
- **eJHb** — *conglomerate, greywacke conglomerate, shale and argillite with minor interbedded andesite or basalt flows.*

BOER PLUTONIC SUITE (lTS - lTJB)

- **lTS** — *STERN CREEK PHASE: diorite, granodiorite gneiss*
- **lTJB** — *BOER PHASE: hornblende diorite to quartz diorite*

SYMBOLS

Geological contact (defined, approximate, assumed)

Faults
displacement unknown (defined, approximate, assumed)

Roads
hard surface
loose surface
logging

Trail, portage

Railway
single track

Power transmission line

Pipeline

Contour
contour
depression

Outcrop localities visible at map scale

Note: All structural readings mark outcrop localities

Bedding (polarity unknown)

Lineation

Foliation, Cleavage (first phase)

Fold axis

NATMAP
CARTNAT
Canada's National Geoscience Mapping Program
La Programme national de cartographie géoscientifique du Canada

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July 1, 1998

Recommended citation:
Struik, L.C. and Whalen, J.B.
1998; Bedrock Geology of the Endako (93K3) map area, British Columbia; Geological Survey of Canada, Open File 3630,scale 1 : 50 000

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