UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PRELIMINARY GEOLOGIC MAP OF THE PRIEST LAKE AREA

by

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Open-File Report
82-1063

INTRODUCTION

This map is part of a 1:48,000 scale preliminary geologic map series covering the Sandpoint 2^{o} quadrangle. The series is a by-product of the Sandpoint 2^{o} project, conducted under the regional framework studies program and the Branch of Western Regional Geology. All the maps are 15' blocks that have been photographically mosaiced from existing 7.5' topographic quadrangles. The series is designed to fill out areas within the Sandpoint 2^{o} quadrangle not covered by geologic mapping at a scale of 1:62,500 or larger. Maps of this series make geologic information available as the project progresses so that interested parties do not have to wait the necessarily long time needed to complete the entire 2^{o} sheet. In addition, these maps present more information than will appear on the final 2^{o} compilation, and they are better suited for field use than will be the compilation.

The maps are more detailed and accurate than reconnaissance maps, but because they are the outgrowths of 2^{o} scale mapping and subject to the inherent haste necessary to cover so large an area in a reasonable length of time, they are not the quality of finished U.S.G.S. maps released in more formal publication series. The coverage is relatively detailed in some areas but almost reconnaissance in others. The maps should therefore be considered preliminary and subject to refinement.

DESCRIPTION OF MAP UNITS

Qag GLACIAL AND ALLUVIAL MATERIAL (Quaternary)--Includes drift from both alpine and continental glaciations, and all alluvial material in modern drainages.

Tc CATACLASTIC ROCKS RELATED TO NEWPORT FAULT ZONE--(Tertiary) Mylonite, chlorite breccia and other cataclastic rocks derived from both plutonic and metamorphic rocks. Ranges from noticeably broken and sheared rock near margins of zone to chlorite breccia, mylonite, and locally pseudotachylyte in central and upper part. At least two periods of movement recorded; early ductile deformation, probably related to emplacement of Selkirk Crest igneous complex, and later brittle deformation that cuts, and in places obliterates, first stage ductile features. Most of ductile zone not coincident with brittle zone; ductilely deformed rocks included in this unit only where coincident with brittle zone. Zone cuts 50 m.y. Silver Point Quartz Monzonite near Newport, Washington (Miller, 1974b.

ROCKS OF SELKIRK CREST IGNEOUS COMPLEX

The name Selkirk Crest igneous complex, is adopted here to describe the large mass of predominantly muscovite-biotite granitic rocks in the Selkirk Mountains between the Priest River valley and the Purcell Trench which lies 20 km east of the map area. Virtually all of the bodies making up the complex are two-mica rocks, and

they are closely related in age, composition, and origin. These bodies (i.e., map units) are not individual plutons per se, in that they were probably not emplaced as distinct plutonic entities. Rather, the entire complex was probably a single intrusive mass and the textural and mineralogical features that distinguish individual bodies comprising the mass resulted from localized physical conditions and compositional inhomogeneities that developed as, or were present when, the complex was emplaced. Relative movement between individual bodies making up the complex could have been large or small during emplacement, regardless of how far the complex traveled through the crust as a unit.

The composition of the complex as a whole varies between relatively wide limits, although these limiting compositions can be found within almost all of the individual constituent bodies. The degree of variation within individual bodies is evident from the ternary modal diagrams. Modal diagrams were not made for several map units because they are too heterogeneous on all scales to take representative samples objectively. The individual bodies making up the complex differ from one another primarily in texture, and to a lesser degree in composition, but in any particular map unit, dikes, pods, or small bodies of almost all other units in the complex can be found. Contacts, both internal to, and between map units that make up the complex, are gradational over intervals ranging from a cm to more than a km wide. Along many of the contacts this gradation is an alternating series of irregular dike-form masses made up of the rock types of

the two bodies in contact. In most cases, the major lithology of one body can be found in any of the other bodies, either as small intrusions or inclusions. No single textural and (or) compositional characteristic distinguishes one body from another; rather a set of characteristics, one or more of which may be common to other bodies in the complex, distinguish one map unit from another.

