520736 93E/6

MARCH 24/81

EXPLORATION 1981 - CORE

JIM CRAWFORD

Jim, I have been told that the following contacts may have prior exploration data for our CORE property.
Please check out.

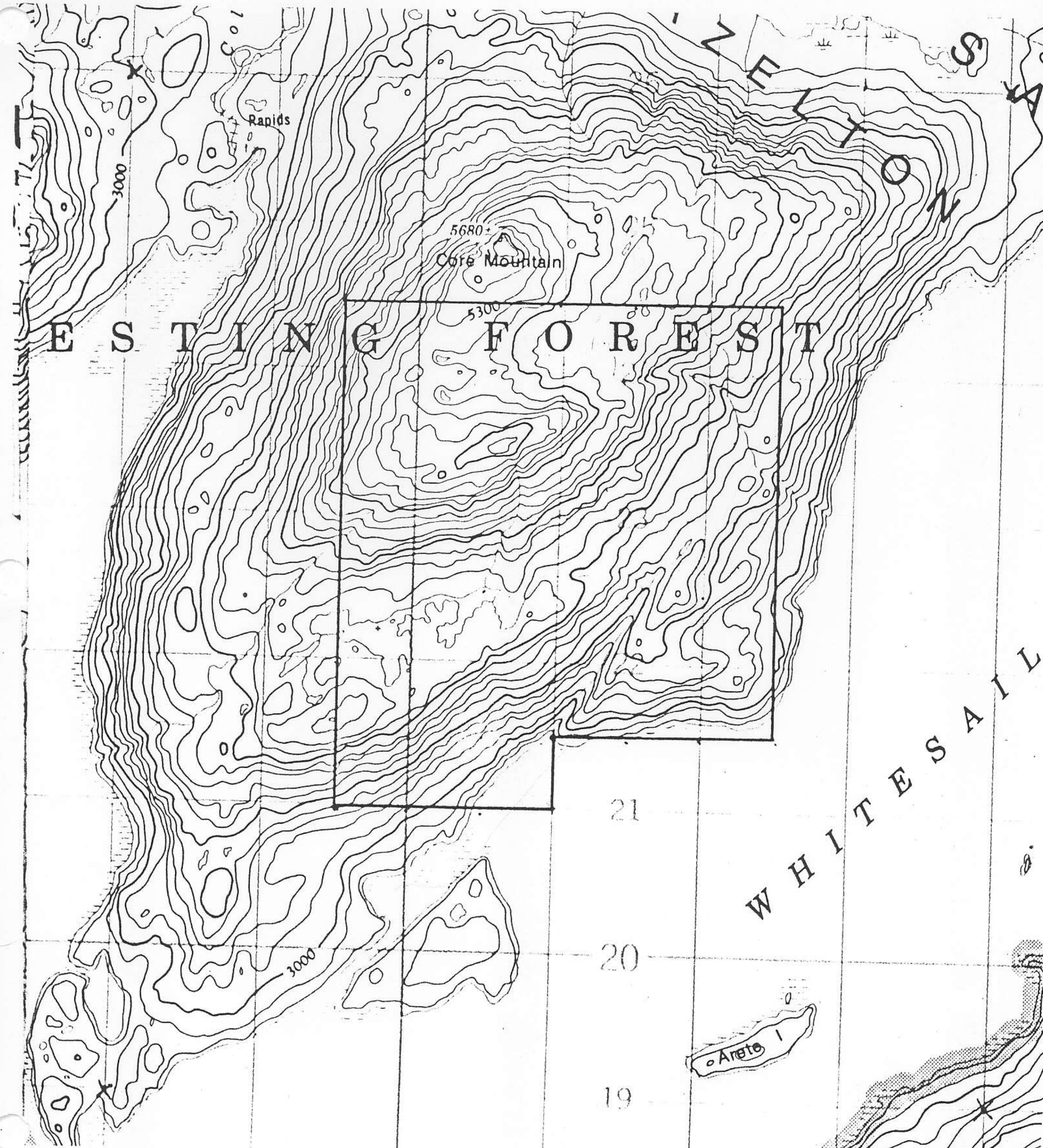
1) BC MIN INV. for prior assessment work reports

2) UTAH - Andy Schmitt - apparently worked area many years ago - maybe when Andy was with Phelps Dodge.

3) KENNCO - Bob Stevenson - again many years ago - supposed to have done some X-Ray drilling.

Schmitt & Stevenson will likely need a key map as the name CORE will not be familiar to them.

93 F/6 E Core Mtn.
#68, Pb-Zn. Cu Au Ag
67. Shirley, Core Au Cu
32 Core (Mag) Au Cu.
Duffel. Mem 299. Whitesail L.
Bull 270 R.—
Parsnip R. 1: 1000,000 1424A
OF 708
79-1A, 31-32, 25-29, 76-1A, 71-75



Rapids
3000
5680
Core Mountain
5300
E S T I N G F O R E S T
Z E L T O N
W H I T E S A I L
21
20
19
3000
Arete

17. EASTERN MARGIN OF THE COAST PLUTONIC COMPLEX IN WHITESAIL LAKE MAP-AREA, BRITISH COLUMBIA

Project 770020

G.J. Woodsworth
Regional and Economic Geology Division, Vancouver

Abstract

Woodsworth, G.J., Eastern margin of the Coast Plutonic Complex in Whitesail Lake map-area, British Columbia; Current Research, Part A, Geol. Surv. Can., Paper 78-1A, p. 71-[illegible], 1978.

Remapping began in 1977. Pre-Lower Jurassic volcanic and sedimentary strata near the east margin of the Coast Plutonic Complex have been penetratively deformed and metamorphosed to greenschist facies sometime between the Early Permian and Late Triassic. The high-grade Central Gneiss Complex may in part be correlative with these strata. The Early Jurassic and younger Hazelton Group has not been penetratively deformed on a large scale, has not been regionally metamorphosed, and is bounded on the west by a major high-angle fault.

Introduction

Remapping of Whitesail Lake (93E) map-area began during the 1977 field season. The project will focus on the structural and stratigraphic relations between the Coast Plutonic Complex and the flanking Intermontane Belt, on revision of the stratigraphy in light of recent work by Tipper and Richards (1976) to the north, and on correlation of the plutonic and metamorphic rocks of the area with units defined during the Coast Mountains Project to the west and south.

Previous mapping by Duffell (1959), Stuart (1960), Read unpubl. rep., 1963 and MacIntyre (1976) provides an excellent base for the present work. During the 1977 field season Woodsworth re-examined critical areas studied by Stuart (1960) and began subdivision of Duffell's (1959) Unit A along the east flank of the Coast Plutonic Complex. T.A. Richards spent several days examining Mesozoic strata just east of the Coast Plutonic Complex.

I thank S.J. Hills for excellent field assistance, Dave Newman and the staff of Okanagan Helicopters at Terrace for outstanding service, Y. Nishimura of Transwest Helicopters for excellent flying, and the people of Kemano, especially Doug Groves and Mrs. Jenny Gipps, for help in many ways.

Stratified Rocks

Central Gneiss Complex

The southwest part of the map-area (Fig. 17.2) is underlain by a broad belt of gneiss, migmatite and related plutonic rock that extends into Douglas Channel map-area to the west (Roddick, 1970). Banded hornblende-biotite gneiss, gneissic quartz diorite, migmatite and irregularly layered gneiss are the dominant lithologies. Bodies of relatively homogeneous plutonic rocks, not separated on Figure 17.2, in places grade into the gneiss and in other places cross-cut it. The Central Gneiss Complex was undoubtedly derived from sedimentary and volcanic strata that are probably, as is discussed below, pre-Jurassic in age.

