LEGEND

TECTONIC ASSEMBLAGES AND PLUTONIC SUITES (from Wheeler and McFeely, 1991)

Tectonic assemblages represent distinctive successions of stratified rocks, mainly bounded by unconformities or faults, deposited in specific tectonic environments during particular intervals of time. Thus they are fundamental components of Cordilleran geology that reflect its evolution and allow comparisons of the tectonic behaviour of various regions during specific intervals of time.

An assemblage may comprise one or more formations from a single region or from several separate regions. Most assemblages are named for an important constituent or group, although a few are named after the region in which the assemblage is best developed. Very few are not yet named. The age assigned to each assemblage reflects the age range of its components. Each assemblage is characterized in terms of its tectonic or depositional setting, the latter illustrated by descriptions of its principal lithologies, facies variations, source areas and other criteria. The degrees of confidence in the identification of the associated tectonic or depositional regimes vary considerably

and, in some cases are controversial. Most assemblages are categorized in terms of environments currently observable on modern continental margins, island arcs and ocean basins. Others are defined with reference to their positions relative to the orogen (foredeep clastic wedge) or to the craton (passive continental margin sediments). The plutonic suites are defined mainly by age and subdivided on the basis of composition or other attributes. They are grouped, for the most part, into magmatic episodes (Armstrong, 1985).

REFERENCES

Armstrong, R.L. 1985: Mesozoic - early Cenozoic plutonism in the Canadian Cordillera - distribution in time and space; Geological Society of America, Abstracts and programs, 1985, v. 17, p 338

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

SOURCES OF INFORMATION

Geological information contained in the GIS map library and the 1:1,000,000 scale folio series is derived directly from John Wheeler's Tectonic Assemblage Map of the Canadian Cordillera (Wheeler and McFeely, 1991; Map 1712A), and is subject to all Copyright laws for distribution in either digital or hard copy form. This map is a revision of the Geological Survey of Canada Map 1505A by Tipper, Woodsworth, and Gabrielse, published in 1981. It is a compilation of published maps, thesis, and unpublished information from officers of the Geological Survey of Canada; from J.G. Abbott, G.W. Lowey, and J.A. Morin of the Geology Section, Department of Indian and Northern Affairs, Whitehorse, Yukon; from D.A. Brew, J.H. Dover, C. Dusel-Bacon, H.L. Foster, J.E. Harrison, W.J. Nokleberg, G. Plafker, and R.W. Tabor of the U.S. Geological Survey; and from R.L. Armstrong, M.T. Brandon, R.L. Brown, D.S. Cowan, P. Erdmer, J. Fillipone, R.M. Friedman, J.T. Fyles, J.M. Hamilton, C.J.R. Hart, R.A. Haugerud, C.J. Hickson, P.M. Holbek, G.A. Jilson, D.L. Jones, A. Jung, W.C. McLelland, E.W. Mountjoy, J.K. Mortensen, D.C. Murphy, J.S. Oldow, R.A. Price, P.B. Read, T.A. Richards, M.E. Rusmore, C.M. Rubin, P.S. Simony, A. Sutherland Brown, R.S. Tolbert, P. van der Heyden, and W.J. Wolfe. Geological cartography for the original version of this map was by M. Sigouin, Geoscience