The Selkirk Crest igneous complex extends well beyond the map area. To the south some elements of the mass extend almost to the Pend Oreille River where relations are complicated by older rocks and several hornblende-biotite plutons that are not part of the complex. South of the Pend Oreille River, similar two-mica rocks extend to the northern edge of the Columbia River Group basalts south of Spokane. At the latitude of the study area the west side of the complex is bounded by the Newport fault along the edge of Priest Lake, and the east side by a probable fault in the Purcell Trench.

All rocks sampled within the complex for potassium-argon dating have yielded concordant ages on coexisting mica pairs that range between 44 m.y. and 54 m.y. (Miller and Engels, 1975). These apparent ages may or may not represent emplacement ages. In addition to numerous inclusions, screens, and pendants of Belt Supergroup rocks, some elements appear to be Cretaceous, Triassic(?), and Precambrian granitic rocks that were caught up and incorporated as units in the two-mica maga The 44 m.y. to 54 m.y. potassium-argon apparent ages may represent cooling or uplift ages; actual emplacement of the complex may have occurred several

million years earlier. Because of uncertainties in both absolute and relative ages, the units making up the complex are described roughly as they occur from south to north.

Tksm MIXED GRANITIC AND METAMORPHIC ROCKS (Tertiary and(or) Cretaceous)--Chiefly leucocratic two-mica granitic rocks, schist, amphibolite, and minor gneiss. Granitic rocks range in composition from tonalite to alkalic monzogranite; color index generally between 5 and 10, even in tonalite. Most have muscovite and biotite, some only biotite. Allanite ubiquitous, garnet locally common, sphene absent. Plagioclase averages calcic andesine, even in tonalite; potassium feldspar is perthitic orthoclase, microcline locally. Rock is extremely heterogeneous; made up of small bodies and dikes that grade by texture and(or) composition into one another. Most common type is leucocratic even-grained two-mica monzogranite, but extensive areas underlain by dikes and bodies of pegmatite and alaskite. Cataclastic texture common in much of the unit; best developed along west margin south of quadrangle. Much of rock is foliated and lineated, partly induced by cataclasis; grades from well developed in western part to irregularly developed at east edge of quadrangle. Metamorphic rocks, chiefly sillimanite-muscovite-biotite-plagioclase-quartz schist, make up about 25 to 45 percent of unit. Andalusite abundant locally. Metasedimentary rocks interlayered with amphibolite; commonly garnet-bearing. Metamorphic rocks occur mainly as screens and irregular bodies from a few tens to a few thousand m in length. Shape and orientation of bodies irregular, but generally elongate parallel

to foliation, especially in western part of unit. Distribution of metamorphic pods in granitic rocks extremely irregular on local scale, but found almost everywhere in unit. Pegmatite and alaskite dikes common within large and small metamorphic masses. Most metamorphic rocks probably derived from Proterozoic Y Prichard Formation of Belt Supergroup and from mafic sills in Prichard Formation. Small screens of calc-silicate rock near center of sec. 30 T60N, R3W may be derived from Wallace Formation of Belt Supergroup.

TKsc MIXED GRANITIC ROCKS OF CAMELS PRAIRIE (Tertiary and(or) Cretaceous)--Mostly leucocratic two-mica rocks with numerous dikes. Basically same granitic rocks as TKsm, but consistently contains less than 10 percent metamorphic rocks; larger proportion of those are amphibolite and gneiss, only minor schist. Greatest percentage of granitic rocks appears to be even-grained two-mica monzogranite, although pegmatite and alaskite abundant in this unit also. Degree of textural and compositional heterogeneity about same as previously described unit. Degree of cataclasis greatest in southwest part near Soldier Creek. Gradational zone between this unit and those on either side of it averages 100 to 500 m in width.

