GEOLOGY OF NANIKA LAKE MAP AREA (93E/13)

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INTRODUCTION

In 1989, the Whitesail regional mapping project concluded with a survey of 800 square kilometres in the Nanika Lake map area (Figure 1-9-1). The project was initiated in 1986 with the objectives of refining stratigraphic divisions of Mesozoic and Cenozoic volcanic arc successions, and evaluating this stratigraphy for economic potential for precious metals. The project area encompasses roughly four 1:50 000 map sheets. The results of this mapping are summarized in a series of published reports (Diakow and Mihalynuk, 1987; Diakow and Koyanagi, 1988; Diakow and Drobe, 1989).

This report presents results of mapping conducted in Nanika Lake map area which is underlain by roughly equal volumes of plutonic and volcanic rocks. The characteristics and inter-relationship of plutonic rocks and Jurassic volcanic stratigraphy are discussed.

GENERAL GEOLOGY

The Nanika Lake area is bisected by a segment of the northwest-trending boundary between the Coast Belt and Intermontane Belt. In the southwest, plutons of probable late Cretaceous and Tertiary age cut plutonic and metamorphic

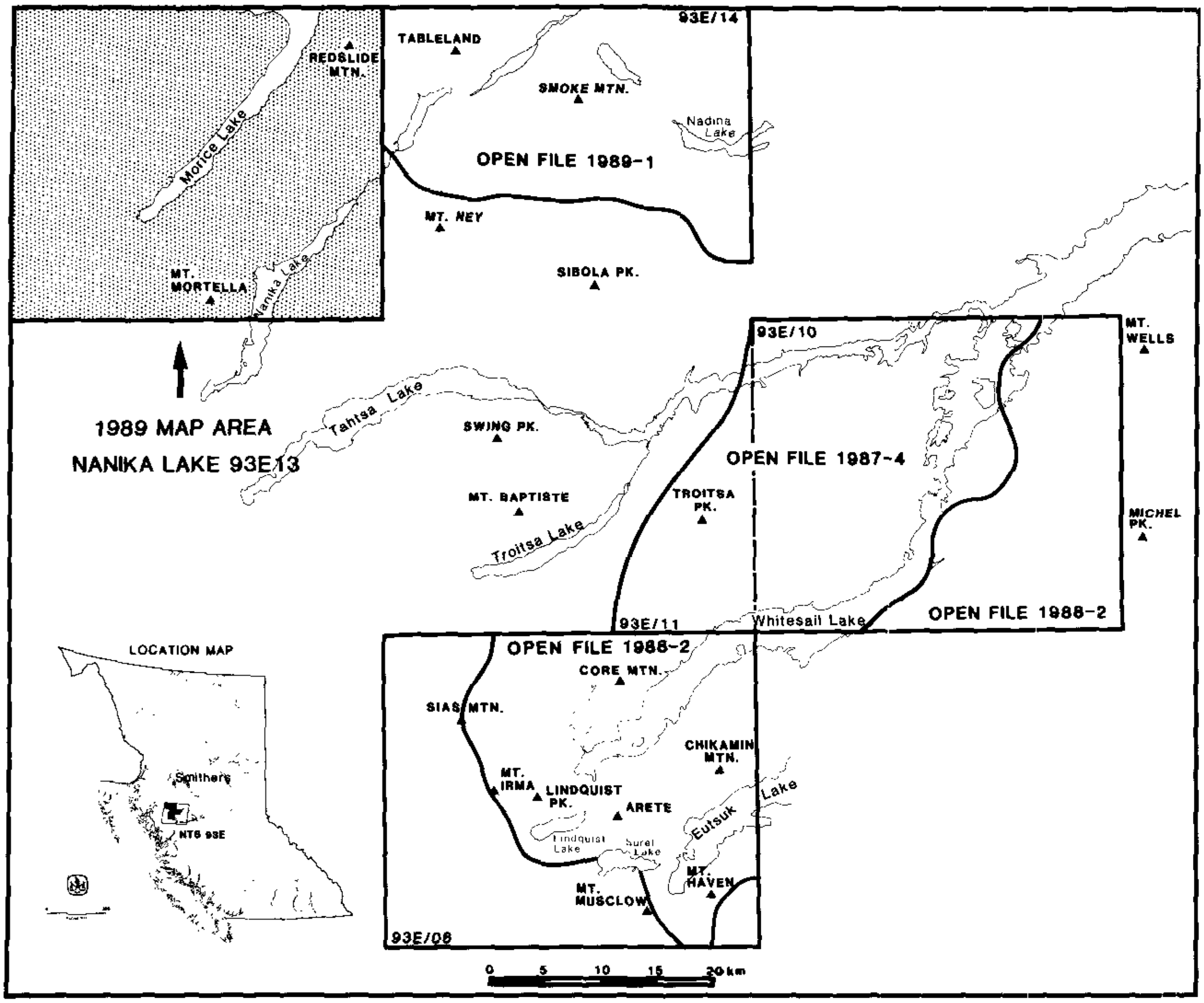

Figure 1-9-1. Index map showing the location of Nanika Lake map area and published Open File maps of the Whitesail Project.

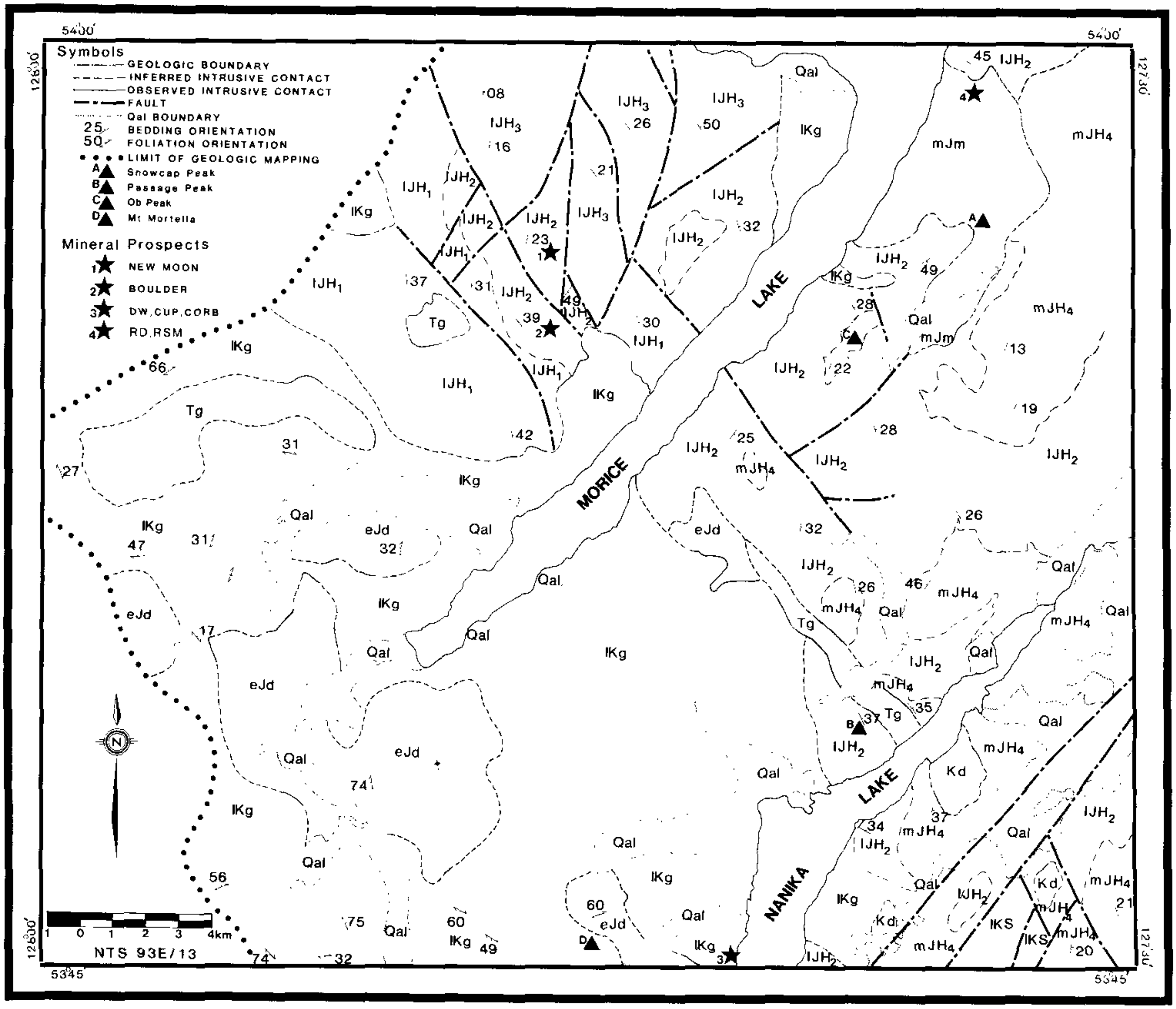

Figure 1-9-2. Generalized geology and mineral prospects in the Nanika Lake map area.

