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Geology of the Western Gladys Lake area (NTS 104N/13E, 14)

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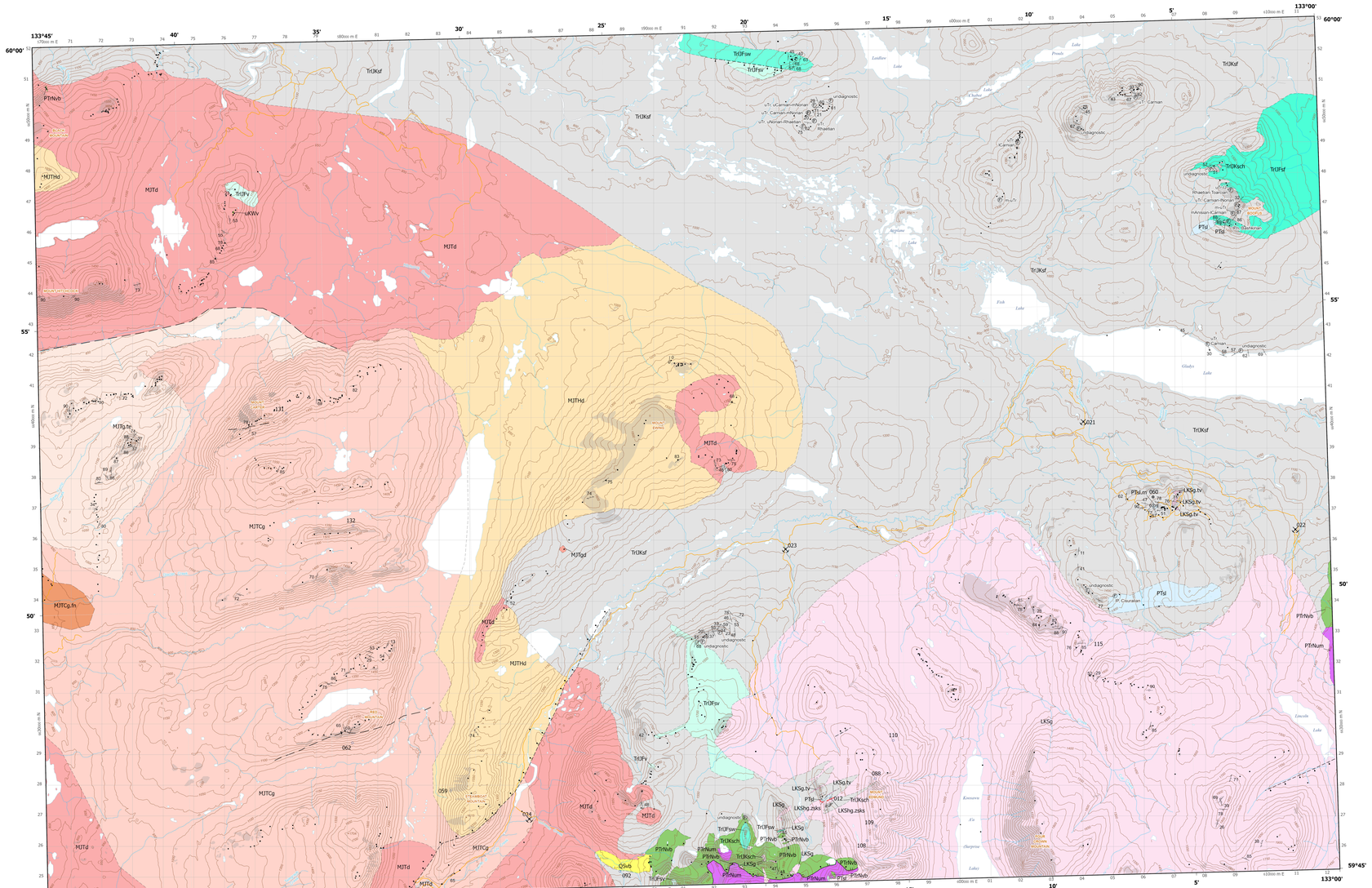

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LEGEND

QUATERNARY

Qlsvb — **Surprise Lake volcanic field:** ***Trachybasaltic scoria cones and flows***; black to red (oxidized); poorly consolidated to unconsolidated; lapilli-to ash-sized pyroclasts; olivine phenocrysts and xenocrysts; rare bomb-sized blocks and 1 m to 10 m-thick flows. Post-glacial (<10,000 years old) in Gladys area. However, to south, near Ruby Mountain, it is dated at 0.54 +/- 0.02 Ma (whole rock K-Ar cooling age; Hunt and Roddick, 1992) suggesting a span of at least 0.5 m.y.