TKscb MAFIC GRANODIORITE OF CAVANAUGH BAY (Tertiary and(or) Cretaceous)--Biotite granodiorite; average color index about 14. Contains only minor muscovite with a few local exceptions. Porphyritic; potassium feldspar phenocrysts range from 1.5 to 4 cm, average

about 2 cm. Concentrations of phenocrysts variable from a few per m^2 of outcrop to several hundred per m^2. Heterogeneous with respect to composition and texture but not as much so as most units in Selkirk igneous complex. Rock is noticeably more mafic than average for complex. Grain size ranges from fine to coarse, but part of variability due to milling of minerals during and after emplacement. Large potassium feldspar (orthoclase) and plagioclase (average an_{30}) crystals are cataclastically rounded with fine-grained trains of quartz and feldspar between them. More than half of this unit falls within highly sheared zone along west side of Selkirk Crest complex. Almost all rock in west part of unit is foliated and lineated. Lineation consists of penetrative alignment of elongate clusters of biotite crystals. Segregation of biotite into clusters defines poorly developed foliation; probably formed during emplacement of complex. Much biotite not in plane of foliation, particularly in eastern part of mass. Fine-grained gray dikes and coarse pegmatite dikes common throughout unit. Dikes show cataclasis, particularly in western part of unit, but in places cross-cut main cataclastic foliation.

TKsh TWO-MICA GRANITIC ROCKS OF HORTON CREEK (Tertiary and(or) Cretaceous)--Heterogeneous mixture of two-mica monzogranite and granodiorite, chiefly former. Most is medium to fine grained, but also includes numerous coarse pegmatites. Some parts have larger proportion of muscovite and potassium feldspar (orthoclase) than most units of Selkirk Crest complex. Muscovite crystals are larger than in most units and orthoclase is cream- colored, not

white, in these rocks. Average color index is 6. Most rock foliated and lineated since most of unit is within zone of sheared rocks along west side of Selkirk complex. Would be difficult to distinguish rocks of this unit from granitic rocks of Camels Prairie if mafic granodiorite of Cavanaugh Bay did not intervene.

TKsk MONZOGRANITE OF KLOOTCH MOUNTAIN (Tertiary and(or) Cretaceous)--Porphyritic two-mica monzogranite and granodiorite; average composition is monzogranite (see modal diagram). Medium- to coarse-grained; color index averages about 6. Potassium feldspar is microperthitic orthoclase, with patches of microcline in some crystals. Plagioclase averages between an_{25} and an_{30}. Rock is distinguished from other two-mica bodies by relatively abundant 2.5- to 3.5-cm potassium feldspar phenocrysts, and micas that are about same size as other groundmass minerals. With minor or local exceptions, micas in all other two-mica bodies have noticeably smaller grain size than other minerals in rock. Phenocrysts are either absent or sparse in southern part of body and along much of eastern margin, 6 km east of quadrangle. Most rock has no primary preferential orientation of mineral grains, but a subtle, presumably secondary, non-penetrative foliation and lineation is present at many places; poorly developed in northern part of body, progressively better developed to southwest towards Newport fault zone. Intergranular brecciation with subsequent annealing obvious in most thin sections; becomes progressively more pronounced in western part of body. Radioactivity of unit generally 20 to 50 percent higher than most two-mica units. Contains dikes and pods

of other two-mica lithologies but proportion is relatively low compared to amount of "foreign" lithologies in other two-mica units. Klootch Mountain rock type is common as inclusions, dikes, and large pods in other units, especially in mixed granitic and metamorphic rocks of Lookout Mountain.

TKsl MIXED GRANITIC AND METAMORPHIC ROCKS OF LOOKOUT MOUNTAIN (Tertiary and(or) Cretaceous)--About 95 percent two-mica granitic rocks and 5 percent gneiss and amphibolite. Named for Lookout Mountain, 3 km northeast of where unit occurs in this quadrangle. Forms irregular body extending more than 20 km north and east of quadrangle. Granitic rocks roughly in order of decreasing abundance are: even-grained biotite and two-mica monzogranite to granodiorite, mafic granodiorite, coarse-grained monzogranite, pegmatite, and alaskite, and Klootch Mountain-type monzogranite. All are intimately mixed. In some areas a particular lithology may underlie one or two km^2, but in most areas mixing is on much finer scale. Most rock other than pegmatite and alaskite is similar to, or related to, bounding units. Even grained rock may be a hybrid of several two-mica units. Almost no cataclasis in this unit. Appears to be mixture of late stage materials from bounding units. Metamorphic rock restricted to small pods and screens in quadrangle, but masses up to 1 km long occur in quadrangle to north; locally inclusion swarms occur near larger pods of amphibolite.