Gamsby group[1]

The existence of Paleozoic strata in Whitesail Lake map-area was first established by Read (unpubl. rep., 1963) who collected Carboniferous or Permian fossils from a small area of limestone about 8 km southeast of Sandifer Lake. Details of these collections are given in Roddick (1970, p. 13). During the present work it was recognized that pre-Lower Jurassic (mostly Permian and older?) strata are much more widespread in the map-area than had previously been thought. These rocks, here informally called the Gamsby group, form a northwest-trending belt northeast of the Central Gneiss Complex.

The Gamsby group consists mainly of felsic and mafic tuffs and volcanogenic sandstone with lesser carbonate, argillite, and conglomerate. The most distinctive rocks are laminated mafic tuffs that alternate with laminated white-weathering rhyolitic tuffs and ignimbrites(?) (Figs. 17.1, 17.3). One or more members of dark grey argillaceous limestone locally grade into white, massive limestone. Intraformational conglomerate, breccia, and volcanic lenses are common in the limestone. Probable correlatives of at least part of the Gamsby group include the Lower Permian Asitka Group in McConnell Creek map-area, and upper Paleozoic rocks near Terrace, about 125 km northwest of Whitesail Lake map-area (Monger, 1977).

Hazelton Group

Strata correlated with the Hazelton Group are restricted to the eastern part of the area shown in Figure 17.2. The term "Hazelton Group" is used here in a general, rock-stratigraphic sense for strata lithologically

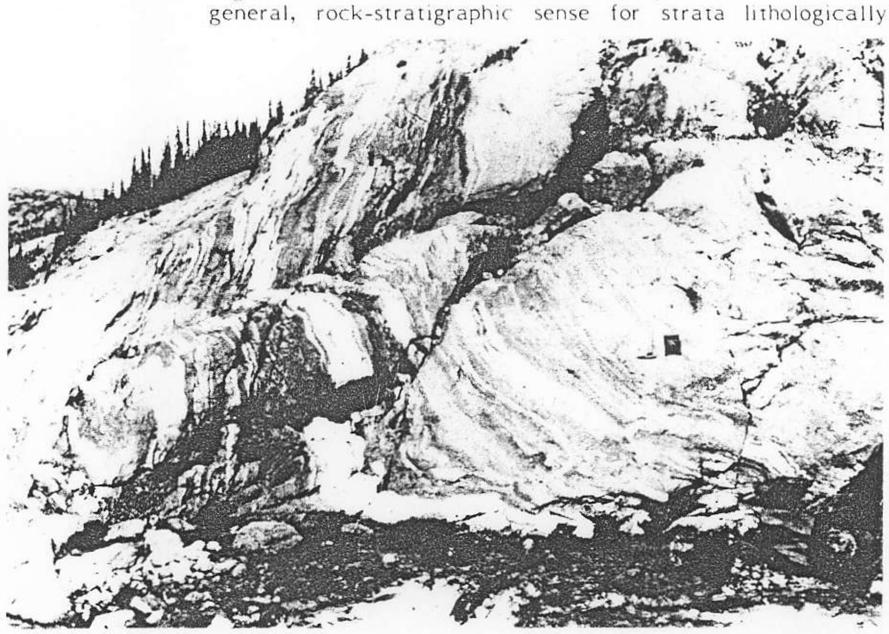


Figure 17.1. Typical strata of the Gamsby group: folded rhyolitic (white) and mafic tuffs about 8 km south-southeast of Sandifer Lake.

[1] Informal term.

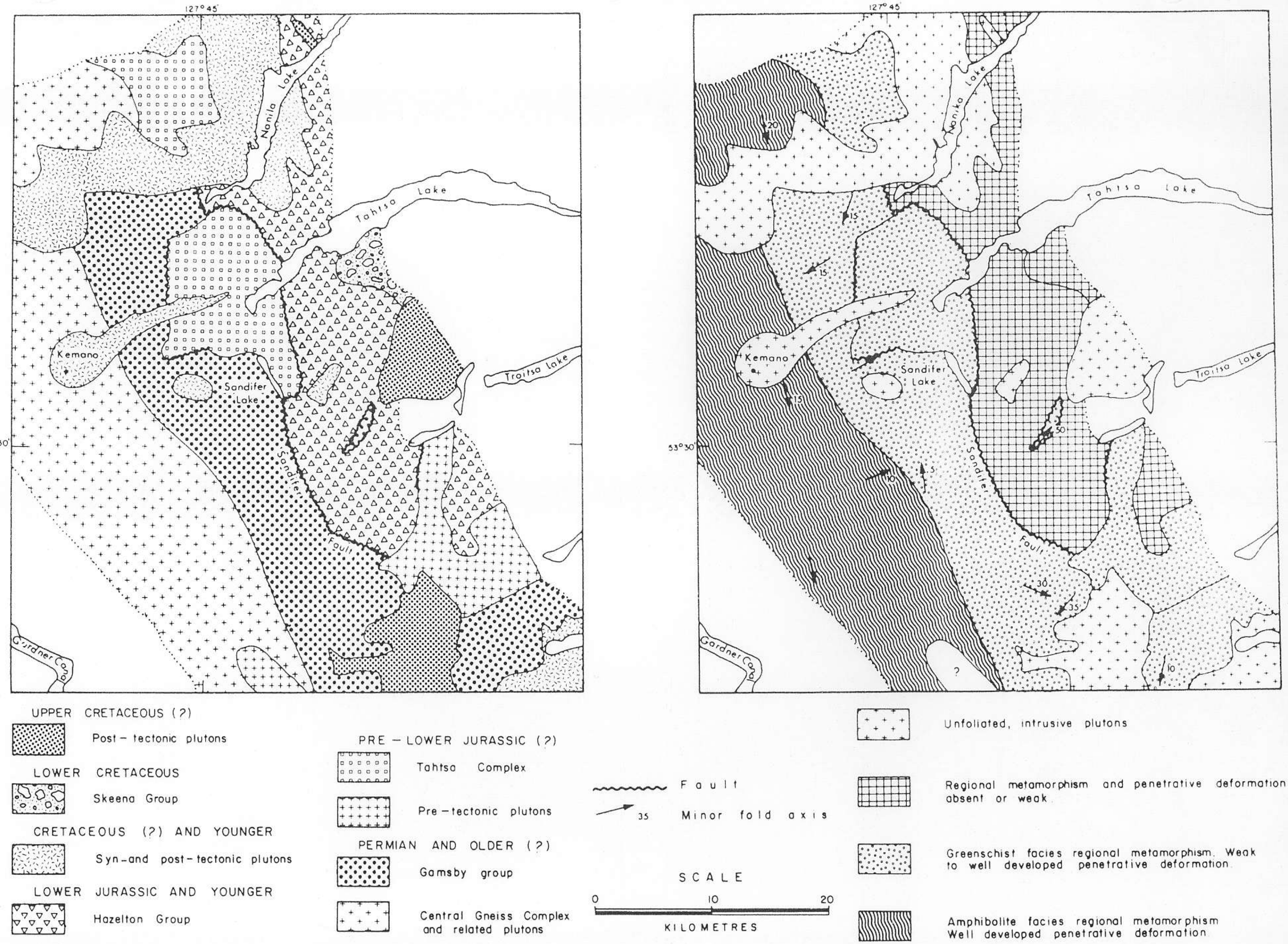


Figure 17.2. Sketch maps of geology (upper) and metamorphism (lower) in part of Whitesail Lake map-area.