LATE CRETACEOUS

LKSg — **Surprise Lake plutonic suite (undivided):** ***Alkali feldspar granite, syenogranite;*** white with grey-brown to almost black quartz; biotite (5%), minor muscovite and chalky plagioclase, local interstitial fluorite; roof rocks and miarolitic cavities common; syn-magmatic, high-level hydrothermal vein complexes at scattered localities. Successive intrusions of early coarse equigranular phase cut by the megacrystic and porphyritic phases, followed by a post-silicification (post-mineralization?) finer grained aplitic phases. Alkalic and peraluminous with strong Ca, Rb, Pb, Th and U enrichments. Generally non-magnetic. 83 to 78 Ma (Mihalynuk et al., 1992; Smith and Arehart, 2009; Zagorevski et al., 2017).

LKSg.tv — ***Monzogranite;*** white, pink, rust; black quartz; fine- to medium-grained aplitic to porphyritic phases; locally extensively cut by aplitic dikes and quartz veins. Alkalic and peraluminous; magnetic (1.0 to 2.5 x 10^{-3} SI) phases tend to host mineralization. Re/Os ages from molybdenite are significantly younger than main intrusion (to ca. 70 Ma; Smith and Arehart, 2009).

LKSfg.zsks — ***Hypabyssal granite and skarn;*** white, pink and rust porphyritic fine-grained granite to aplitic contact zone of the Surprise Lake intrusive body. Where adjacent marble and less commonly, chert, massive and disseminated magnetite and Fe-Cu-Pb-Zn sulfide skarn bodies may be up to several metres thick, extending discontinuously for hundreds of metres along the contact (perhaps best known at the Sunrise occurrence, MINFILE 104N 012).

uKWv — **Windy Table suite (undivided):** ***Rhyolitic to basaltic volcanic and hypabyssal units***; green to white or yellow; feldspar-, hornblende- and pyroxene-porphyritic; common flow fabric (especially rhyolite). Comagmatic with Surprise Lake plutonic suite; pyroxene-phyric tuffite may in part be Late Triassic.

MIDDLE JURASSIC

MJTgd — **Three Sisters suite, including Fourth of July batholith (undivided):** ***Granodiorite;*** light grey to pink or orange; hornblende cored by titanaugite; local igneous foliation; generally lack tectonic fabrics. Transformation of clinopyroxene to more hydrous hornblende and biotite resulted in excess titanium, growth of rutile, and sporadic introduction of chalcopyrite. Poststates regional deformation; yields Middle Jurassic crystallization (ca. 174-172 Ma) and cooling ages (to ca. 162 Ma, Mihalynuk et al., 2018).

MJTCg — **Como Lake phase:** ***Orthoclase megacrystic monzogranite.*** light grey to pink; zoned pink orthoclase megacrysts typically comprise 25% (10-40%); hornblende and biotite (5-10% combined, in ratios of 1.3 to 3:1); trace titanite, finely disseminated magnetite; monzodioritic enclaves (<0.1 up to 1 m; 1% to rarely 3%) are rounded and are finer grained than host rocks; locally non-magnetic (MJTCg.fn).

MJTHd — **Mount Hitchcock phase:** ***Diorite to quartz diorite and tonalite***; grey to beige, fine- to medium-grained; brown biotite (may be in part secondary), sparse medium to coarse-grained pyroxene, and pyroxene-cored hornblende, accessory titanite; texturally variable. Moderately to strongly magnetic in part due to magnetite intergrowths in hornblende.