TKslc MAFIC GRANODIORITE OF LUCKY CREEK (Tertiary and(or) Cretaceous)--Tonalite to monzogranite; average composition, granodiorite (see modal diagram). Distinguished by relatively high mafic mineral content; color index ranges from 5 to 20, averages 13. Biotite and minor opaque minerals are only mafic minerals. Potassium feldspar is orthoclase with patches of microcline. Distribution of potassium feldspar not uniform; areas in which grains are concentrated and areas with almost no potassium feldspar. Size of potassium feldspar-concentraton domains varies from cubic cm to cubic m. Plagioclase composition ranges from an_{24} to an_{32}. Small amounts of muscovite in most rocks. Rock is medium-to coarse-grained; has poorly developed foliation at some places, and locally has segregated mineral layers. Zone about 300 m wide in eastern part of unit is leucocratic two-mica monzogranite and has double amount of radioactivity (170 cps) [1/] as rest of unit (about 90 cps).

TKshc GRANODIORITE OF HUNT CREEK (Cretaceous(?))--Medium- to coarse-grained biotite granodiorite. Highly porphyritic; potassium feldspar phenocrysts range in size from 2 to 10 cm, average about 4 cm. Potassium feldspar is orthoclase with minor amounts of microcline in some crystals; proportion of microcline increases westward. Most potassium feldspar is in phenocrysts, very little in

[1/] All radioactivity measurements made with Geometrics model GR-101A scintillometer. Readings from this instrument were consistently about 15 percent lower than readings from several other scintillometers with which it was compared in the field. All of the other scintillometers had larger sodium iodide crystals, however.

groundmass; color is pale pink. Biotite and opaque minerals are only mafic minerals. Small amount of muscovite interlayered with opaque minerals is probably secondary. Abundant allanite and zircon, but no sphene. Rock has poorly developed foliation and(or) lineation commonly marked by alignment of phenocrysts or by smeared out trains of comminuted quartz crystals. Orientation of foliation extremely irregular on outcrop scale. Intergranular cataclasis to varying degrees throughout unit, but increasing southwestward. Main part of unit is outside quadrangle; extends about 20 km to the northeast. Forms thin, in places discontinuous, band around Klootch Mountain mass. Composition and texture of Hunt Creek body is much more uniform than other units of the Selkirk Crest complex, even though abundant pegmatite and two-mica dike rocks are present in it, especially around the margins. Unit is thought to be older granitic rock caught up in two-mica rocks of Selkirk Crest igneous complex and smeared out as a screen between Klootch Mountain mass on west and various two-mica units on east. Hunt Creek mass resembles several Cretaceous plutons of the hornblende-biotite suite of Miller and Engels (1975), and to lesser degree, Precambrian (?) paphyroblastic granitic gneiss found on east side of Selkirk Crest complex. Radioactivity of rock and associated rocks within the unit is higher than any other in the Selkirk Crest mass. Response averages 150 cps and in fairly extensive areas east of the quadrangle averages 350 to 400 cps.