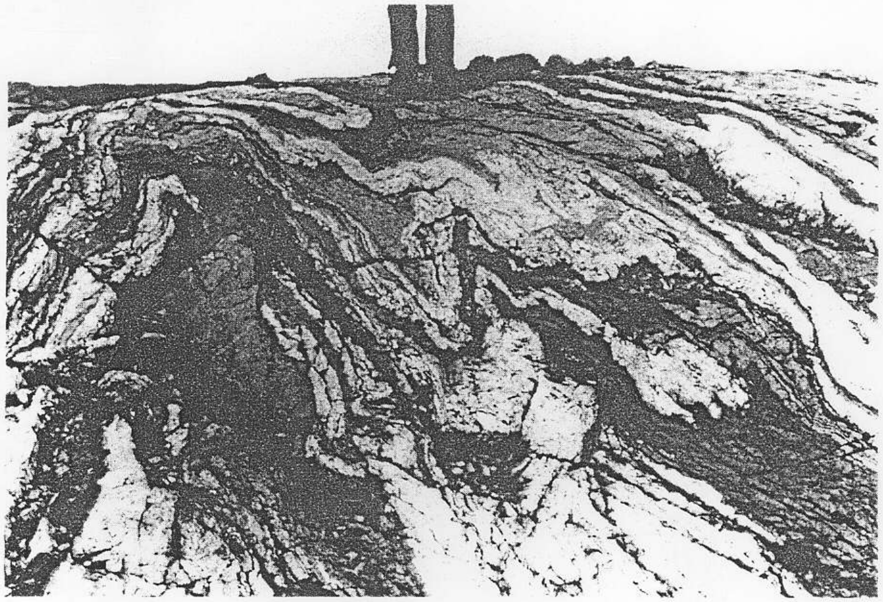


Figure 17.3.

Folded rhyolite and volcanogenic sandstone of Gamsby group 15 km northeast of Kemano.

Figure 17.4.

Near-horizontal roof (dashed line across middle of photo) of a miarolitic quartz monzonite pluton. The grey strata above the stock are Gamsby group. View to north from ridge 7.5 km northeast of Black Dome.

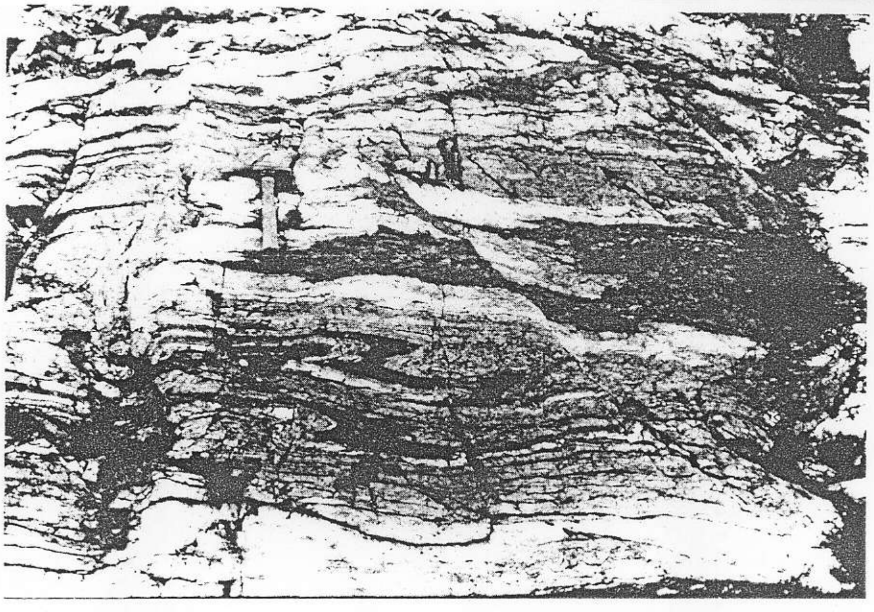


Figure 17.5.

Folded rhyolite and greenstone of Gamsby group 15 km northeast of Kemano.

similar to those described by Tipper and Richards (1976) in areas to the north. Because no fossils were found in this assemblage, rocks as old as Early Triassic and as young as Early Cretaceous may be included in the Hazelton Group shown on Figure 17.2.

Where examined, the Hazelton Group consists predominantly of rhyolitic to basaltic fragmental volcanic rocks, mainly lapilli tuff, tuff-breccia, and aquagene tuff. Greywacke, siltstone, immature sandstone and conglomerate are common in some areas. Fluvial conglomerate containing rare granitoid clasts outcrops 3 km southeast and 5 km south-southeast of the south end of Sandifer Lake. About 4 km southeast of Sandifer Lake a distinctive polymict conglomerate contains undeformed and unmetamorphosed volcanic clasts derived from the Hazelton Group and some phyllitic rhyolite and folded limestone clasts presumably derived from underlying Gamsby group strata. The matrix of the conglomerate is mainly red mudstone with rare mudcracks; the rock has a pronounced reddish colour. This conglomerate is similar to a polymict conglomerate forming the base of the Hazelton Group in other areas (Monger, 1977).

Skeena Group

Lower Cretaceous sandstone and shale south of Tahtsa Lake were not examined by the writer but are described by MacIntyre (1976) and Duffell (1959).

Tahtsa complex

Stuart (1960, p. 10) defined the Tahtsa complex as "an igneous complex of hornblende diorite and quartz diorite cut by quartz monzonite stocks, granodiorite dykes, and basic dykes". Re-examination of the type areas near the west end of Tahtsa Lake indicate that the complex may be interpreted better as a dioritized volcanic unit similar to many basic complexes found in the Coast Plutonic Complex. The complex consists largely of greenstone and lesser felsic rock (meta-rhyolite?). The greenstone has been feldspathized and dioritized to varying degrees and is cut by several generations of mafic and felsic dykes, many of which are also recrystallized and feldspathized. The entire complex, except for the youngest dykes, is cut by numerous shears and fractures that have been healed by epidote.

Greenschist-facies metamorphism has obliterated most primary sedimentary and volcanic structures. In places, the less dioritized parts of the complex resemble strata of the Gamsby group; in other places the Gamsby group seems to grade into the Tahtsa complex by increasing dioritization. It is tentatively suggested that the Tahtsa complex is, at least in part, correlative with the Gamsby group; in any event, a pre-Jurassic age is probable.

Plutonic Rocks

Plutonic rocks of many ages and varieties are exposed in the map-area. Probably the youngest are three stocks of miarolitic granite to granodiorite west and south-southwest of Troitsa Lake and north of Nanika Lake. These are high-level, unfoliated and slightly porphyritic plutons that cross-cut all other units and structures in the area. The gentle outward dips of the contacts of the southern of these bodies indicate that the stock is just beginning to be unroofed (Fig. 17.4). Numerous unfoliated to weakly foliated plutons are not miarolitic, are equigranular, and appear emplaced at greater depths than the miarolitic rocks. Most of these plutons are undeformed and unmetamorphosed and may have been emplaced during the Cretaceous and Tertiary.

An irregular body of pre-tectonic quartz diorite is exposed southeast of Troitsa Lake. The quartz diorite is cut by swarms of mafic dykes; plutonic rock and dykes have been sheared, fractured, and metamorphosed to greenschist facies.