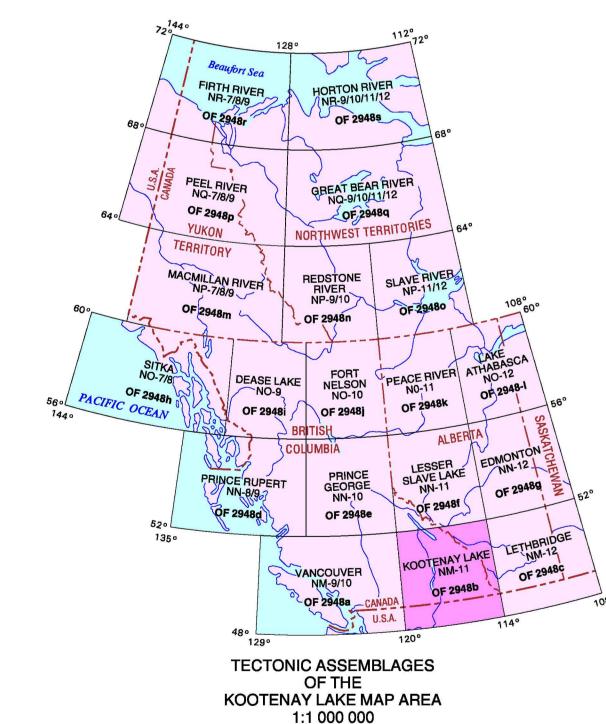
GIS MAP LIBRARY

The Cordilleran GIS Map Library was initiated in March, 1993 as a collaborative research and development project by the Pacific Division and the Geoscience Information Division (GID) of the Earth Sciences Sector (ESS). The goal is to develop an integrated 1:1,000,000 scale digital geoscience database for the Canadian Cordillera that can be used as an archive and research facility by the Geological Survey of Canada (GSC) and its clients. This map is part of a new series of 1:1,000,000 scale tectonic assemblage maps for the Canadian Cordillera based on the Wheeler and McFeely (1991) Tectonic Assemblage Map of the Canadian Cordillera (Map 1712A). It is one of 19 digital data sets derived from the Cordilleran GIS Map Library CDROM (GSC Open File 2948).

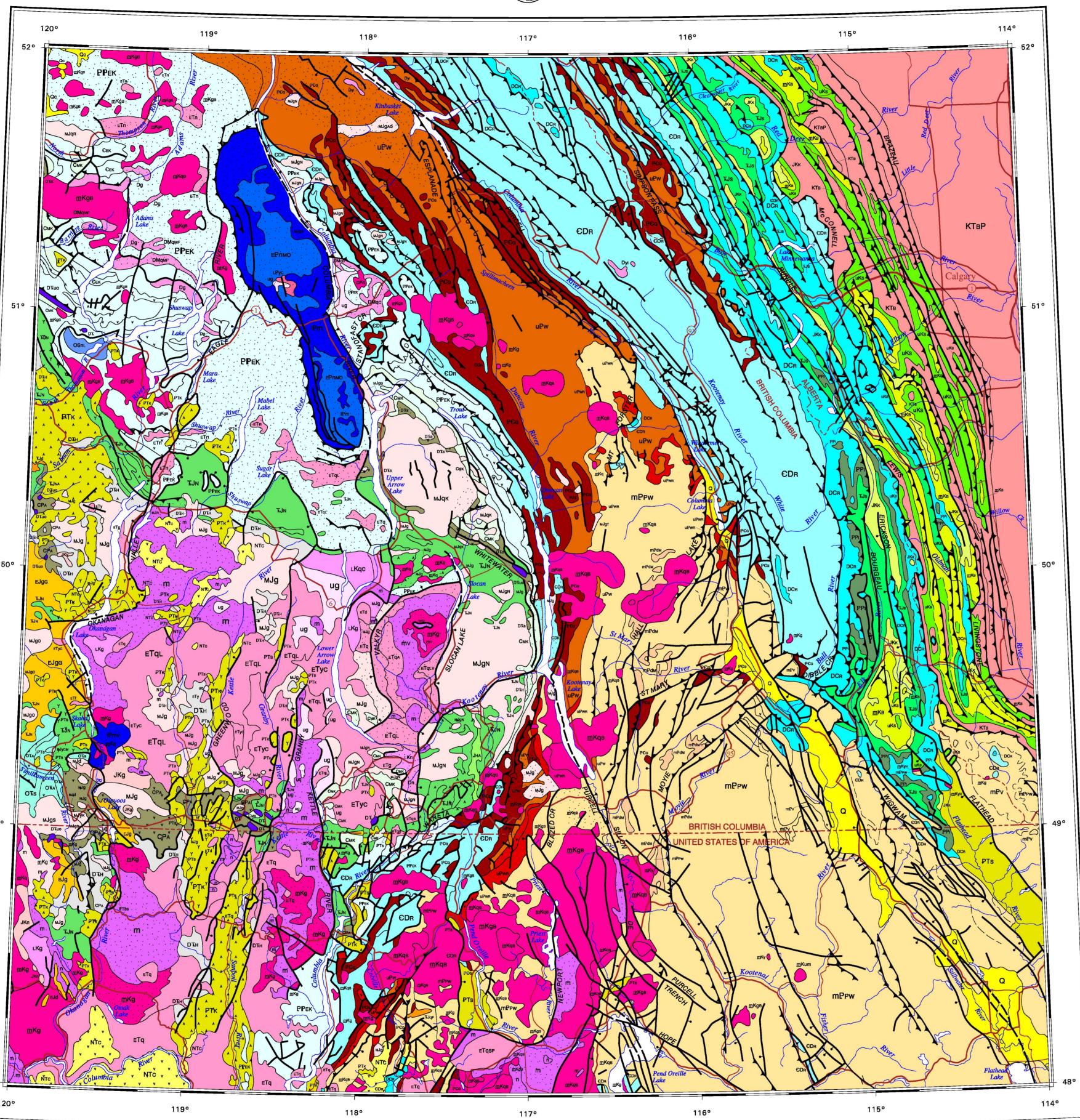
The legend which accompanies Map 1712A was converted to digital format and made available to the GSC by Doug Brownlee, and has been modified and expanded for use as a GIS database. Design and implementation of the digital GIS map library structure, final editing and attributing of all geological and geographic features and cartographic production of the 1:1,000,000 scale folio series were performed by Stephen Williams and Murray Journeay of the GSC