Kr GRANODIORITE OF REEDER CREEK (Cretaceous(?))--Medium-grained biotite granodiorite; most rocks contain about 0.5 percent fine grained muscovite. Average color index is 11. All potassium feldspar is microcline. Rock appears hypidiomorphic granular in outcrop, but stained slab shows "spongy- or poikilitic-looking" microcline phenocrysts that average 2 cm in length. Spongy appearance of phenocrysts caused by at least 50 percent, by volume, included plagioclase that is not oriented concentrically with outer crystal forms of microcline; poorly defined crystal forms of microcline suggest many phenocrysts were in incipient stage of formation. Plagioclase averages about an_{30}. Quartz forms large and small crystals, obvious by distinct gray color that contrasts with feldspars; size range gives rock slight seriate texture. Biotite also has range in size and is anhedral with ragged borders. Accessory minerals include allanite, epidote, zircon, apatite and opaque minerals. With only a few exceptions, texture and mineralogy varies slightly throughout pluton. Two most significant exceptions are (1) a porphyritic phase (Krp) south of Huckleberry Bay, which could be a separate pluton, and (2) a mafic, lineate zone along the northwest and southwest borders of pluton. Age is unknown but probably Cretaceous on basis of mode of occurrence and composition and textural similarities with nearby plutons of known Cretaceous age. Intrudes Proterozoic Y Prichard Formation; appears to intrude granodiorite of Priest Lake; contact relationship with Galena Point Granodiorite not exposed. Entire east end of pluton bounded by Newport fault.

Kbm GRANODIORITE OF BOULDER MOUNTAIN (Cretaceous)--Medium- to fine-grained biotite granodiorite; contains minor muscovite. Pluton underlies about 15 km^2 northwest of map area and 5 km^2 in map area. Average color index is 13; biotite is only mafic mineral. Plagioclase composition between an_{30} and an_{35}. Potassium feldspar is microcline; generally finer grained than other minerals, locally poikilitic(?); has abundant included plagioclase similar to granodiorite of Reeder Creek. Quartz forms 1 cm phenocrysts near margins of pluton; same size as other minerals in most of body. Biotite is subhedral to anhedral, varies greatly in grain size. Accessory minerals are zircon, apatite, and epidote; is a conspicuous dearth of opaque minerals. Texture is seriate in most of body. At many places around margin of pluton, rock shows chilled textures. Numerous large quartz bodies and anomalous amounts of molybdenum are present in southern part of pluton, possibly other parts. Castor and others (1980) report a core of fine-grained to microcrystalline porphyry and extensive rock alteration near center of pluton. Rock intrudes Proterozoic Y Prichard Formation and possibly other formations of Belt Supergroup up to Striped Peak Formation. Probably Cretaceous on basis of mode of occurrence and compositional and textural similarity with nearby plutons of known Cretaceous age. Rock may be separate, higher level pluton derived from same magma type as granodiorite of Reeder Creek (compare modal diagrams).

Ktc MONZOGRANITE OF TANGO CREEK (Cretaceous)--Porphyritic muscovite-biotite monzogranite. Medium- and coarse-grained, with potassium

feldspar phenocrysts to about 10 cm, average length about 5 cm. Perthitic; microcline twinning in phenocrysts is patchy; potassium feldspar as phenocrysts and in groundmass. Phenocrysts contain abundant small plagioclase crystals oriented concentrically with outer crystal form; contrasts with randomly oriented plagioclase in potassium feldspar of Reeder Creek pluton. Concentration of phenocrysts varies considerably over short distances. Rock contains average of 0.7 percent muscovite, consistently smaller size than other minerals in rock, especially biotite. Size difference between muscovite and biotite contrasts with relatively equal mica sizes in Selkirk Crest igneous complex. Color index averages 7. Plagioclase averages an_{20}. Quartz typically in round crystals or crystal aggregates averaging 1 cm across. Accessory minerals include zircon, apatite, allanite, opaque mineral(s), and a small amount of sphene. Texture is porphyritic with hypidiomorphic-granular groundmass; no foliation or lineation, but phenocrysts aligned locally. Pluton has crude textural zonation; relatively finer grained seriate core roughly concentric with coarse-grained outer margin of body, but elongate in east-northeast direction. Textural zonation is irregular and two types not internally uniform. Textural contrast subtle enough that attempts to map it have been unsuccessful; both types highly porphyritic. Pluton underlies about 85 km^2 in map area and area to north; east end cut off by Newport fault. Intrudes Proterozoic Y Prichard Formation; nowhere forms intrusive contact with any other unit. Potassium-argon apparent age of biotite from sample collected in sec. 31, T. 62 N., R. 4 W., is 87.2 m.y.; this is

minimum age due to prolonged burial or Tertiary thermal disturbance by Selkirk Crest igneous complex. Radioactivity of Tango Creek pluton much higher (average 200 cps) than most granitic rocks in region (average 90 cps); some areas over 300 cps.