rocks of the Early to Middle Jurassic Gamsby complex (Figure 1-9-2). The Gamsby complex, renamed after the informal Gamsby group of Woodsworth (1978), is presently defined as an early-Late Jurassic metamorphic belt superimposed on Early and Middle Jurassic magmatic rocks of the Intermontane Belt (van der Heyden, 1989).

The Morice Lake pluton bounds volcanic and minor sedimentary rocks of the Lower and Middle Jurassic Hazelton Group to the northeast. Sedimentary rocks of the Lower Cretaceous Skeena Group crop out in several localities near the southeast boundary of the map area. The layered successions are cut by plutons and swarms of dikes of mid-Jurassic to Tertiary age. These intrusive episodes coincide with nearby coeval volcanic deposits which mark the end of Hazelton island arc development and construction of a younger continent-margin arc.

HAZELTON GROUP

Strata of the Hazelton Group comprise a northeast to east-facing homoclinal succession which has an estimated minimum thickness of about 4.5 kilometres in the Nanika Lake area. A lower stratigraphic contact with pre-Jurassic rocks was not observed. Instead the oldest Jurassic strata share an intrusive contact with the Morice Lake pluton west of Morice Lake. The youngest strata of the Hazelton Group cap mountain peaks in the eastern part of the area and continue into the adjoining Newcombe Lake map area where, near Mount Ney, they are apparently disconformable with overlying Cretaceous stratigraphy of the Skeena and Kasalka groups.

The Hazelton Group consists almost exclusively of subaerial volcanic rocks; rare intravolcanic sediments of lacustrine origin are confined to a few stratigraphic intervals.

LEGEND	
Qal	Alluvium and glacial till
	LAYERED ROCKS
	LOWER CRETACEOUS
lKs	Skeena Group: micaceous sandstone and siltstone, shale
	MIDDLE AND LOWER JURASSIC
	Hazelton Group
mJH4	Dacite and rhyolite lapilli tuff, lithic-crystal tuff, lava flows and minor ash-flow tuff
lJH3	Well-layered, maroon lapilli and ash tuffs of andesitic composition, interspersed flows of basaltic and dacitic composition.
lJH2	Basalt and rhyolite flows and related lapilli tuff, ash tuff, minor ash-flow tuff and local agglomerate; intravolcanic sedimentary rocks on Ob Peak ridge.
lJH1	Well-layered green lapilli and ash tuffs of andesitic composition, interspersed flows of basaltic and rhyolitic composition, rare limestone intercalated with chert and ash tuff occur at several intervals.
	INTRUSIVE AND METAMORPHIC ROCKS
Tg	Tertiary: miarolitic granite and megacrystic granodiorite.
lKg	Late Cretaceous(?): hornblende-biotite granodiorite of the Morice Lake pluton.
Kd	Cretaceous(?): fine-grained diorite
mJm	Middle Jurassic: porphyritic monzonite
eJd	Early to Middle Jurassic: Gamsby complex hornblende diorite; includes metavolcanic rocks and orthogneiss.

The volcanic succession is subdivided into four lithostratigraphic units, each established on the basis of composition, texture and volume of flows versus pyroclastic rocks. Collectively, these units reflect successive episodes of volcanic activity in an island arc environment.

UNIT lJH1

The lowest stratigraphic map unit of the Hazelton Group, lJH1, is at least 1 kilometre thick west of Morice Lake. It is a well-layered succession composed mainly of pyroclastic rocks with minor lava flows. In general, lapilli tuffs form massive beds up to 5 metres thick that commonly grade upward into sections composed of 1 to 30-centimetre layers of ash tuff. Accretionary lapilli are sometimes found within finer ash tuff layers. Rapid lateral variation in texture and thickness of layered pyroclastic sections is common, diminishing the usefulness of these rocks as reliable markers for correlation.

Basalt, andesite and dacite flows make up perhaps as much as 20 per cent of Unit lJH1. The mafic to intermediate flows are dark green, aphyric and often partly altered to chlorite and epidote. Dacitic flows, between 15 and 30 metres thick, appear mainly in the upper part of the unit in association with lapilli and block tuffs that contain abundant felsic pyroclasts. Rare sag structures are developed where airborne blocks have fallen and disrupted alternating parallel layers of lapilli and graded ash tuff.