Pacific Division, and Richard Allard of the Geoscience Information Division. The geographic base for the GIS library and the 1:1,000,000 scale folio series is derived from the National Atlas Information System (NAIS) 1: 2,000,000 digital map series and is subject to all Copyright laws for distribution in either

CORDILLERAN TECTONIC ASSEMBLAGE MAP LIBRARY



GSC OPEN FILE 2948b



TECTONIC ASSEMBLAGES

Undivided Quaternary alluvium and colluvium

CLEARWATER: transtensional back-arc volcanics; alkaline to tholeiitic olivine basalt

flows, pyroclastics, volcanoes and cones; contains lherzolite nodules; nonmarine

PALEOGENE

KAMLOOPS: transtensional arc volcanics; alkali-rich, calc-alkaline andesite, basaltic andesite, dacite, rhyolite and basalt flows, pyroclastics and epiclastic deposits. In south and southeast, highly alkaline rhomb-porphyry flows and breccia; bimodal basalt-rhyolite along Tintina Fault; includes alkaline volcanics east of Foreland Belt; all nonmarine

CHILCOTIN: back-arc volcanics; basalt flows transitional between alkaline and tholeiitic

SIFTON: nonmarine fault-trough clastics (locally includes upper Upper Cretaceous strata); shale, siltstone, sandstone, conglomerate, local lignite, marl and dacitic volcanics;

UPPER CRETACEOUS - OLIGOCENE BRAZEAU: foredeep clastic wedge; eastward prograding alluvial sandstone, conglomerate, KTB shale, coal and local tuff and bentonite. In southern foredeep lower part grades eastward into marine shale; upper part nonmarine Paleocene (KTBP)

UPPER CRETACEOUS SMOKY: foredeep marine shales; sideritic and calcareous shale, siltstone and sandstone forming two megacycles; marine

MID-CRETACEOUS

BLAIRMORE: foredeep clastic wedge; mainly eastward prograding deltaic clastics: basal chert-pebble conglomerate, sandstone, locally with metamorphic, granitic and volcanic detritus, shale, coal; alkaline volcanics at top; marine and nonmarine

UPPER JURASSIC - LOWER CRETACEOUS KOOTENAY: foredeep clastic wedge; marine sandstone and mudstone grading westward and southward into northward prograding fluvial deltaic sandstone,

chert-pebble conglomerate, mudstone, and coal; marine and nonmarine

LOWER AND MIDDLE JURASSIC

HALL: Quesnellia arc-derived clastics; carbonaceous shale, siltstone, greywacke and conglomerate derived from volcanic and granitic rocks of Quesnellia; marine

TRIASSIC - JURASSIC

SPRAY RIVER: continental margin prism: Jurassic shale, organic-rich paper shale, sandstone, phosphatic and cherty limestone; Triassic shoaling-upward marine siltstone, sandstone, limestone, dolostone, collapse breccia, rare gypsum; marine

UPPER TRIASSIC - LOWER JURASSIC

NICOLA: arc volcanics in Quesnellia; calc-alkaline andesite, dacite, rhyolite subaerial flows, ignimbrite, minor limestone passing eastwards into augite and feldspar porphyry, andesite and dacite flows, and volcanic clastics grading further eastward into relatively alkaline augite porphyry flows, analcite trachybasalt and trachyandesite, volcanic clastics

and finally into shale, siltstone, limestone and minor quartzite; marine and nonmarine

