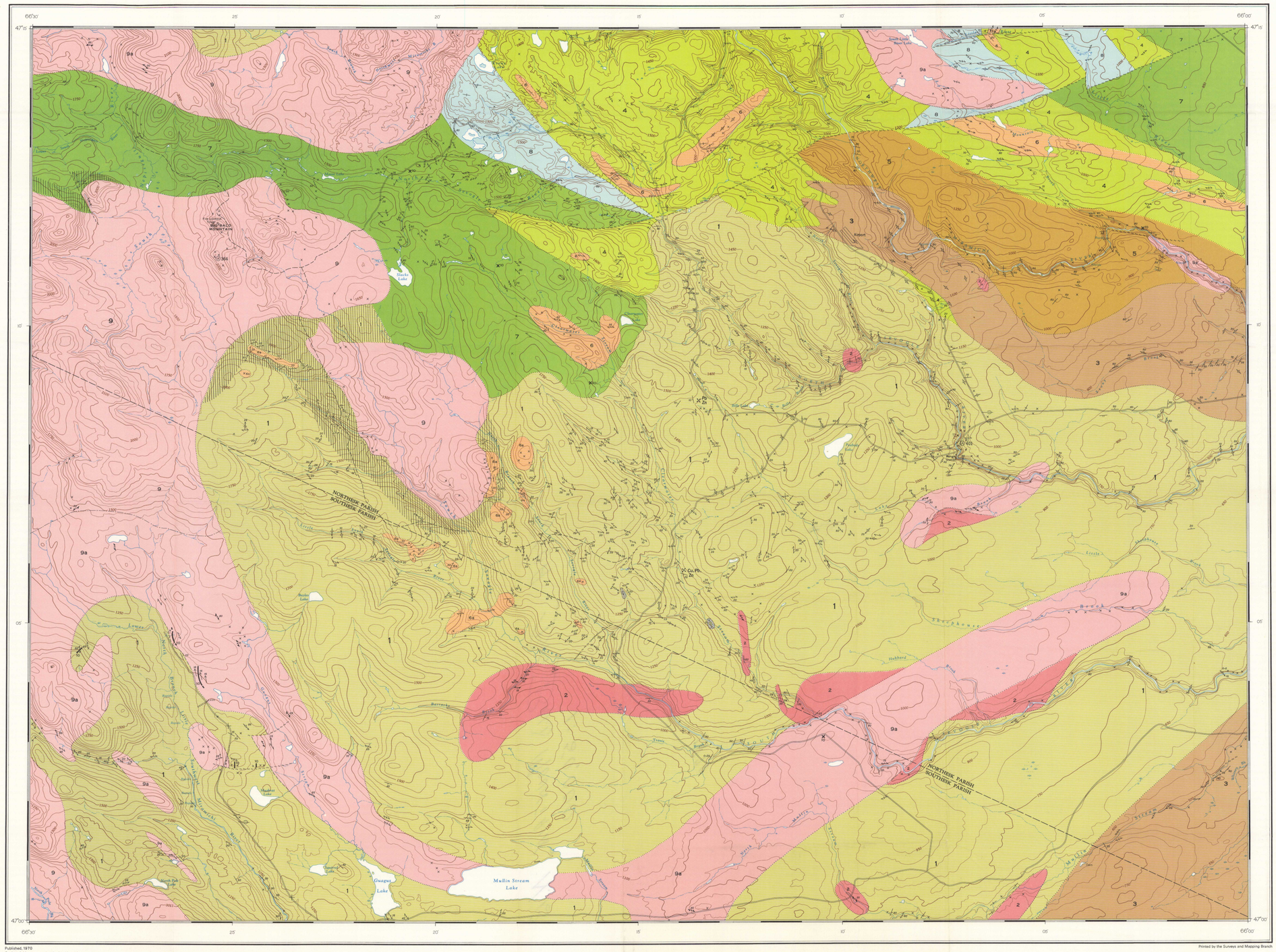
GEOLOGICAL SURVEY OF CANADA
DEPARTMENT OF ENERGY, MINES AND RESOURCES



LEGEND

PALEOZOIC

CARBONIFEROUS
PENNSYLVANIAN (?)
- 11 — Red and brown conglomerate

DEVONIAN
- × 10 — Diorite and diabase sills and dykes
- 9 — Granite, granodiorite, quartz monzonite; 9a, gneissic granite to granodiorite

ORDOVICIAN
- 8 — Quartzite, slate, greywacke; minor basic volcanic rocks
- 7 — Basic volcanic rocks; interbedded slate; graphitic schist; iron-formation
- 6 — Quartz-feldspar porphyry; minor rhyolite; chlorite schist; 6a, feldspar porhyry
- 5 — Undivided 1, 3 and 4
- 4 — Acid to intermediate volcanic rocks; locally abundant agglomerate and breccia; minor sedimentary and porphyritic layers
- 3 — Quartzite, slate, greywacke; minor phyllite
- 2 — Paragneiss
- 1 — Phyllite, schist, quartzite; minor basic volcanic rocks; locally abundant gneiss