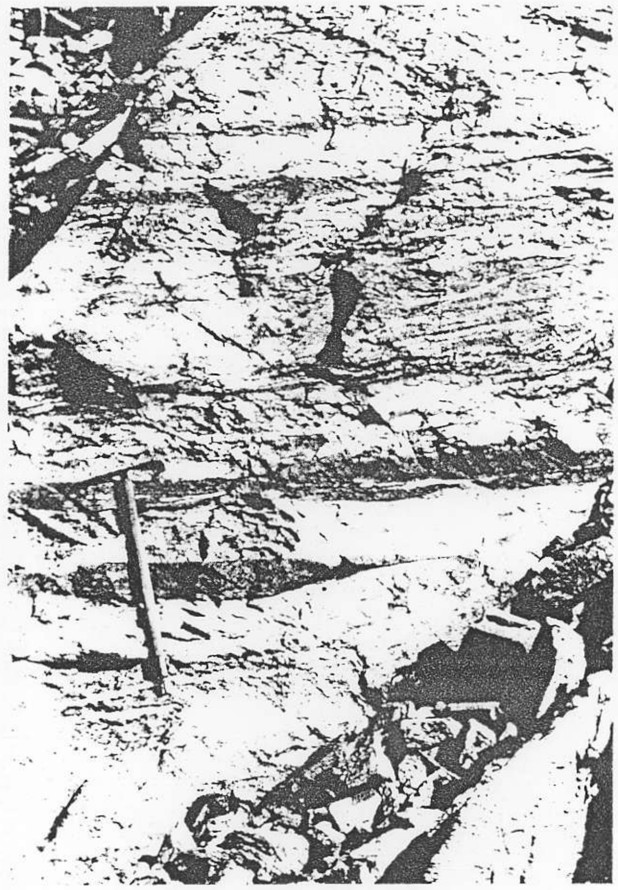


Figure 17.6. Irregularly-layered gneiss of Central Gneiss Complex 17 km southeast of Kemano. Note similarity in layering and deformation between this and Gamsby group of Figure 17.5.

Structure, Metamorphism, and Age Relations

Pre-Jurassic deformation and metamorphism

The Gamsby group and the Hazelton Group show major differences in metamorphic and structural styles. The gross structure of the Gamsby group south of Sandifer Lake is approximately a gently dipping homocline, complicated perhaps by later thrusting (Fig. 17.4). Tight folds up to several metres in amplitude are superposed on this homocline; fold axes generally have gentle plunges (Fig. 17.2). A moderate schistosity, axial planar in some outcrops, is commonly present in the Gamsby group, particularly in the more mafic strata. Regional metamorphism to greenschist facies accompanied the penetrative deformation. In some localities metamorphic minerals such as actinolite have grown parallel with the axes of minor folds. Strata of the Hazelton Group have been neither penetratively deformed nor regionally metamorphosed, although a slight schistosity is commonly developed near shear zones. Clasts of folded and metamorphosed strata derived from the Gamsby group are found in the unmetamorphosed Hazelton polymict breccia, indicating that a major metamorphic and deformational event affected that area sometime between the Early Permian and Late Triassic.

The Tahtsa complex has also been metamorphosed to greenschist facies but recognizable minor folds are rare. Stuart (1960) thought that the Tahtsa complex was the basement on which the "Hazelton" rocks (Gamsby plus Hazelton) were deposited. Re-examination of all of Stuart's unconformities indicates that most are fault contacts and that none are unconformable.

The structural relations between the Gamsby group and the Central Gneiss Complex are not understood. Layering in the Central Gneiss Complex dips gently and is roughly parallel with bedding in the Gamsby group. In some places the Gamsby group seems to grade by increasing metamorphism into Central Gneiss Complex (Figs. 17.5, 17.6); in other places the contact may be a fault. Minor fold styles are much the same in both units, suggesting that strata forming the Central Gneiss Complex were involved in the folding event that affected the Gamsby group. If so, then the Central Gneiss Complex in this area contains no Hazelton or younger strata.

Western limit of the Hazelton Group

A major tectonic break, the Sandifer fault, forms the western limit of the Hazelton Group in the map-area. This break is a steep, west-dipping reverse fault that juxtaposes unmetamorphosed Hazelton strata against metamorphosed Gamsby rocks. The latest movement on this fault was probably pre-Late Cretaceous, as the extension of the fault south of the area shown in Figure 17.2 is cut by a high-level Upper Cretaceous(?) stock. Presumably the Hazelton Group once extended west across the fault into the area now occupied by the Coast Plutonic Complex but has been removed by uplift and erosion.

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5. GEOLOGY OF WHITESAIL LAKE MAP AREA, BRITISH COLUMBIA

Project 770020

G.J. Woodsworth
Regional and Economic Geology Division, Vancouver

Woodsworth, G.J., Geology of Whitesail Lake map area, British Columbia; in *Current Research, Part A, Geol. Surv. Can., Paper 79-1A, p. 25-29, 1979.*

Abstract

The Intermontane Belt is underlain mainly by the largely volcanic Lower Jurassic Hazelton Group, the sedimentary Middle Jurassic Ashman Formation, the sedimentary Lower Cretaceous Skeena Group, and Upper Cretaceous to Miocene(?) nonmarine volcanics. Block faults dominate the structure. The Coast Plutonic Complex is underlain by isoclinally folded Central Gneiss Complex, Gamsby group, and plutonic rock. The Gamsby group grades by increasing metamorphism into Central Gneiss Complex. Between the Coast Plutonic Complex and the Intermontane Belt is a zone characterized by intense faulting, numerous dyke swarms, Lower Permian limestone and Lower Cretaceous(?) volcanics that may represent the northwest extension of one strand of the Yalakom Fault.

Introduction

Remapping of Whitesail Lake (93E) map area, begun in 1977 (Woodsworth, 1978), continued in 1978. The area was originally mapped by Duffell (1959); parts of the area have been mapped in more detail by Stuart (1960), Read (unpubl. rep., 1963), and MacIntyre (1976). Emphasis in the present study is on the structural and stratigraphic relations between the Coast Plutonic Complex and the flanking Intermontane Belt and on revision of the Mesozoic stratigraphy in the Intermontane Belt. Excellent field assistance was given by B. Douglas, L. Erdman, C. Evenchick, R. Helgason, B. Hayden, P. van der Heyden, M.L. Hill, P. Holbek, R. Rodman, R. Yamamoto, by cooks J. Wheeler and B. Souther, and by pilot B. McLaughlin of Quasar Aviation. T.A. Richards spent five weeks on the project; H.W. Tipper (see this publication, report 6) studied the Jurassic biostratigraphy of the area. J.W.H. Monger examined several areas of Paleozoic and Triassic strata. The following notes are a supplement to a map of Whitesail Lake map area to be released later in 1979.