Grey to black limestone is locally intercalated with chert and ash tuff at several intervals in the middle and upper part of the unit. The limestone comprises single and multiple beds 25 centimetres to 5 metres thick within sections up to 25 metres thick.

The upper contact of Unit lJH1 is gradational with overlying strata of Unit lJH2. West of Morice Lake, the contact is placed at the base of the first major section of basaltic flows.

UNIT lJH2

A significantly greater volume of lava flows in Unit lJH2 is the main feature which distinguishes it from Unit lJH1. Flows of basalt, andesite and rhyolite, and subordinate interbeds of tuff, characterize the unit. It has a maximum thickness of 1.4 kilometres west of Morice Lake and thickens to at least 2 kilometres east of the lake.

In the west, the section is comprised of alternating flows of basalt, andesite and rhyolite. Dark green mafic flows with porphyritic, aphyric and amygdaloidal textures dominate lower parts of the sequence. They generally pass upward into light green and cream-colored felsic flows with sparsely porphyritic, flow-laminated and spherulitic textures. Contacts between flows are sometimes indicated by flow breccia and vesiculated tops; otherwise they are difficult to recognize within homogeneous weathered sections that may be as much as 200 metres thick.

A variety of bedded pyroclastic deposits occupy stratigraphic intervals between the lava flows. These include green, mauve and maroon lapilli tuff with graded coarse to fine ash interbeds, and in places substantial accumulations of monolithic block tuff. Rhyolitic fragments and up to 5 per cent quartz crystals are common constituents in tuffs interlayered with the felsic flows. Compaction layering, indicated by flattened and aligned pyroclasts, is evident over several metres within local sections of well-layered and graded airfall tuffs. Lapilli-block tuff forms several spectacular lenticular deposits in contact with both mafic and felsic flows. For example, 1 kilometre southwest of the New Moon prospect, a section 100 metres thick is composed of 50 metres of tightly packed monolithic blocks of rhyolite, some as large as 75 centimetres in diameter. This deposit rests sharply upon about 150 metres of basaltic andesite flows at the base of Unit lJH2. Up-section the blocks are concentrated in thinner beds within related deposits of lapilli tuff and ash-flow tuff. This breccia is truly an agglomerate that was deposited close to a vent. At several other localities, breccias dominated by blocks and smaller fragments are interpreted as talus deposits at the over-steepened margin of felsic lava flows.

East of Morice Lake, Unit lJH2 is dominated by very thick basaltic and andesitic flows with intercalated tuffs and, rarely, intravolcanic sedimentary rocks. Rhyolitic flows and pyroclastic rocks that are common in Unit lJH2 to the west are notably absent from this succession. Black aphyric basalt flows, with a fresh appearance and subtle protruding parallel laminae produced by trains of plagioclase microlites, underlie the lower west-facing slope on the east side of Morice Lake. These flows pass upwards into porphyritic basaltic andesite which is the dominant lithology of Unit lJH2 as far southeast as Nanika Lake. Pristine augite is diagnostic of these flows; although, their small size (2 or 3 millimetres) and low abundance (1 to 3 per cent) allow them to be easily overlooked. Amygdaloidal flows with irregular calcite-quartz amygdules comprise discrete members or occasionally the upper part of texturally graded aphyric and porphyritic lava flows.

Monolithic breccia interleaves co-genetic basaltic flows over 250 metres of vertical section within an area of 1 square kilometre approximately 6 kilometres due south of Ob Peak. Less than 2 kilometres away, the breccia thins rapidly to just a few scarce beds, or is absent altogether from the enclosing succession of flows. The breccia is an aggregate of poorly sorted, subangular and angular fragments varying from lapilli to blocks 75 centimetres in diameter. The texture and composition of fragments is identical to basaltic flows nearby. The matrix consists of fine granular mafic debris or white quartz which imparts a diagnostic irregular net-like texture. The overall angularity and unimodal composition of fragments suggest they are proximal deposits of a nearby volcanic centre. The quartz-rich matrix is attributed to low temperature, postdepositional diagenetic fluids, as hydrothermal fluids would undoubtly result in a broad area of altered country rock.

Dark maroon lapilli tuff with graded crystal-ash and accretionary lapilli interbeds comprise well-layered sections between resistant lava flows. Individual sections exceed a thickness of 100 metres.