Contact metamorphic aureoles around bodies of 9; hornfels, biotite gneiss and schist
Rock outcrop ×
Geological boundary (defined, approximate, assumed)
Geological boundary (gradational)
Bedding, tops known (horizontal, inclined, vertical)
Bedding, tops unknown (inclined, vertical, dip unknown)
Gneissosity (inclined, vertical)
Cleavage (horizontal, inclined, vertical, dip unknown)
Axial plane of minor fold (inclined - no plunge, plunging; vertical - no plunge, plunging)
Lineation (horizontal, inclined)
Fault (defined, approximate, assumed; arrow indicates dip)
Glacial striae (direction of ice-movement known, unknown)
Esker
Mineral prospect (copper, Cu; lead, Pb; zinc, Zn) × Cu
Locality where age has been determined by K-Ar method, in millions of years 364

Geology by F.D. Anderson, 1956-1958

Geological cartography by the Geological Survey of Canada, 1969

Private road, dry weather
Cart track
Parish boundary
Horizontal control point △
Intermittent stream
Marsh or swamp
Contour (interval 50 feet) 750

Base-map from 1:50,000 scale map published by the Surveys and Mapping Branch in 1957. Roads were revised by the Geological Survey of Canada for this edition from data supplied by the New Brunswick Forest Service, Department of Natural Resources and Fraser Companies Limited

Approximate magnetic declination 1969, 23°01' West, decreasing 1.4' annually

DESCRIPTIVE NOTES

The area lies along the eastern edge of the Miramichi Highland[1]. Local relief varies from a few tens of feet in the southeast to several hundred feet in the northwest.

All but the southeastern part of the area is covered with a thin mantle of drift and is heavily forested. In many places in the southeastern part glacial outwash and post-glacial river gravels are more than 50 feet thick. Glacial striae and distribution of erratics indicate that ice-movement was from west to east. The presence of soft, deeply weathered rock outcrops in several places, however, shows that ice abrasion was not intense.

The rocks in the map-area have been divided on the basis of lithology and structural characteristics. Because of the scarcity of outcrop, absence of fossils, few exposed contacts, and complexity of structure, the stratigraphic sequence is unknown, and it is possible that the units mapped are not stratigraphically significant.

A metamorphic assemblage of schists and phyllites (1) comprises the probable oldest rocks in the map-area. Their composition and texture shows that they were derived mainly from a variety of sedimentary rocks, although a few may have been derived from igneous rocks. Rock types recognized include quartz-sericite phyllite, talc schist, graphitic schist, quartzite, slate, biotite and muscovite schists and gneisses, and amphibolite. An outcrop of recrystallized limestone occurs a few hundred feet west of a bridge over North Sevogle River about 2 miles northeast of Clearwater Lake. Rocks apparently derived from quartzose rocks are more common in the eastern and southern parts of the map-area, whereas rocks apparently derived from argillaceous sediments and basic volcanic rocks are more common in the western part. Chlorite schists with specularite, and magnetite in crystals up to ¼ inch across, are found about one mile north of Bills Lake; these rocks may represent a metamorphosed part of unit 7.

A second group of metamorphic rocks (2) consists predominantly of paragneiss, with minor mica schist and feldspathic quartzite. These rocks occur here and there along the margins of the gneissic granite bodies (9a) and in small areas within unit 1. The sedimentary origin of the gneiss is clearly visible on Barracks Brook and on South Sevogle River, where bedding, crossbedding, and grain gradation are distinguishable. Strata in this unit generally dip much less than those of other units in the map-area, and are regionally conformable with strata of unit 1.

Unit 3 may, in part, represent a relatively unmetamorphosed equivalent of unit 1. Although some phyllite, schist, and gneiss similar to those of unit 1 in the eastern part of the map-area occur within this unit, the predominant rock types are quartzite, slate, and greywacke.

Acid to intermediate volcanic rocks (4) are generally grey- to white-weathering and green to grey on fresh surfaces. They are commonly porphyritic with an aphanitic groundmass. These rocks are commonly highly schistose and therefore difficult to distinguish from those of unit 6.

Quartz-feldspar porphyry[2] (6) or augen-schist[3] occurs in lenticular bodies within the acid volcanic rocks (4). In many places this unit includes siliceous tuffs and porphyritic rhyolites. Feldspar porphyry (6a) is associated with rocks of unit 1. It has minor quartz, is only slightly sheared, and in many places exhibits a layered appearance that resembles bedding. Relatively low dips are common. Feldspar crystals commonly transect boundaries between layers, suggesting recrystallization. This feldspar porphyry appears to be of tuffaceous origin.

Basic volcanic rocks and associated sediments (7) are similar in character to those of a member of the Middle Ordovician Tetagouche Group described in adjoining areas to the north and east[4]. In the northeast corner of the map-area the basic volcanic rocks are fine grained to aphanitic, dark green, and of andesitic to basaltic composition. They are rarely schistose, and in many places contain calcitic amygdules and pillow structures. In the western part of the map-area unit 7 is generally highly sheared and here and there contains red, purple, and maroon slates, with narrow lenses of hematite. Northwest of Big Bald Mountain a few outcrops and erratics of porphyry similar to that of unit 6 occur within the outcrop area of unit 7.