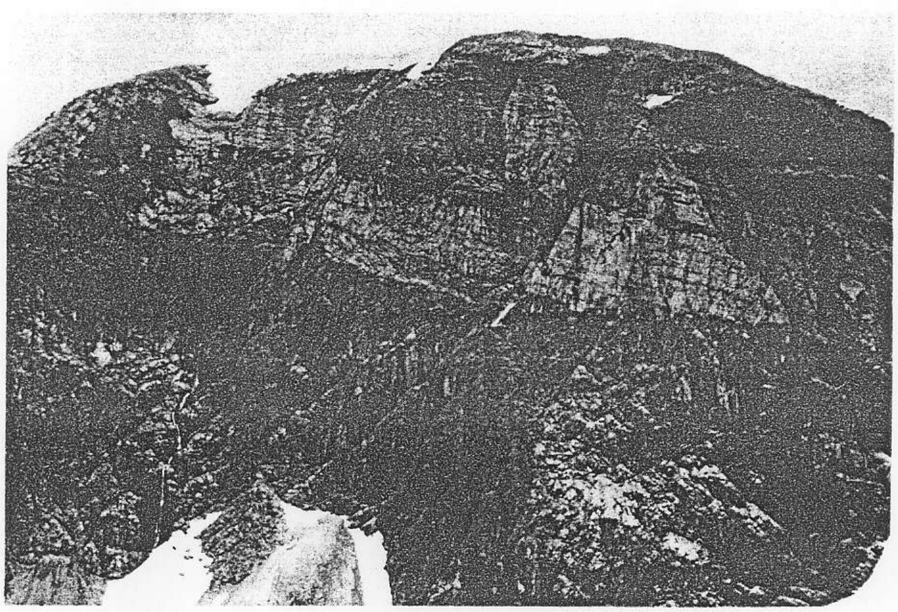

Figure 5.1. *Cliffs of Gamsby group, about 700 m high, between Tsaytis and Gamsby rivers. The lower part of the cliffs are nondescript volcaniclastics characteristic of the Gamsby group; the upper part is the thin bedded marble and skarn member that serves as a useful marker horizon in the group. The white rock about halfway up the cliff on the left is also marble.*

The map area is underlain by the Coast Plutonic Complex on the west, the Intermontane Belt on the east, and by a narrow, intensely faulted transition zone.

Stratigraphy

Central Gneiss Complex

The Central Gneiss, the dominant unit in the southwest part of the map area, consists largely of banded amphibolite, gneisses, agmatite, plutonic rock, and minor schist, skarn, and marble. Bodies of plutonic rock form an important part of the Central Gneiss Complex and only the larger and more homogeneous bodies are mapped separately. The Central Gneiss Complex was, at least in part, derived by increasing migmatization of the Gamsby group.

Gamsby group

The Gamsby group (Woodsworth, 1978) underlies much of a belt extending southwest from Nanika Lake to near the south boundary of the map area. The unit consists largely of felsic and mafic tuff, commonly laminated, with lesser volcanogenic sandstone and one or more limestone and skarn members up to 200 m thick (Fig. 5.1). The Gamsby group has been metamorphosed to greenschist facies and the transition from Gamsby group to Central Gneiss Complex is arbitrarily placed at the first appearance of a significant amount of granitoid material. No diagnostic fossils have been found in the Gamsby group but a Paleozoic age appears probable.

Paleozoic(?) strata northwest of Atna River

Quartz-biotite schist and schistose metagreywacke containing andalusite and staurolite underlie the extreme northwest corner of the map area. These strata have been isoclinally folded about northeast-trending axes and are faulted against the Telkwa Formation to the east.

Figure 5.2. Polymict conglomerate about 9 km southeast of Sandifer Lake. Clasts are mainly red and green volcanics, tuffs, and breccias with some limestone clasts. This conglomerate may form the base of the Telkwa Formation in the map area.

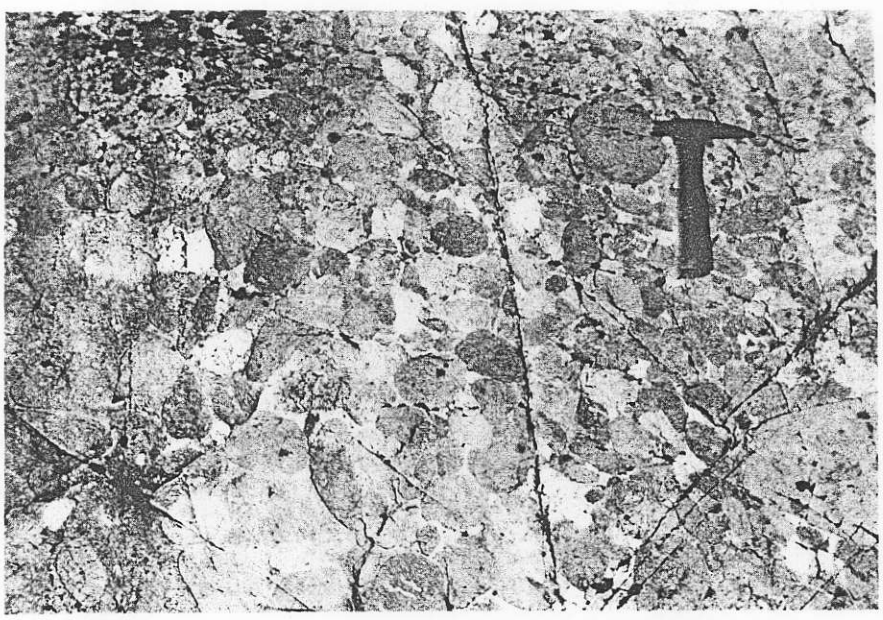

Figure 5.3. Well sorted and winnowed conglomerate (Lower Cretaceous(?)) at head of Tsaytis River. Most clasts are a great variety of volcanics and high-level porphyries with lesser tuff, breccia, and altered granitic material. The conglomerate fines downward into sands and siltstone.

Permian and Triassic strata southeast of Sandifer Lake

About 9 km southeast of Sandifer Lake is a small complex area of rocks ranging in age from Permian to Jurassic. Four units, separated from one another by faults or intrusions, are present (J.W.H. Monger, pers. comm.). From oldest to youngest they are:

1. Massive to thin bedded limestone with chert nodules containing Early Permian fusulinids (C.A. Ross, pers. comm., 1978). This limestone is correlative with lithologically similar limestone described by Monger (1977) from the Terrace area.
2. About 100 m of thin bedded black shale and calcareous siltstone containing Middle or Upper Triassic fossils.
3. About 80 m of Upper Triassic strata consisting of boulder conglomerate with abundant limestone clasts that grades upwards into shales and limestone.
4. A red polymict conglomerate (Fig. 5.2) with some limestone clasts that is similar to the basal conglomerate of the Telkwa Formation in the Terrace area. This conglomerate appears to grade up into volcanic rocks typical of the Telkwa Formation.

Triassic(?) rocks near Smaby Peak

Thin bedded tuff, breccia, feldspar porphyry and minor limestone occur in several areas southwest of Lindquist Lake. No diagnostic fossils have been found in these rocks but an Upper Triassic age is suggested on the basis of lithologic similarities with Upper Triassic rocks in the Mount Waddington map area (Tipper, 1969), about 250 km to the southeast.

Hazelton Group: Telkwa and Smithers formations

Red, maroon, and green rhyolite basalt breccia, tuff and minor sediments and flows of the Telkwa Formation underlie large areas of the eastern part of the map area. The age of the Telkwa Formation is assumed to be largely Early Jurassic (Tipper and Richards, 1976) but lithologically similar red volcanics on Whitesail Range are Bajocian in age (Tipper, this publication, report 6). The base of the Telkwa Formation may be exposed southeast of Sandifer Lake, where a red polymict conglomerate grades up into typical Telkwa volcanics.

Grey to green volcanic sandstone, volcanic breccia and tuff, pebble conglomerate and rare limestone of the Smithers Formation overlie the Telkwa Formation. The Smithers Formation is probably mostly Middle Jurassic in age, but Lower Jurassic strata are present west of Michel Lake.

Bowser Lake Group: Ashman Formation

Thin bedded shale, siltstone, and limy sandstone of the upper Bajocian to Callovian Ashman Formation outcrop in several areas from Sibola Range southeast to near the south margin of the map area. The unit appears to overlie the Smithers Formation; the top of the unit is not exposed.

volcanics in the Mount Waddington (Tipper, 1969) and Bella Coola (Baer, 1973) map areas.

Similar volcanics with interbedded sediments, including a well sorted granitic-cobble conglomerate (Fig. 5.3) outcrop near the head of Tsaytis River.