ISHBEL: faulted passive continental margin sediments; Permian siltstone, sandstone, chert, phosphate, siliceous mudstone; Pennsylvanian dolomitic siltstone, chert breccia, sandstone, orthoquartzite; marine

DEVONIAN - TRIASSIC

HARPER RANCH: arc clastics; basement of Quesnellia; volcanic sandstone derived from andesitic and dacite volcanics and chert, minor basalt, andesite and dacite flows and pyroclastics, Devonian to Permian limestone blocks in upper Paleozoic to Triassic

SLIDE MOUNTAIN: oceanic marginal basin volcanics and sediments; variably sheared, ophiolite-like assemblage of oceanic, alkalic to transitional pillowed basalt, tuff, breccia, serpentinized peridotite and gabbro, radiolarian chert, argillite and volcanic clastics; marine - east of McLeod Lake Fault - fragmental basalt, diorite, volcanic clastics and limestone that may be a distal North American assemblage

CARBONIFEROUS - PERMIAN

ANARCHIST: oceanic volcanics and sediments; basement of Quesnellia; disrupted radiolarian chert, argillite, basalt, local limestone blocks, ultramafic rocks and greenschist metamorphic equivalents, locally as "broken formation" and mélange; marine

CARBONIFEROUS

MILFORD: marginal basin sediments and oceanic volcanics in pericratonic Kootenay Terrane; eastern assemblage of basal conglomerate, crinoidal and coralline limestone, sandstone, shale and cherly tuff; central assemblage of conglomerate, pillowed tholeiite, tuff and volcanic clastics; and western assemblage of sandstone, conglomerate, coralline limestone, siliceous argillite and minor tholeiite. Basal conglomerate contains boulders of previously foliated Lardeau Group and of Early Ordovician granitic rocks; marine. Includes Permian limestone near Pleasant Valley thrust

DEVONIAN - CARBONIFEROUS

RUNDLE: continental shelf carbonate and shale; Carboniferous shelf and slope limestone, lime grainstone, dolomite, sandy dolomite, crossbedded sandstone, shale, dark, locally bituminous shale, dolomitic shale; tuff in Exshaw Formation; Jpper Devonian platform and reef limestone and dolomite, detrital carbonate channel deposits, grey, green and red shale, sandstone, breccia; marine

ORDOVICIAN - TRIASSIC

Undivided calcareous mudstone, siltstone, thin-bedded limestone, subordinate mafic to felsic volcanics, carbonate, chert, minor ultramafics; locally metamorphosed to slate, phyllite, schist, gneiss and marble; marine

SHOEMAKER: enigmatic assemblage of Paleozoic oceanic tuffs and sediments and Triassic arc (?) volcanics and sediments in Okanagan subterrane of Quesnel Terrane; complexly interleaved argillite, siliceous tuff and chert containing Devonian radiolarian and rare limestone yielding Ordovician and Triassic conodonts, Triassic greenstone and volcanic breccia; marine

ROCKY MOUNTAINS: passive continental margin sediments; resistant dolomite, limestone, and local sandstone interbedded with recessive red, green, and grey shale and detrital carbonate that together form several carbonate-shale grand cycles. These pass westward into offshelf shale, siltstone and thin-bedded carbonate with minor, alkalic tuff, breccia and amygdaloidal basalt of Cambrian, Cambro-Ordovician, Silurian, and Devonian ages but mainly of Ordovician age. Chert and greywacke also occur in Cariboo subterrane; marine UPPER PROTEROZOIC - PALEOZOIC EAGLE BAY: clastics and volcanics of pericratonic Kootenay Terrane and Devonian and older magmatic arc rocks in Yukon-Tanana Terrane; Paleozoic phyllite, siltstone, sandstone, grit, minor limestone, which near Quesnel Lake contains fossil fragments, Devonian felsic metavolcanics and older magmatic arc rocks and fragmentals overlying black siliceous argillite, ribbon chert, quartzite, and local archeocyathid-bearing limestone in mafic metavolcanics (CEK), Proterozoic olive green and grey grit, quartzite and carbonate, and metamorphic equivalents; mainly marine

UPPER PROTEROZOIC - LOWER CAMBRIAN GOG: rifted and passive continental margin sediments; shallow-water crossbedded orthoguartzite, feldspathic quartzite, locally graded-bedded guartzite, guartz-pebble onglomerate, mafic flows, breccia and tuff overlain by interbedded quartzite, siltstone,