Kh MONZOGRANITE OF HUNGRY MOUNTAIN (Cretaceous)--Medium- to coarse-grained muscovite-biotite monzogranite. Contains abundant potassium feldspar phenocrysts which are irregularly concentrated; in some areas almost none occur, in other areas rock is over 50 percent phenocrysts. Potassium feldspar is microcline. Phenocrysts have abundant small plagioclase crystals oriented concentrically with respect to outer crystal form. Average plagioclase composition an_{20}; most crystals highly zoned, however. Quartz occurs as large gray crystals or crystal aggregates; gray contrasts with white of feldspars more than in most granitic rocks in region. Biotite is only mafic mineral; color index averages 7. Muscovite forms smaller crystals than other minerals in rock; nowhere exceeds 1 percent of rock. Accessory minerals include zircon, apatite, allanite and opaque mineral(s). Texture is porphyritic with hypidomorphic-granular groundmass; rock has no directional fabric. Pluton underlies about 90 km^2, mostly west of map area. Grades inward through decrease in grain size and concentration of phenocrysts into monzogranite of Gleason Mountain. Monzogranite of Hungary Mountain similar to monzogranite of Tango Creek; two may be separate plutons originating from same magma. Field of Tango

Creek modes is plotted on Hungry Mountain modal diagram for comparison. Hungry Mountains pluton intrudes no sedimentary or metamorphic rock; appears to intrude Galena Point Granodiorite but contact relations poorly exposed and ambiguous. Sample collected 5 km west of map area yielded potassium-argon apparent ages of 90.9 m.y. on biotite and 94.3 m.y. on muscovite (Miller and Engels, 1975).

Kgm MONZOGRANITE OF GLEASON MOUNTAIN (Cretaceous)--Leucocratic muscovite-biotite monzogranite. Medium-grained, but locally fine- or coarse-grained. Contains sparse microcline phenocrysts up to 4 cm in much of body especially where grades into coarse-grained porphyritic monzogranite of Hungry Mountain. Gleason Mountain rock identical chemically, modally, and mineralogically to Hungry Mountain monzogranite; differs texturally. Field of Hungry Mountain modes is plotted on Gleason Mountain modal diagram for comparison. Gleason Mountain pluton is oval and underlies 35 km^2, most of which lies just west of map area. Average plagioclase composition is about an_{18}. Potassium feldspar is microcline. Biotite is only mafic mineral; average color index is 7. Biotite: muscovite ratio varies greatly even on outcrop scale; most rocks have less than 1 percent muscovite. Most rock is even grained to seriate; great local variation in grain size. Some irregularly shaped migmatitic and aplitic pods with diffuse gradational borders. Pluton intrudes no sedimentary or metamorphic rocks; surrounded by monzogranite of Hungry Mountain on all but east end. Appears to intrude Galena Point Granodiorite, but contact

relations poorly exposed and ambiguous. Probably genetically related to, and same age as, granodiorite of Hungry Mountain.

Kg GALENA POINT GRANODIORITE (Cretaceous)--Porphyritic biotite granodiorite. Medium- to coarse-grained. Average plagioclase composition is calcic oligoclase. Most potassium feldspar is microperthitic orthoclase, but in some parts of pluton is microcline; occurs as phenocrysts up to 6 cm and in groundmass. Biotite is chief mafic mineral; trace of hornblnde in some rocks. Color index averages 12, but locally as high as 16. Accessory minerals include zircon, apatite, allanite, opaque mineral(s), and sphene; latter ranges from absent to abundant. Texture is porphyritic with groundmass ranging from hypidiomorphic-granular to seriate. Underlies several hundred km^2 west of map area, but more than one pluton may be mapped as Galena Point in that area. Intrudes Belt Supergroup; stratigraphically highest unit intruded is lower Wallace Formation. Sample collected about 18 km west of map area yields potassium-argon apparent age of 98.3 m.y. on biotite.