Skeena Group

Micaceous sandstone, shale, and conglomerate of the Lower Cretaceous Skeena Group outcrop in the western part of the Intermontane Belt. Paleocurrent data indicate a west to southwest paleoslope. The base of the Skeena Group is not exposed in the map area; the unit is unconformably overlain by the Kasalka Group.

Kasalka Group

The Kasalka Group was defined by MacIntyre (1976) as a sequence of Upper Cretaceous nonmarine volcanics and sediments in the vicinity of Tahtsa Lake. The term is used here for all presumed Upper Cretaceous volcanics in the map area that are lithologically similar to rocks in the type area.

The Kasalka Group overlies the Skeena Group with distinct angular unconformity. The base of the Kasalka Group is marked by a distinctive red conglomerate containing volcanic and sandstone clasts in a hematitic matrix. This conglomerate is normally less than 50 m thick, but northwest of Seel Lake what is probably the same conglomerate is about 200 m thick. There the conglomerate contains abundant boulders of Tahtsa complex, representing the first direct evidence, in the map area, of exposure of part of the Coast Plutonic Complex.

The conglomerate is overlain by a thick succession of andesite to rhyolite flows, pyroclastics, and lahar (Fig. 5.4).

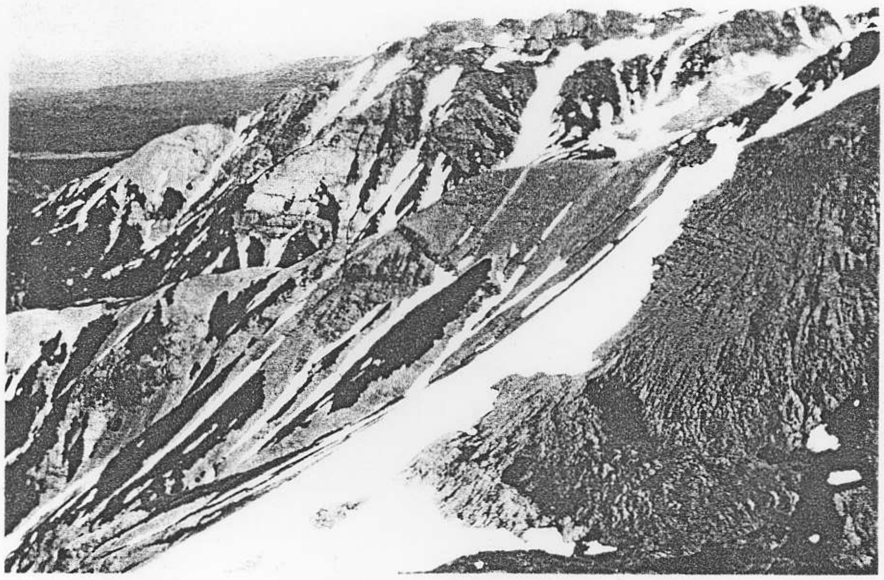

Figure 5.4. *Looking southeast from Swing Peak to typical strata of the Kasalka Group. Rocks are dominantly flow-banded rhyolite, feldspar porphyry, and lahar. Strata are slightly tilted and faulted but otherwise undeformed.*

Figure 5.5. *In the background are flat lying, undeformed flows of the plateau basalts. These flows form a conspicuous escarpment east of St. Thomas River. The plateau basalts are cut by a plug of columnar-jointed basalt (foreground) that extends about 20 m above the plateau formed by the plateau basalts.*

Ootsa Lake and Endako groups

Nonmarine volcanics of the Ootsa Lake Group, dominantly rhyolite and dacite flows and pyroclastics with minor basalt and sediments, underlie a large part of the eastern half of the map area. Except for the Whitesail Range, most outcrops of the Ootsa Lake Group are in topographically low areas. Tectonic and age relations between the Ootsa Lake and Kasalka groups are unknown.

Basalt, andesite, and minor gabbro of the early Tertiary Endako Group are found east of Whitesail Reach and Eutsuk Lake, and probably underlie a large part of Mosquito Hills.

Lower Cretaceous(?) volcanic rocks

Extensive areas just east of the Coast Plutonic Complex, particularly near Salient Peak and Mount Tsaydaychuz, are underlain by thick bedded, brownish weathering andesite to rhyolite flows and pyroclastics. These volcanics are distinguished in the field from the Telkwa Formation by their relatively fresh mafic minerals, by their steep, cliff-forming nature and by the drab colour of their talus slopes (as distinct from the maroon talus common in the Telkwa volcanics). No fossils have been found in these rocks, but they are lithologically indistinguishable from Hauterivian

Plateau basalts

Flat lying undeformed basalt flows form a conspicuous plateau about 1700 m in elevation west of Wells Gray Peak (Fig. 5.5). The lack of deformation suggests correlation with the Miocene-Pliocene plateau basalts in map areas to the east.

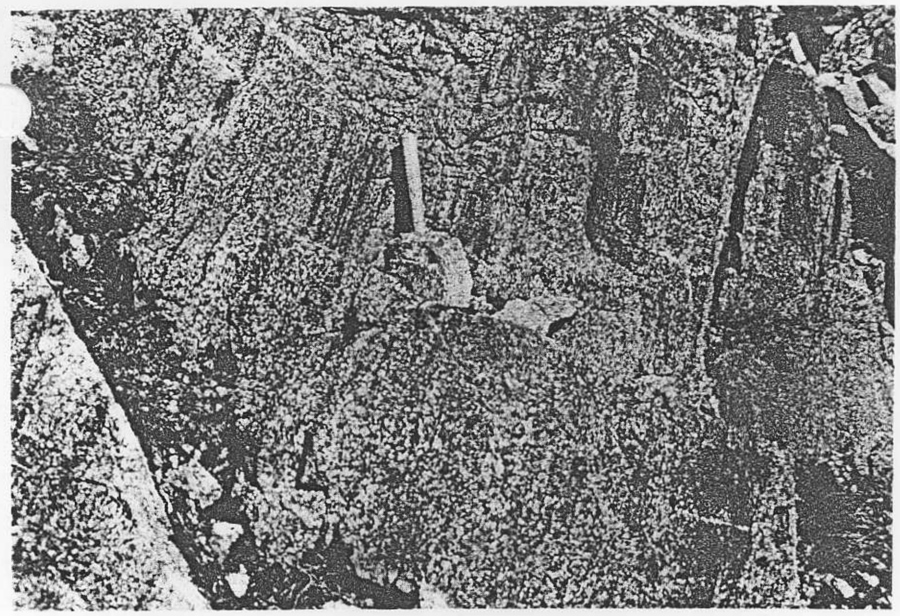

***Figure 5.6**. Well layered diorite of the Black Dome complex, about 1 km southeast of Black Dome. The layering is defined by variations in the amount of hornblende and pyroxene, in grain size, and in texture. Much of the feldspar has a distinct purplish hue.*

Small necks of columnar jointed basalt are common in the low country east of Eutsuk Lake and may be feeders to the plateau basalts.

Plutonic Rocks

Plutons in the Intermontane Belt are high-level stocks forcibly emplaced into the surrounding strata. Most of the plutons fall into one of four categories:

1. Pink granite, monzonite and syenite of the Lower Jurassic Topley Intrusions. These are probably deep-seated equivalents of the Hazelton Group (Tipper and Richards, 1976) and are highly faulted and altered.
2. Small microdiorite, gabbro, and diabase plugs that may be feeders for the Kalsalka Group.
3. Granodiorite, quartz diorite, monzodiorite and monzonite stocks of the Upper Cretaceous Bulkley Intrusions.
4. Granite, quartz monzonite and their porphyritic equivalents of the Lower Tertiary (mainly Eocene) Nanika Intrusions. Included in this category are numerous small felsite and quartz-feldspar porphyry stocks that may be correlatives of the Ootsa Lake Group.