UPPER PROTEROZOIC

WINDERMERE: mainly clastic continental margin sediments; graded-bedded assemblage of interbedded quartz-feldspar grit, sandstone, siltstone and shale, commonly maroon and green; diamictite in Rocky Mountains, limestone in upper part, local greenstone ows, breccia and tuff, and metamorphic equivalents; marine

rcheocyathid reefs; metamorphic equivalents; shale, and limestone with marine

RAPITAN: rift assemblage; Rapitan: upper tillite, hematite-jaspilite iron formation, silicic

turbidite and red, maroon and green argillite, lower tillite; local tholeiite above calc-alkaline basalt and minor felsite; Toby: andesite flows and tuffs above diamictite and conglomerate: marine

MIDDLE PROTEROZOIC PURCELL - WERNECKE: continental margin sediments, partly within an embayment in

mPpw the craton margin in the south; mainly shallow-water, grey, green and red argillite, siltstone, quartzite, and orange and buff dolomite, locally stomatolitic, and grey limestone grading from a clastic carbonate platform, into offshelf, locally turbiditic. siltstone-quartzite and argillite; mPv (Purcell Volcanics); marine and nonmarine

Craton related paragneiss and metasediments; may include younger Proterozoic and wer Paleozoic rocks in Monashee Complex; core paragneiss unconformably overlain by basal quartzitic conglomerate succeeded by pelitic psammitic and calc-silicate neisses in turn overlain by psammitic gneiss. Includes IPmv (Vasseau Gneiss)

PLUTONIC AND ULTRAMAFIC ROCKS

Plutonic Suite....Coryell PLuton....(Sheppard)

EARLY TERTIARY (40 - 64 Ma) ETyc - Coryell: alkalic to calc-alkalic, high-level, pink and buff syenite and quartz monzonite and trachytic, pink feldspar porphyry dykes ETg - undivided granodiorite and quartz diorite; commonly has concordant U-Pb and K-Ar ages in Coast Plutonic Complex ETq - undivided granite

ETqA - (Airy): quartz monzonite ETqL - (Ladybird): granite; ETqLv - Ladybird in Valhalla Complex ETd - undivided diorite, monzonite, gabbro, diabase, amphibolite ETf - undivided felsite, quartz feldspar porphyry, ETy - undivided syenite, syenodiorite, nepheline syenite, sodalite syenite, jacupirangite, ijolite, urtite,

ETqs - (Sheppard): undivided granite, leucogranite, alaskite, quartz monzonite, monzonite, granophyre ETqsp - (Silver Point): undivided granite, leucogranite, alaskite, quartz monzonite, monzonite, granophyre ETn - predominantly orthogneiss

LATE CRETACEOUS (64 - 87 Ma)

L**Kn** - orthogneiss LKg - undivided granodiorite, leucogranodiorite, quartz monzonite, quartz diorite, tonalite LKqc - (Caribou Cr): undivided granite, leucogranite, alaskite, quartz monzonite, monzonite, granophyre

MID-CRETACEOUS (87 - 130 Ma) mКqв - Bayonne: discordant, biotite and biotite-muscovite leucoquartz monzonite or granite: biotite-hornblende granodiorite and quartz monzonite; all locally porphyritic; KgB - undivided granodiorite, leucogranodiorite, quartz monzonite, quartz diorite, tonalite Kg - variably foliated hornblende quartz diorite, tonalite, and hornblende diorite intrusive into Gravina-Nutzotin rocks of S. E. Alaska and forming part of western Coast Plutonic Complex mKy - undivided syenite, syenodiorite, nepheline syenite, sodalite syenite,

jacupirangite, ijolite, urtite mKum - ultramafic rocks associated with gabbro <u>m</u>Кун - Howell Cr.: syenite and trachyte stocks

UNCERTAIN AGE

ug - granodiorite, quartz diorite and quartz monzonite in Central and southernmost Cordillera uq - undivided granite, leucogranite, alaskite, quartz monzonite, monzonite, granophyre

LATE JURASSIC - EARLY CRETACEOUS (130 - 155 Ma)

JKg - undivided granodiorite, leucogranodiorite, quartz monzonite, quartz diorite, tonalite JKy - undivided syenite, syenodiorite, nepheline syenite, sodalite syenite, jacupirangite, ijolite, urtite JKn - predominantly orthogneiss

MIDDLE JURASSIC (155 - 187 Ma)