Kpl GRANODIORITE OF PRIEST LAKE (Cretaceous)--Medium- to coarse-grained hornblende-biotite granodiorite. Average plagioclase composition about an_{30}; subhedral, moderately zoned crystals. Potassium feldspar is microperthitic and non-perthitic orthoclase; anhedral, occupies intersticies between other crystals. Also occurs as poikilitic grains that have spongy look on stained slabs. Hornblende biotite ratio averages about 1, but varies widely.

Hornblende occurs commonly as 1 cm long stubby prisms; larger than other minerals in rock. Accessory minerals include sphene, zircon, apatite, allanite, epidote, and opaque mineral(s). Sphene obvious in most hand specimens; epidote visible in many. Texture ranges from pseudo-porphyritic where spongy orthoclase grains are present to hypidomorphic-granular and seriate. Coarse-grained to pegmatitic mafic masses occur around margin of pluton, especially where in contact with granodiorite of Reeder Creek. Some of these coarse-grained rocks include hornblende-rich orbicular-like masses in them. Granodiorite intrudes Prichard Formation, but in contact with no other sedimentary rocks; determination of age relative to adjacent plutons not possible due to poor exposure or ambiguous contact relations. Cretaceous age assigned on basis of modal, chemical, and textural similarities with nearby Cretaceous plutons and similar mode of occurrence.

Yp PRICHARD FORMATION (Proterozoic Y)--Interbedded argillite, siltite, and fine-grained quartzite in about equal amounts. Intruded by numerous sills of tholeiitic composition. About 2,700 m (excluding sills) in map area; neither top nor bottom exposed. About 5,200 m (including sills) in Newport No. 1 quadrangle 30 km to southwest (Miller, 1974a). Exposed section in map area probably middle to lower-middle part of Prichard, because concordant sills most abundant in that part of section at other localities. Argillite mostly dark gray and medium to light gray, thinly bedded to finely laminated. Siltite medium to light gray and white; very fine-grained. Bed thickness up to 1 m, but most 5

cm to 20 cm. Quartzite white and light gray. Bed thickness from a few cm to several meters; numerous siltite and some argillite interbeds. Cross laminations, graded beds, and channel-and-fill structures common in argillite and many siltite beds; quartzite beds relatively structureless internally. Argillite and to lesser degree siltite contains abundant pyrite and(or) pyrrhotite; oxidation of iron sulfides forms ubiquitous limonite-colored weathered surfaces.

Yd METADIABASE SILLS (Proterozoic Y)--Diabase and gabbro, slightly to moderately metamorphosed. Tholeiitic composition (Bishop, 1973). Plagioclase ranges from labradorite to oligoclase depending on metamorphism and differentiation in sill. Mafic mineral is hornblende, except within contact aureole of younger plutons where biotite occurs. Some or all hornblende probably derived from metamorphism of pyroxene. Quartz generally less than 5 percent of rock; may result from excess silica formed from metamorphism of pyroxene to hornblende. Thickness of sills range from about 1 m to 450 m. Sill on south flank Watson Mountain probably two sills (possibly same two on west flank Blacktail Mountain), but sedimentary rock between is concealed. Most sills over 100 m thick show some degree of differentiation and have pegmatitic or relatively leucocratic zone within 10 to 20 m of top. Uranium-lead age on zircon from sill 51 km to east is 1430 m.y. (Elston and Bressler, 1980).