Plutonic rocks in the Coast Plutonic Complex show a great variety of composition, structure, and probably age that defies adequate summation in a paragraph. Much of the granodiorite, quartz diorite, and quartz monzonite in the southwestern part of the map area is intimately related to the Central Gneiss Complex. Contacts between Central Gneiss Complex and plutons are in many places arbitrary, because many plutons grade into the gneiss in some places but in others, contacts are highly discordant.

Several dioritic complexes, notably the Tahtsa complex (Woodsworth, 1978) and Black Dome complex, occur near the east margin of the Coast Plutonic Complex. The Black Dome complex consists of heterogeneous, massive to well layered diorite (Fig. 5.6), greenstone, and numerous mafic dykes. The relationships among the various lithologies are poorly understood, and the entire complex has been metamorphosed to greenschist facies, possibly in conjunction with metamorphism of the Gamsby group.

Several post-tectonic plutons cut the Coast Plutonic Complex. These include the large miarolitic granite stock in the Gamsby River valley that gives an Eocene K-Ar age, and the Horetzky Dyke, a 74 Ma old diorite and quartz diorite body that cuts Central Gneiss Complex, Gamsby group, and Tahtsa complex.

Structure

Faults dominate the structure in the Intermontane Belt. The major mountain massifs may represent uplift blocks, some of which are cored by plutons of the Bulkley and Nanika intrusions. Block faults affect all rocks except the Miocene-Pliocene(?) plateau basalts. Block faulting may have begun in the mid-Cretaceous, because the basal conglomerate of the Kasalka Group, deposited unconformably on faulted Skeena Group, indicates a major change in the tectonics of the Intermontane Belt in mid to Late Cretaceous time.

Northwesterly-directed thrust faults on Sibola, Whitesail and Chickamin ranges predate at least some of the block faulting.

The structure of the Coast Plutonic Complex in the map area is dominated by at least one period of isoclinal folding. Minor fold axes, with many exceptions, plunge gently to moderately northwest to northeast and southwest to southeast. In the Central Gneiss Complex much of the granitoid material predates or is synchronous with the isoclinal folding, but the structure is complicated by at least one later period of folding (perhaps related to uplift of the Coast Plutonic Complex) and by the emplacement of post-tectonic plutons.

The structure of the Gamsby group is approximately a southwest-dipping homocline, but there is some evidence for isoclinal folding about southwest-plunging fold axes.

The transition between Coast Plutonic Complex and Intermontane Belt is marked by a zone up to 10 km wide characterized by intense faulting, numerous diabase dyke swarms, and the juxtaposition of greatly differing rock units. Several map units, particularly the Lower Permian and Upper Triassic carbonates and the Lower Cretaceous(?) volcanics, are restricted to this belt. The zone may in part represent one strand of the Yalakom Fault, but whether the movement in Whitesail Lake map area is transcurrent is not known.

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6. JURASSIC STRATIGRAPHY OF THE WHITESAIL LAKE MAP AREA, BRITISH COLUMBIA

Project 750035

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Tipper, H.W., Jurassic stratigraphy of the Whitesail Lake map area, British Columbia; in Current Research, Part A, Geol. Surv. Can., Paper 79-1A, p. 31-32, 1979.

Abstract

In the Whitesail Lake map area, several Lower and Middle Jurassic volcanic and sedimentary formations correlative with and lithologically similar or identical to formations of the Hazelton and Bowser Lake groups have been recognized. They are a southerly extension of rocks exposed in the Smithers map area. These strata characterize the Nechako Basin south of the Skeena Arch and are the oldest strata in much of the area east of the Coast Mountains.

In conjunction with the remapping of Whitesail Lake map area (see G.S. Woodsworth, this publication, report 5) the Jurassic rocks of the area were studied with a view to relating them to the stratigraphic and tectonic model proposed for the Jurassic immediately to the north (Tipper and Richards, 1976).

The Hazelton Group

In the areas to the north of Whitesail Lake map area, the Telkwa Formation is volumetrically and areally the most prominent formation of the Hazelton Group. Typically it is composed of reddish, maroon, purple, grey and green pyroclastic and flow rocks of marine and nonmarine origin of Sinemurian to (?) Early Pliensbachian age. The rocks of the Telkwa Formation in Whitesail Lake map area appear to be a direct southerly extension of those exposed in the Smithers area where similarly it is nonmarine in the west part and marine in the east. In Whitesail Lake, however, the age is not defined. The rocks underlie a wide area east of the Coast Mountains and are, for the most part, nonmarine. Only in the Quanchus Mountains in the east half of the map area were Lower Jurassic marine fossils found. These beds resemble the Smithers Formation.

Overlying the Telkwa Formation is a unit that is unlike any of the formations of the Hazelton Group in the areas to the north. It appears to represent an eruptive centre in which cream coloured, reddish and dark grey rhyolitic flows and pyroclastic rocks predominate. In part the unit is marine with, in some beds, abundant ammonites and pelecypods. Minor siltstone and rare sandstone is interbedded with the rhyolitic tuffs in thin, well laminated beds. The age is Middle Jurassic (Lower Bajocian) but may extend down into the Early Jurassic (Toarcian). Thick beds of red tuff and breccia overlie the cream-coloured rhyolite near the top of the unit. The reddish pyroclastics are difficult to distinguish from the Telkwa Formation and, hence, in places the unit may be mapped as Telkwa Formation. It does, however, have a more consistently red or maroon colour and is more regularly bedded than the Telkwa Formation. In these respects the rocks resemble the Red Tuff Member of the Nilkitkwa Formation in the Smithers and Hazelton map areas to the north. They are approximately the same age. They are also similar in lithology and age, in whole or in part, to the 'Toodoggone Volcanics' of the Spatsizi and Cry Lake map areas of northern British Columbia (Gabrielse, 1978). In the Quanchus Mountains, eastern part of the Whitesail map area, a correlative and lithologically similar unit has conglomerate at its base and appears to rest with erosional unconformity on the Telkwa Formation.

The Smithers Formation is widespread in the map area. It is composed of well bedded marine tuff, volcanic breccia, siltstone and minor grit, conglomerate and flows. The volcanics are largely andesitic and the coarse clastic strata contains abundant feldspar fragments. It is characteristically well bedded or coarsely laminated, poorly sorted, resistant, and breaks along blocky, closely spaced joints. Fossils, particularly pelecypods, are common but belemnites and ammonites are present at many localities. In the northern part of the map area early Middle Bajocian and late Middle Bajocian fauna were collected but the base was not exposed. However, on Chikamin Mountain, in the central part of the area, strata with a late Middle Bajocian fauna rest directly on Telkwa Formation. The Lower Bajocian – Toarcian rhyolitic strata and the early Middle Bajocian beds are missing. On Chikamin Mountain conglomerate and conglomeratic beds occur at the base of the Smithers Formation and together with the probable absence of beds present elsewhere, suggests an erosional interval in Middle Bajocian time. The shelly fauna and the coarseness of the clastic material indicates probable shallow sea with many nearby volcanic sources of material.