мJgn - Nelson: grey porphyritic hornblende-biotite granite with white- and flesh- coloured feldspar phenocrysts; pinkish leucocratic granite; greenish-grey hornblende-biotite granodiorite and quartz diorite, locally foliated and lineated мJgAd - (Adamant): мJgт - (Toby): brownish hypersthene-augite monzonite core rimmed by hornblende granodiorite мЈqк - Kuskanax: whitish discordant, aegerine-leucogranite and leucocratic quartz monzonite; мЈук - undivided syenite, syenodiorite, nepheline syenite, sodalite syenite, jacupirangite, ijolite, urtite мJd; мJg - foliated diorite, diorite-tonalite complex; foliated hornblende-biotite quartz

diorite and granodiorite, respectively in Central Coast Plutonic Complex, altered to greenschist-facies along E. margin мJge - (Galena Bay): biotite-muscovite granodiorite and quartz monzonite MJgo - (Osprey Lakes): pink biotite granodiorite and quartz monzonite
MJgs - (S. Similkameen): pink and grey soda rich biotite-hornblende granodiorite мJn - predominantly orthogneiss мJqn - (Raft): granite, leucogranite, alaskite, quartz monzonite, monzonite, granophyre

EARLY JURASSIC (187 - 214 Ma)

EJgg - Guichon: elongate, partly concordant, calc-alkaline, grey, green and pink, hornblende-biotite granodiorite and quartz diorite, lesser biotite granodiorite, quartz monzonite, leucogranodiorite, pyroxene-hornblende diorite and syenodiorite. Altered and foliated near shear zones EJycm - Copper Mtn.: high-level, alkaline, syenite, syenodiorite, monzonite, pryoxenehornblende diorite and gabbro EJg - older partly foliated and altered hornblende granodiorite and quartz diorite in E. Coast Plutonic Complex; includes Texas Creek Pluton EJd - undivided diorite, monzodiorite, gabbro, diabase, amphibolite

LATE TRIASSIC - EARLY JURASSIC

KJd - undivided diorite, monzodiorite, gabbro, diabase, amphibolite TJqF - (Flowery Trail): undivided granite, leucogranite, alaskite, quartz monzonite, monzonite,

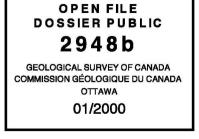
DEVONIAN - TRIASSIC

DTuo - oceanic ultramafic rocks commonly elongate plutons of reddish brown to khaki weathering dunite, olivine-orthopyroxene peridotite (harzburgite), pyroxene; commonly