MJTg.te — ***Equigranular granodiorite;*** tan to grey, medium- to coarse-grained, locally weakly porphyritic; zoned K-feldspar (20-30%), interstitial quartz (25-30%), plagioclase (40-50%), hornblende (10%, up to 3x biotite), variably chloritized. Commonly cut by pink granite and aplite dikes.

MJTd — **Marginal phases:** ***Tonalite, diorite, rare pyroxenite***; white to dark grey green, generally medium- to coarse-grained; titanaugite (15-30%) rimmed by amphibole, minor biotite (can locally be 4 x hornblende); mafic minerals partly altered to chlorite and epidote. Gradational to sharp contacts between constituent rock types and screens of country rock including chert, peridotite, and basalt. Magnetism increases toward batholith.

MIDDLE TRIASSIC TO LOWER JURASSIC

TrJKsch — **Kedahda Formation:** ***Chert and argillite***; variably coloured (black, grey, green, tan, white, yellow, rust), argillite is typically black and rust; widespread pyrite (to several %) especially near intrusions; beds typically parallel-sided but discontinuous, thinly layered (2-5 cm) 'ribbon' chert; argillite interbeds vary from partings to the predominant lithology, tightly to isoclinally folded. Radiolaria are commonly visible and yield Middle Triassic to Early Jurassic ages (Cordey et al., 1991; Mihalynuk et al., 2003; Cordey, 2020; Cordey et al., 2024).

TrJKsf — **Kedahda Formation:** ***Siltstone and argillite***; black and rust, recessive, cherty argillite. May also include minor intervals of typically black, massive to poorly bedded, argillaceous chert. Visually indistinguishable from unit TrJFsf; unit designation based on adjacency of other Kedahda Formation rocks.

TrJFsf — **Farnsworth unit fine-grained sedimentary rocks:** ***Siltstone and argillite***; black and rust, recessive, cherty argillite with subordinate intervals of orange and green silty wacke that may contain argillite rip-up clasts. May also include minor intervals of typically black, massive to poorly bedded, argillaceous chert. Visually indistinguishable from unit TrJKsf; unit designation based on adjacency of other Farnsworth unit rocks.

TrJFsv — **Farnsworth volcanic sandstone unit:** ***Volcanic sandstone, tuff, interbedded chert***; blue-green where predominantly volcanic, to grey-brown where predominantly cherty; intruded by possibly co-magmatic diabase dikes. Intermediate to mafic volcanic clasts are vesicular and veined by epidote and quartz. Volcanic sandstone is interbedded with chert on cm to dm scale.

TrJFsw — **Farnsworth wacke unit:** ***Wacke and pebble conglomerate***; orange, blue-green, grey, rusty; fine- to medium-grained with coarse sandstone to granule (sparse cobble) conglomerate interbeds; pyritic and locally calcareous; feldspathic, may be rich in quartz grains (30-50%) or angular chert clasts (10-15%) or plagioclase porphyry clasts (10-20%, +/- hornblende, pyroxene, biotite, titanite), and grains of detrital epidote and pumpeliite. Beds of sharpstone conglomerate and soft-sediment deformed chert and argillite, possible mass flow deposits. May unconformably overlay on mantle peridotite. Outside of map area contains microfossils and detrital zircons as young as Early Jurassic.

TrJFv — **Farnsworth volcaniclastic unit:** ***Porphyritic mafic to intermediate volcaniclastic rocks***; purple-grey to green, predominantly fine to medium-grained feldspar, hornblende-feldspar, and/or pyroxene-feldspar porphyry clasts in a dark matrix. Some occurrences difficult to distinguish from augite porphyry units typical of the Stuhini Group (Late Triassic).

Atlin terrane ophiolitic rocks

PERMIAN - MIDDLE TRIASSIC

Nahlin Suite

PTrNum — ***Mantle peridotite;*** typically dun, ranging from orange to green; may be knobbly due to resistant orthopyroxene; harzburgite with subordinate dunite and sparse orthopyroxenite dikes; rare therzolite and clinopyroxenite. Dunite and orthopyroxenite form channels, pods, and sheets; dunite contains whisps of chromite. Interpreted as the mantle section of an ophiolite, although it locally includes minor ultramafic cumulates.