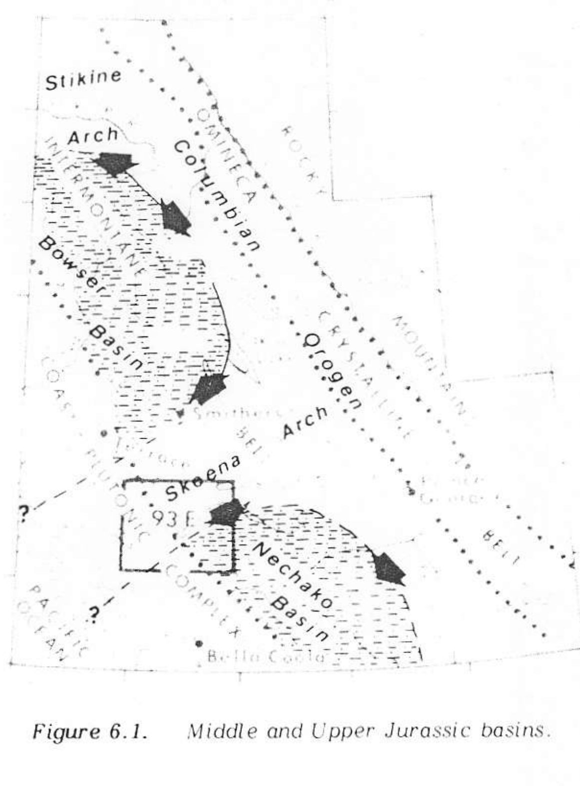

Figure 6.1. Middle and Upper Jurassic basins.

Bowser Lake Group

Only one formation of this group, the Ashman Formation, is recognized in the Whitesail map area. In the type area it is characteristically dark grey to black shale, feldspathic to quartzose sandstone, greywacke, chert-pebble conglomerate, and greywacke conglomerate. This description is applicable to the formation in the Whitesail Lake map area as well. In the type area tuffaceous laminae and thin beds are present as in the Whitesail Lake area, particularly near the Coast Mountains, suggesting that the source may have lain to the west. Coarseness of the sediments along the northern part of the area becoming shaly to the south suggests that the basin of deposition had one shoreline oriented east-west with detritus supplied from the north. Although exposure is sparse, there are sufficient occurrences to indicate that the basin extended from the north part of the map area to the southern boundary and from the Coast Mountains easterly, possibly into the map area to the east. Marine fossils, mainly ammonites and belemnites indicate an age of Late Bajocian to Early Callovian. Only in the area of the basin margin, in the north, are fossils abundant or are pelecypods common.

The configurations of the Jurassic basins in the Whitesail Lake area are difficult to determine. The western margin is fault bounded, the eastern margin is covered with younger rocks, and the central part is intruded, covered, and highly faulted. The Lower Jurassic Telkwa Formation apparently was deposited in the western part under subaerial conditions and graded easterly into a marine basin that extended easterly beyond the area into the Nechako River map area. The formation is an extension of the Sinemurian volcanics of the Smithers area to the north and extends into the Bella Coola and Anahim Lake areas to the south and southeast where it is obscured by Tertiary cover. In the Smithers area the Skeena Arch (Fig. 6.1) came into existence late in Early Jurassic time. It was a linear uplifted terrane oriented northeasterly and lying just north of the Whitesail Lake area. It divided the Hazelton Trough into two basins – the Bowser Basin to the north and the Nechako Basin to the south. The Skeena Arch was a source of detritus for these basins. In the Smithers area it was clearly demonstrated that several shoreline facies were developed on the north side of the Arch but the nature of the south side was in doubt. Certainly the Arch separates two areas underlain by Smithers Formation but little has been documented about direction of transport nor can shoreline facies be recognized. However the sediments of the Ashman Formation clearly show that a shoreline facies existed on the south side of the Skeena Arch, that sediment transport was from the north into the Nechako Basin and that the basin extended far to the south beyond the Whitesail Lake area in Early Callovian time. Nothing is known about the Nechako Basin in Jurassic time after Early Callovian.

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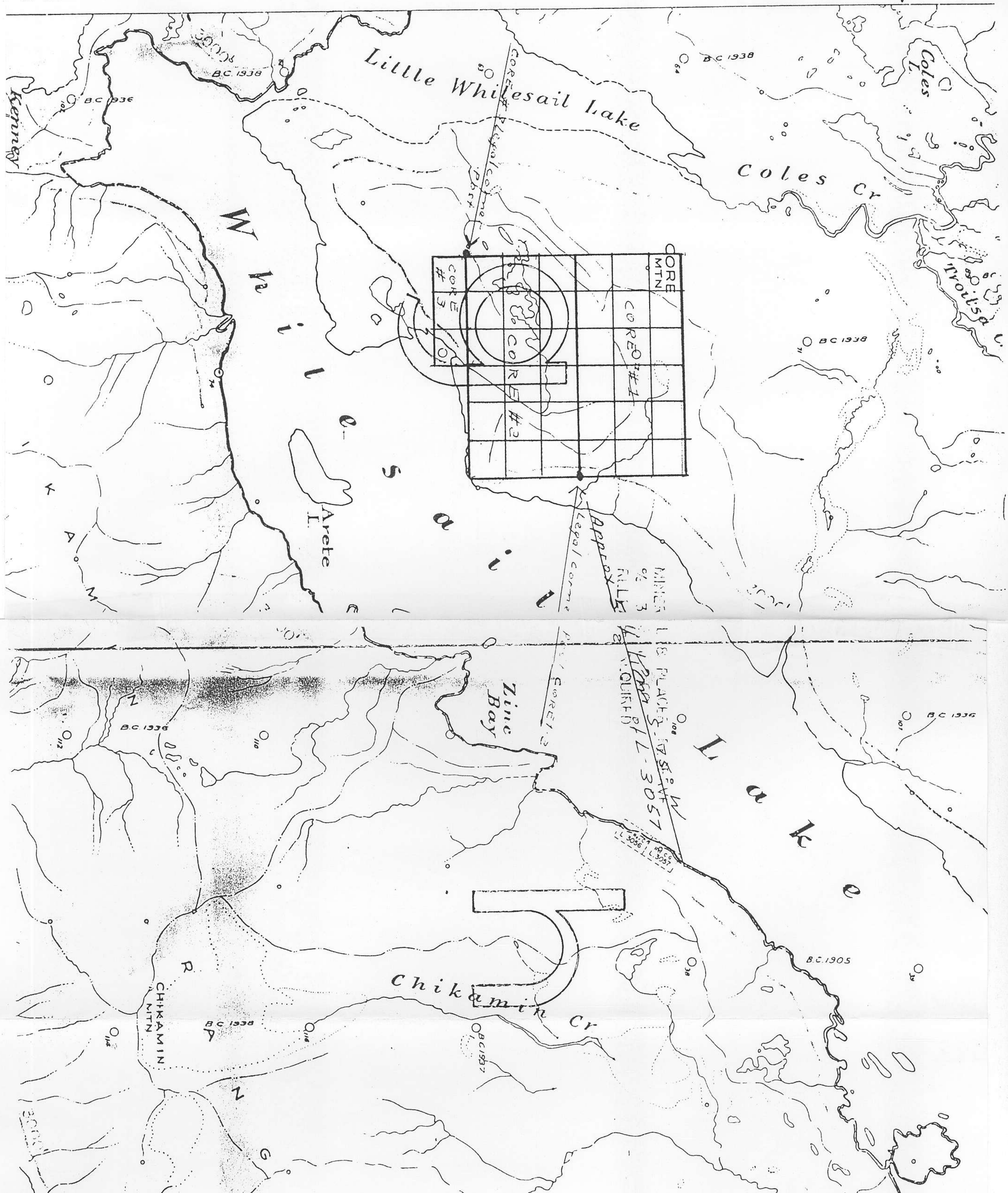

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