Intravolcanic sedimentary rocks at least 75 metres thick are conformable with underlying flows and tuffs of Unit lJH2 on the ridge that includes Ob Peak. The longest section extends for 2 kilometres; a small outlier caps the southern part of the ridge. A representative section near Ob Peak comprises a base of ash tuff and tuffaceous siltstone with scarce marlstone and limestone layers up to 10 centimetres thick. The bulk of this succession consists of interbedded green and grey sandstone and siltstone that commonly grade into thinly laminated mudstone. Structures in these rocks include parallel beds from several millimetres to 0.5 metre thick, scarce trough crosslaminations and rare thin beds with rip-up clasts and convolute bedding.

UNIT lJH3

Unit lJH3 is a heterogeneous succession of maroon and green pyroclastic rocks and subordinate lava flows between 1.2 and 2.1 kilometres thick. Superb sections crop out in the type area between Atna Bay in the north and the New Moon prospect in the south. Immediately north of the New Moon, maroon tuffs conformably overlie and in part interleave basaltic and rhyolitic flows of Unit lJH2.

Maroon and brick-red lapilli tuff are diagnostic of this unit. From a distance, a typical exposure is very well layered; close up, medium and thick beds of lapilli tuff are commonly internally graded or separated by thinly bedded coarse to fine ash and crystal-ash tuff. Accretionary lapilli are characteristic of many of the finer grained layers. Occasionally tuff beds composed primarily of accretionary lapilli occur over an interval of at least 50 metres. The most common pyroclasts are composed of dark maroon and green aphyric fragments. Light-colored fragments of rhyolitic composition are also sporadically present. Trace amounts of broken quartz crystals are ubiquitous in most tuff beds. Scarce welded tuffs generally have aligned and compacted pyroclasts. In thin section ash-flow tuff consists of varying proportions of lithic fragments, cuspate shards and broken crystals. Ash-flow tuff containing compacted dacitic fragments up to 14 centimetres in diameter is associated with nearby dacitic flows and maroon tuffs on several small islands in Atna Bay.

Lava flows in Unit lJH3 include aphyric and amygdaloidal basalt and sparsely porphyritic and flow-laminated dacite. They are distinguished from flows of similar composition in Unit lJH2 by their widely spaced and relatively thin character, absence of visible pyroxene phenocrysts and their occurrence within thick successions of pyroclastic rocks. Lithologies of Unit lJH1 resemble Unit lJH3, however, demonstrable gradational contacts with intervening flows of Unit lJH2 indicate that similar successions of tuffs recur within the stratigraphy.

UNIT mJH4

Unit mJH4 is a very distinctive succession, more than 600 metres thick, that is characterized by tuffs with rhyolitic fragments, massive lava flows and minor ash-flow tuff of rhyolitic composition. This succession is widely distributed along the east margin of the map area. The lower contact is abrupt and unconformable with underlying strata of Unit lJH2 approximately 3 kilometres east-southeast of Ob Peak. A similar stratigraphic relationship is inferred on a ridge leading to an unnamed 2130-metre peak in the southeast corner of the map area.

Light green lapilli tuff with interbeds of lithic-crystal tuff are the principal lithologies of the unit. A typical example of lapilli tuff contains fragments of off-white, light green and pink, aphyric and flow-laminated rhyolite. The matrix may be slightly recessed and charged with ubiquitous quartz (2 to 5 per cent) and plagioclase crystal fragments. Other fragments that have local prominence include fine-grained andesite, chloritized shards and rare quartz-feldspar intrusive. The size of fragments is generally between 0.5 and 2.0 centimetres in diameter, although blocks between 20 and 40 centimetres in diameter are not uncommon.

Rhyolite flows are interlayered with the felsic tuffs mainly in an area adjacent to the north end of Nanika Lake. Also, a section of massive flows, more than 200 metres thick, overlies a thick succession of rhyolitic tuffs in the southeast corner of the map area. In general, the flows underlie knolls and pass laterally into interfingering tuffs and local ash-flow tuffs. Massive and flow-laminated textures are dominant but are sometimes obscured by coalescing spherulites. In some rhyolite flows east of Nanika Lake miarolitic cavities up to 15 centimetres in diameter are lined by drusy quartz and feldspar crystals. Nearby, the ash-flow tuffs contain collapsed pumice fragments that define thin zones of moderate welding. Ash-flow tuffs are generally thin, areally restricted deposits that apparently grade laterally into thickened piles of interfingered rhyolitic flows and related tuffs. These deposits record small-volume explosive eruptions, perhaps associated with domes; they lack features indicative of caldera-forming eruptions.