STRUCTURE

The Newport fault passes along the east side of Priest Lake for the entire length of the quadrangle. It separates two fundamentally different terranes; the Selkirk Crest igneous complex and its associated high rank metamorphic rocks on the east, and barely metamorphosed Belt Supergroup rocks intruded by relatively high-level plutons on the west. The fault appears to dip west at a low to moderate angle, but no dips have been directly measured. About 20 km south of the map area, where there is relatively good control on the surface trace of the fault across irregular topography, a dip of 30 degrees was calculated for three separate localities. In the north half of the Priest Lake map area, the fault appears to be steeper. The strike of the fault is generally north-south, but several bends of up to 20 degrees occur. At the north end of the area, the fault turns to N. 40 W., and continues with that strike for at least 8 km beyond the quadrangle.

Within the map area, rocks of the Selkirk Crest complex exhibit development of progressively more intense cataclasis from east to west. The rocks appear to have responded in a semi-ductile, semi-brittle manner, with almost all products of the cataclasis showing moderate to high degree of recrystallization. The cataclasis involves milling and recrystallization of quartz and feldspars, and disaggregation and wrapping of micas around milled felsic minerals. The fabric formed by this cataclasis is more strongly lineate than foliate, and presumably formed during emplacement of the complex. Eastward from the Newport fault, fabric development progressively decreases. In the eastern part of the map area the rock has almost no directional fabric, even where cataclasis is apparent; the fabric becomes apparent only where cataclasis is relatively strong.

The cataclastic rock subdivisions shown on the geologic map are based on degree of cataclasis exhibited in thin section. The subdivisions portray the approximate configuration and relative degree of cataclasis within the complex, and are strictly qualitative. Criteria defininining the zones are given at the end of the section on structure. The degree of cataclasis is completely gradational within the subdivisions and across the boundaries between them; placement of the boundaries is necessarily subjective.

A moderate to strong streaked-mineral lineation is developed on discontinuous shear zones within the ductily deformed cataclastic rock and appears to become progressively strong toward the west edge of the complex. The lineation strikes generally west, and plunges westward. The discontinuous shears merge with each other to some degree and with apparently flattened and elongated trains of disaggregated quartz and micas to form a foliation that strikes roughly north and dips west.

Within and near the actual trace of the Newport fault, the cataclasis is totally brittle and shows almost no recrystallization. This brittle cataclasis is associated with the Newport fault zone only, has no directional fabric other than discontinuous slickensided surfaces, and clearly post-dates all or most of the ductile cataclasis associated with emplacement of the Selkirk Crest igneous complex.

West of the Newport fault the Belt Supergroup rocks are intruded by several Cretaceous and Cretaceous(?) plutons that were emplaced at a relatively shallow level compared to the Selkirk Crest rocks. These plutons have relatively narrow contact metamorphic auroles around them and appear to have disrupted the regional north or northeast strike of the Belt rocks by forceable intrusion.

The Belt rocks are cut by a few high angle faults that appear to have less than 500 m displacement and probably predate the Newport fault. Only the fault north of Nickleplate Mountain appears to have a large displacement. None of these faults cut the Cretaceous or Cretaceous(?) granitic rocks. In the 15' quadrangle to the south, similar faults are more numerous and some may have up to 1000 m of displacement.

Thin Section Characteristics of Cataclastic Subdivisions

1. Minor cataclasis limited primarily to scattered intergranular granulation

2. Discrete thin zones or small areas of cataclasis, some through-going, but separated by large areas of no cataclasis or by areas where only intergranular milling is apparent.

3. Moderately well developed cataclastic zones; most are continuous across the thin section. Within shear zones quartz is strung out in lens shaped pods of recrystallized fine-grained milled products. Feldspars are rounded and milled. Rock between zones shows obvious cataclasis and milling of quartz and feldspar, but most feldspar is near original grain size.

4. Well developed zones of nearly total cataclasis, many shear zones merging; very little rock that shows only moderate cataclasis between zones.

5. Extreme cataclasis; almost all areas of thin section show cataclasis; only minor number of original size feldspar crystals preserved and those are milled and rounded. Mica crysals disaggregated and strung out between trains of cataclasized felsic minerals.

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