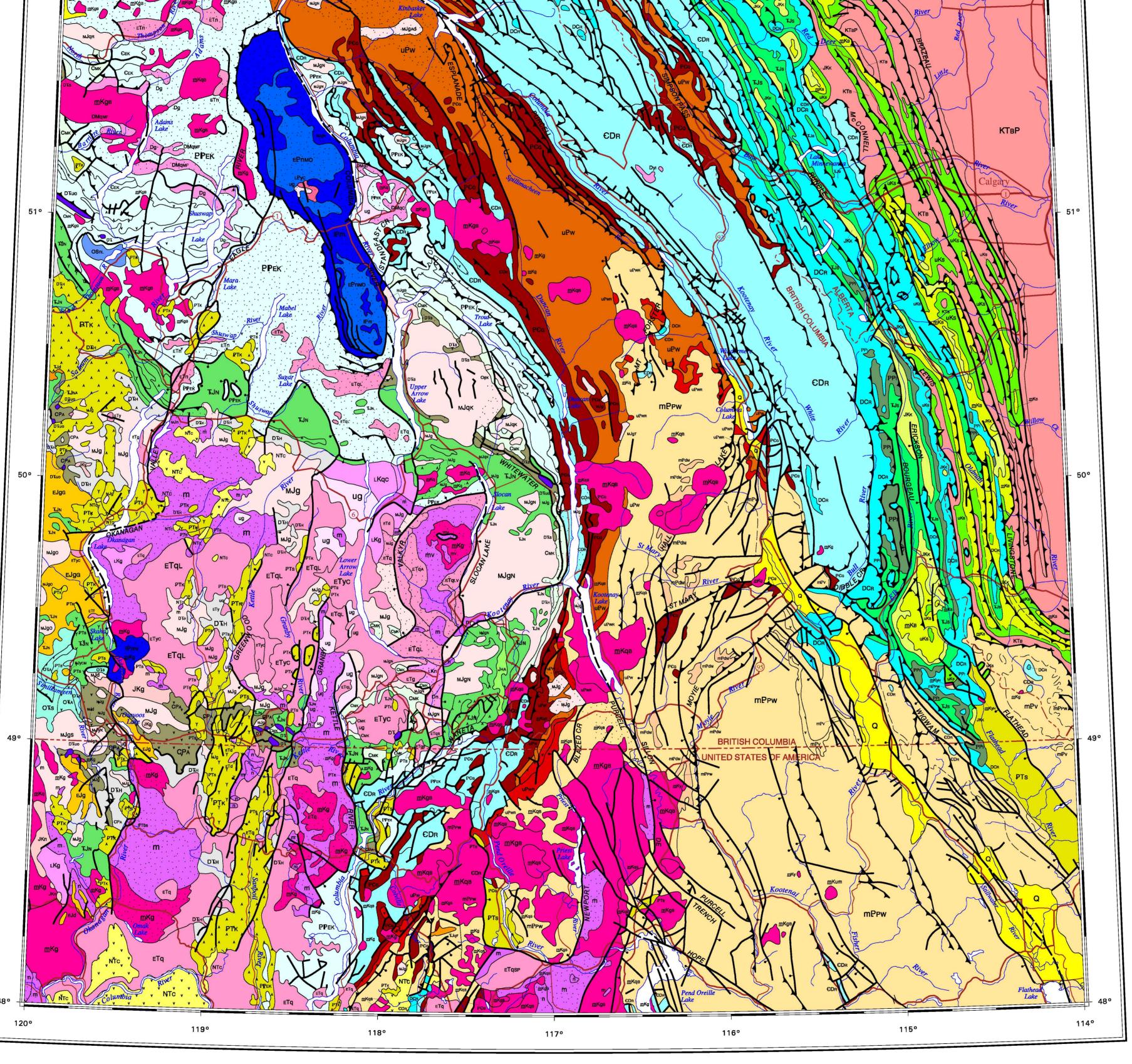
DEVONIAN - MISSISSIPPIAN

DMqmF - (Mt. Fowler): white to grey, foliated and lineated biotite leucocratic granite and granodiorite and local augen gneiss Mqc - (Clachnacudainn): undivided granite, leucogranite, alaskite, quartz monzonite,

Contribution to Canada – British Columbia Agreement on Mineral Development (1991 – 1995), a subsidiary agreement under the Canada – British Columbia Economic and Regional Development Agreement.
Contribution à l'Entente Canada – Colombie Britannique sur l'exploitation minérale (1991 – 1995), entente auxiliaire négociée en vertu de l'Entente Canada – Colombie Britannique de développement économique et régional.



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OPEN FILE 2948b

TECTONIC ASSEMBLAGE MAP

KOOTENAY LAKE

BRITISH COLUMBIA - ALBERTA - U.S.A.

Scale 1:1 000 000 - Échelle 1/1 000 000

Standard Parallels 48°40' and 51°20' Parallèles d'échelle conservée 48°40' et 51°20'

Projection conique conforme de Lambert

Lambert Conformal Conic Projection



Dyı - (Ice River): older mafic nepheline-clinopyroxene rocks (ijolite, jacupirangite, urtite)

cut by marginal nepheline syenite, central sodalite syenite, and younger carbonatite

mРdм - Moyie: hornblende diorite and micropegmatite intruding Purcell Supergroup

EPnмо - Monashee basement complex: augen gneiss, leucocratic gneiss and

VOLCANIC ROCKS

METAMORPHIC ROCKS

netamorphic rocks (undivided), (mv) paragneiss of Valhalla Complex

SYMBOLS

OSnL - (Little Shuswap Lake): leucocratic biotite-muscovite granodiorite, granite and diorite gneiss

Dn - predominantly orthogneiss

LPyc - (Mt. Copeland): nepheline syenite

predominantly orthogneiss

Geological contact (defined) .

Thrust fault (teeth on upper plate) . .

Right lateral transcurrent fault.

Fault of unknown displacement .

protolith metamorphosed to amphibolite facies

Overturned thrust fault (teeth on upper plate, dip of fault overturned)) .

Extension fault (solid circle indicates downthrow side) .

Submerged faults and those buried by younger strata.

Submerged normal fault (solid circle indicates downthrow side) .

ORDOVICIAN - SILURIAN

LATE PROTEROZOIC

MIDDLE PROTEROZOIC