DEPOSITIONAL ENVIRONMENT

Jurassic volcanic rocks underlying the map area are analogous with the complexly interlayered pyroclastic and flow deposits of composite volcanoes (Cas and Wright, 1987). In the Nanika Lake area volcanic rocks accumulated in a subaerial environment. A thick succession composed of parallel-layered and graded deposits attests to the explosive nature of volcanoes that erupted large volumes of airborne ejecta. The relative absence of intervening deposits of pyroclastic breccia in the thick successions characterized by tuffs charged with lapilli-size and finer pyroclasts may indicate that these deposits aggraded on a gentle topography some distance from the volcanic centres. Thick flows with few interspersed pyroclastic deposits record waning explosive phases in eruptive episodes. Volcanism was punctuated by intervals of fine clastic and limestone sedimentation in shallow lakes established on the volcanic terrain.

Except for felsic volcanic rocks at the top of the stratigraphy, the physical nature and composition of rock units changed little in space and time. This terminal episode of felsic volcanic activity relates to small rhyolitic volcanoes that apparently mark the end of Hazelton volcanism and island arc construction in the Whitesail Lake area.

AGE AND CORRELATION

The age of volcanic rocks underlying the Nanika Lake area is poorly constrained by a U-Pb age of 1844 Ma (van der Heyden, 1989). This date is from tuffs mapped as part of the uppermost felsic volcanic unit, mJH4. Felsic rocks with similar stratigraphic position in the Whitesail Lake area have been informally named the Whitesail formation (Woodsworth, 1980). They are contemporaneous, in whole or in part, with Aalenian to Bajocian shallow-marine sedimentary rocks of the Smithers Formation.

Based on lithology, strata of map units lJH1 and lJH2 are tentatively assigned to the Telkwa Formation. In particular, the general gradation up-section from andesitic tuffs with subordinate basalt and dacite flows in Unit lJH1, into thick basalt, andesite and rhyolite flows and interlayered tuffs in Unit lJH2 resembles sections of the Telkwa Formation reported to the north in the Thautil River area (Desjardins *et al.*, 1990, this volume). Well-layered tuffs with subordinate flows that characterize Unit lJH3 may be stratigraphically equivalent to the Red Tuff member of the Nilkitkwa Formation. Felsic volcanic rocks representative of map units lJH2 and mJH4 have been collected from three sites for U-Pb geochronology.

INTRUSIVE AND METAMORPHIC ROCKS

GAMSBY COMPLEX DIORITE AND METAMORPHIC ROCKS – UNIT eJd

Hornblende diorite and subordinate quartz diorite crop out intermittantly within an area that extends from the south end of Morice Lake to Nanika Lake. Variation in proportions of felsic and mafic minerals, and grain size over short distances impart an inhomogeneous weathered appearance to the diorite. The main variety of diorite contains as much as 60 per cent medium and coarse-grained hornblende. Typical exposures are dark green and mesocratic with the concentration of hornblende generally exceeding that of plagioclase. Quartz is rarely visible in hornblende diorite but it increases to approximately 15 per cent in quartz diorite. Diorite is typically unfoliated except in the northernmost exposure east of Morice Lake, where a weak to strong foliation is locally developed. In the same area segregations of light and dark minerals alternate in layers within sections up to 3 metres thick. Several generations of randomly oriented basaltic dikes cut the diorite.

Metamorphic rocks, including metavolcanics, schist and orthogneiss in the greenschist and amphibolite grade of regional metamorphism, are spatially associated with dioritic rocks. They occur discontinuously within areas tens of metres to 2 kilometres across. Diorite clearly intrudes the metamorphic rocks at some localities. The contacts are varied; some contain xenoliths of schist incorporated into diorite and others are transitional contacts with greenschist alternating with narrow tabular injections of diorite.

The age of hornblende diorite in the map area is assumed to be early Jurassic. A typical hornblende diorite near the south boundary of the map area and on the west side of Nanika Lake apparently continues into the adjoining map area to the south. It has yielded a K-Ar age of 176±40 Ma (Sample GSC 80-38; Stevens *et al.*, 1982).