MIDDLE PERMIAN - MIDDLE TRIASSIC

Nakina Suite

PTrNvb — ***Microgabbro and basalt;*** dark green to black, medium- to very fine-grained gabbro and flinty basalt; feldspar-, pyroxene- and lesser hornblende-phyric. Hypabyssal intrusive sills to flow-foliated or banded; rare pillows and pillow breccia. Dikes and pods cutting Nahlin suite peridotite display chilled contacts. Locally the contact with Nahlin suite rocks is structurally interleaved. Geochemical affinity with primitive island arc tholeiites.

Cache Creek terrane

PERMIAN

Teslin Formation

PTsl — ***Limestone;*** brown to white (commonly recrystallized) to dark grey (fetid and/or indurated), to locally fossiliferous or with sparry calcite or dolomite; poorly bedded, rare cross stratification in crinoidal grainstone, fusulinid packstone horizons (10-60 cm) relatively common (where thermally altered to marble, indicated as PTsl.m). One limestone raft on Mount Bouflus contains Carboniferous fossils and may be olistostromal.

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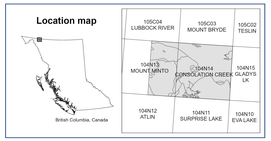
Location map



Map projection: Universal Transverse Mercator Zone 8 (North), North American Datum 1983.

Topographic data: BC Terrain Resource Information Mapping Digital Base map at the scale of 1:50 000 with modifications.

Contour interval: 50 meters. Elevations in meters above mean sea level.

Geomatics by Mitch Mihalynuk, cartography by Paulina Marczak and George Nyi.

Symbols

Field station
Sample site: fossil
Joint
Dike, vein
Foliation, cleavage (axial)
Bedding
Glacial scour - unidirectional
Lineation - fold hinge
Igneous flow banding
Shear/fault plane
Contact: defined, approximate, inferred
Fault: defined, approximate, inferred
Normal fault: defined, approximate, inferred
Detachment fault: defined, approximate, inferred
Thrust fault: defined, approximate, inferred
Outcrop

Mineral occurrence (see Table 1; numbers indicate 104N MINFILE No.)
Past producer
Developed prospect
Prospect
Showing

MINFILE No.	Name	Status	Commodity	Deposit Type
104N 012	SUNRISE	Showing	CU, PB, ZN	X02: Pb-Zn skarn
104N 021	DAVENPORT CREEK	Past producer	AU	C01: Surficial placers
104N 022	CHERALIS CREEK	Past producer	AU	C01: Surficial placers
104N 023	CONSOLATION CREEK	Past producer	AU	C01: Surficial placers
104N 024	VOLCANIC CREEK	Past producer	AU	C02: Buried channel placers
104N 089	STEAMBOAT MOUNTAIN	Showing	MO	L05: Porphyry Mo (Low F- type)
104N 090	GLADYS LAKE MOLY	Prospect	MO, CU, WO	L05: Porphyry Mo (Low F- type)
104N 062	SUN	Showing	MO, PB, CU	L05: Porphyry Mo (Low F- type)
104N 088	IRA 5	Showing	UR, MN	I15: Classical U veins
104N 092	VOL	Showing	MO, CU, WO	L05: Porphyry Mo (Low F- type)
104N 108	D & D	Showing	UR	I15: Classical U veins
104N 109	IRA 6	Showing	UR	I15: Classical U veins
104N 110	IRA	Showing	UR	I15: Classical U veins
104N 115	TURN	Showing	UR	B08: Surficial U
104N 131	MOUNT CARTER	Showing	MO, CU	L05: Porphyry Mo (Low F- type)
104N 132	PET	Showing	MO	L05: Porphyry Mo (Low F- type)

Table 1. Mineral occurrences from MINFILE database (MINFILE, 2024). Abbreviated deposit type designations (e.g., L05) follow deposit type descriptions detailed in Lefebure and Jones (2022).