MORICE LAKE PLUTON – UNIT lKg

The Morice Lake pluton underlies the entire southwest half of the map area. Satellite bodies crop out in the Atna River valley and south of the entrance to Atna Bay on Morice Lake. Midway down the west side of Morice Lake a sharp intrusive contact with early Jurassic volcanic rocks rises steeply from the shoreline; it flattens below the ridge crest at about 1950 metres elevation. In many places this pluton and related dike swarms cut across diorite and the foliation of metamorphic rocks of the Gamsby complex. Agmatite is locally extensive in irregular bodies adjacent to these contacts. It is comprised of angular blocks of diorite supported by a matrix of leucocratic granodiorite.

The Morice Lake pluton is composed of granodiorite with a contrasting fabric and subtly variable proportions of felsic and mafic minerals. Xenoliths of grey, fine-grained quartz diorite are both diagnostic and widely distributed. The main mass of the intrusion is light pink, inequigranular and contains between 20 and 40 per cent anhedral quartz up to 1.5 centimetres in diameter. Quartz has a distinctive elliptical shape in the granodiorite at Atna Bay. Biotite is typically more abundant than hornblende and combined they average 5 to 10 per cent of the rock and rarely exceed 20 per cent. Chlorite pseudomorphs and commonly comprises a felty aggregate that mantles the mafic minerals. Southwest of the head of Morice Lake the appearance and composition of granodiorite changes; here it is off-white in color, the quartz content decreases and a planar penetrative fabric is pervasive. In these rocks the foliation is defined by flattened aggregates of chlorite psedomorphous after biotite and hornblende. The foliation is weak to moderate and its orientation random throughout the pluton. At Mount Mortella and 3 kilometres to the west, a foliation in large rafts of schist is apparently concordant with that of the surrounding granodiorite.

The Morice Lake pluton is inferred by Woodsworth (1980) and van der Heyden (1989) to be the same age as a suite of Middle Jurassic plutons which are unroofed along the Coast-Intermontane Belt structural boundary that transects the Whitesail Lake map sheet. Intrusive relationships in the map area, however, suggest it may be as young as the tentative late Cretaceous age assigned in this report. Two samples, one foliated and the other unfoliated granodiorite, have been collected in an attempt to resolve the timing of deformation and emplacement of the Morice Lake pluton.

The stock of porphyritic monzonite (mJm) at Snowcap Peak, east of Morice Lake, is dated by the potassium-argon method and the original reported age (Carter, 1981) recalculated to 181 ± 8 Ma. This pluton is composed of subhedral plagioclase phenocrysts, averaging 5 millimetres in diameter, set within a hypidiomorphic granular aggregate of potassium feldspar. Biotite, partly altered to chlorite, varies in abundance between 3 and 7 per cent. In terms of composition and texture this pluton is distinctly different from the nearby Morice Lake pluton and they are believed to be unrelated.

Plutons of perceived Tertiary age (Tg) are distinguished by fresh mafic minerals and their unique textures. Several examples include elongate plutons northwest of Nanika Lake and at the headwaters of the Atna River. Northwest of Nanika Lake, pink, medium-grained equigranular miarolitic granite weathers recessively so that its contact with the Morice Lake pluton is a pronounced escarpment. Irregular cavities with a drusy lining of minute feldspar and quartz crystals are diagnostic of this pluton. The intrusion at Atna River is composed of granodiorite with 3 to 5 per cent pristine biotite and megacrysts of potassium feldspar between 1 and 2 centimetres in diameter. Although the rock is unfoliated, a weak foliation is developed along a subtle, steeply dipping contact with rocks of the Morice Lake pluton. By contrast, the Morice Lake pluton in this area is a homogeneous white granodiorite with 15 per cent biotite and 5 per cent hornblende that are aligned on a pervasive moderate foliation. Small dioritic xenoliths present in the Morice Lake pluton are absent in the granodiorite containing megacrysts.

STRUCTURE

Stratified rocks comprise a homocline in which beds consistantly dip between 20° and 40° to the northeast and east. The homocline is dissected by numerous steeply dipping normal faults, particularily west of Morice Lake. Two dominant fault orientations recognized are a set trending northwest and an array trending north to northwest. The northwest faults correspond with swarms of basaltic dikes which strike 125° to 145° and dip steeply throughout the region. A complementary swarm of quartz feldspar porphyry and monzonitic dikes east of Morice Lake appears to be unrelated to mapped faults. In the southeast corner of the map area, several northwest-trending structures are segments of a larger fault system that apparently continues into the adjoining Newcombe Lake map area.

MINERAL PROSPECTS

Mineral prospects in the area can be catagorized as follows: (1) Quartz veins containing gold and silver in association with high concentrations of base metal sulphides; (2) banded copper-zinc-lead sulphides in thin lenses associated with interlayered limestone and chert; (3) iron-copper skarn associated with Tertiary granodiorite; (4) disseminated chalcopyrite, with or without molybdenite, associated with Middle Jurassic and late Cretaceous(?) plutons. Locations of these mineral prospects are shown in Figure 1-9-2.

QUARTZ VEINS

Quartz veins at New Moon (MINFILE 093E 011) are the best known precious metal prospect in the map area. They are hosted by a thick succession of basaltic andesite and rhyolitic flows, and related tuffs of Unit lJH2. The veins are confined to local fractures and normal faults that dip steeply and trend north to northeast.

Quartz occurs in solitary veinlets that develop en echelon and in branched sets of veinlets up to 3 metres wide and typically less than 50 metres long. Banded and comb textures are common, suggesting that silica-rich fluids were channelled along dilational fractures. Galena, sphalerite, minor chalcopyrite and pyrite are the typical opaque mineral assemblage. Reported assays of gold and silver indicate their concentrations vary significantly with the concentration of base metal sulphides. Calcite is present within vein quartz; epidote and chlorite are widespread in altered country rocks near the veins.

BANDED BASE METAL SULPHIDES

Boulders containing banded and massive sphalerite, galena, chalcopyrite, magnetite, pyrite and hematite are found in glacial debris at the base of an icefield about 2 kilometres south to southeast of the New Moon prospect. The sulphides are associated with thinly bedded limestone and chert, and sometimes jasperoidal chert. These rocks resemble the thin, laterally discontinuous sedimentary members that occur near the middle and upper parts of the dominantly flow-pyroclastic succession of Unit lJH1 to the south. The source of the mineralized boulders is unknown; a program of diamond drilling at the base of the icefield failed to locate mineralized rocks in place. Massive sulphide mineralization associated with chemical sedimentary rocks has not been recognized elsewhere in the Jurassic volcanic stratigraphy in the Whitesail Project area.

SKARN

Iron-rich skarn is localized in a thin layer of calcareous tuffs of Unit lJH1, 2.5 kilometres northwest of the aforementioned sulphide boulder occurrence. Magnetite, specular hematite, pyrite and minor chalcopyrite occupy a lens 1 metre thick and 35 metres long. Garnet, epidote and diopside are the main calc silicate minerals present. Dikes of granodiorite cut layered tuffs near the occurrence. These intrusions are apparently offshoots of a large Tertiary pluton exposed 1 kilometre to the south.

PORPHYRY COPPER-MOLYBDENUM

Pluton-related copper and pyrite, and sometimes molybdenite occur as disseminations and in fractures within gossanous volcanic rocks (lJH2) near the contact with porphyritic monzonite (mJm) east of Morice Lake. This mineralization was covered by the RD and RSM claims (MINFILE 093E 083), on the north side of Redslide Mountain. Similar mineralization occurs on the DW, CUP and CORB claims (MINFILE 093E 055), west of Nanika Lake near the southern border of the map area. The mineralized hostrocks are reported to be volcanics, however they were not examined during this study. Unfoliated granodiorite of the Morice Lake pluton (lKg) crops out immediately north and west of drill sites on the property.

SUMMARY

The Nanika Lake map area is underlain in part by a thick interlayered succession composed of basaltic to rhyolitic pyroclastic rocks and lava flows. This succession is subdivided into four lithostratigraphic units that are part of the Lower and Middle Jurassic Hazelton Group. These strata record prolonged subaerial eruptions of stratovolcanoes in an island arc environment. Jurassic volcanism culminated in a local episode of felsic eruptions that correlates with regionally distributed shallow marine deposits of the Smithers Formation.

Jurassic diorite and metamorphic rocks of the Gamsby complex are intruded by granodiorite of the Morice Lake pluton. This intrusion is tentatively assigned a Late Cretaceous age.

Mineralized propects occur in a variety of settings that include fracture-controlled precious metal veins, stratabound sulphide lenses hosted by early Jurassic strata, disseminated sulphides and rare skarn associated with Middle Jurassic and Late Cretaceous(?) intrusions.

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NOTES