Rocks of unit 8 are similar to those of unit 3; however, the slates and quartzites are associated with basic volcanic rocks and are commonly graphitic.

Two distinct types of granitic rocks occur in the map-area. Massive, pink to grey, coarse-grained biotite granite to granodiorite and quartz monzonite (9), and gneissic granitic rocks (9a). The gneissic bodies outlined near South Little River Lake, west and northwest of Mullin Stream Lake, and some of the gneiss exposed along South Sevogle River, all are believed to be of intrusive origin. The gneiss is medium to coarse grained, pink to grey-green, hornblende granite to granodiorite. The hornblende is generally highly altered except northwest of Mullin Stream Lake. There relatively unaltered hornblende is oriented parallel to the contacts. Other occurrences of granitic gneiss in the extreme northwest corner of the map-area, and on parts of the South Sevogle River, Sheephouse Brook, and Lake Brook, appear to be granitized sediments, as bedding and other primary features are locally discernible. Along Lake Brook sedimentary rocks in various stages of metamorphism from unaltered rock to granitic gneiss are readily visible. The massive granitic unit 9 in the map-area is part of a large batholith for which K/Ar dating[4] suggests a Lower to Middle Devonian age. The relationship of the gneissic granite (9a) and the massive granite (9) to each other is unknown.

Diorite and diabase sills and dykes (10) are typically dark green on fresh surfaces and various shades of brown on weathered surfaces. They are medium to coarse grained, and locally display ophitic textures. Some of these rocks are highly sheared and are now essentially chlorite schists.

Three small patches of red and brown conglomerate (11) lie unconformably on rocks of unit 1 on North Sevogle River, Clearwater Stream, and about one mile west of Clearwater Stream. These patches of conglomerate are interpreted as outliers of extensive flat-lying Pennsylvanian (?) strata that occur to the east of the map-area, but they may actually be recently limonite-cemented gravel.

Thermal metamorphic aureoles (A) are commonly present around the massive granitic bodies (9). The rock types in the aureoles include biotite hornfels, biotite-quartz gneiss, and schist. Andalusite, cordierite, and minor garnet have been noted.

The structure of the map-area is complex. The rocks of units 1, 3, and parts of 5, regionally are essentially gently undulating, but in detail are intensely folded, sheared, and crenulated. Beds are commonly overturned, and here and there folds are recumbent. More than one type of cleavage is present, and four types of crenulations have been recognized, which were formed by flexure folding and shear folding of both bedding and cleavage planes. The attitudes of these four types of crenulations vary considerably. Detailed studies in small areas indicate at least two periods of deformation and probably a third. The two periods may represent the Taconic and Acadian orogenies or successive stages of the Acadian orogeny.

The structural pattern of other layered rock units (3-8, 9a) in the area, although simple in detail, is complex on a regional basis. The dips of the rocks in these units are mostly vertical. Rocks generally trend southeasterly. Those in the acid volcanic unit (4) in the north-central part of the map-area change strike from southeast to northeast suggesting a broad open fold with a northerly trending axis.

Most of the faults shown on the map were located by topographic lineaments and are supported by geological and geophysical data. Many more faults are suspected.

Copper, lead, and zinc sulphides have been found in most of the rocks in the map-area but development of sulphide deposits has been restricted to those in unit 1. A deposit of lead and zinc sulphides about 1 mile west of Bills Lake has been trenched and diamond-drilled. The sulphides are disseminated and in veinlets in a fine-grained quartzite rock. Massive and disseminated copper, lead, and zinc sulphides occurring in a chloritic schist near Clearwater Stream were outlined by Kennco Explorations (Canada) Limited in 1956. Neither of these deposits is associated with porphyry or augen schist although this relationship is common to most of the other sulphide deposits in the district.

[1]Weeks, L. J.: The Appalachian region; in Geology and Economic Minerals of Canada (4th edition); Geol. Surv. Can., Econ. Geol. Ser. No. 1, p. 126 (1957).
[2]Smith, C. H.: Bathurst-Newcastle area, New Brunswick; Geol. Surv. Can., Map 1-1957 (1957).
[3]McNutt, J. R. A.: Upper parts North Big Sevogle and Northwest Miramichi Rivers, New Brunswick; N. B. Mines Branch report 61-2 (1961).
[4]Tupper, W. M., and Hart, S. R.: Minimum age of the Middle Silurian in New Brunswick based on potassium-argon method; Geol. Soc. Amer., Bull. V.72, pp. 1285-1288 (1961).

Published, 1970
Copies of this map may be obtained from the Geological Survey of Canada, Ottawa

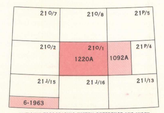
Printed by the Surveys and Mapping Branch

INDEX MAP

MAP 1220A
GEOLOGY
BIG BALD MOUNTAIN
NEW BRUNSWICK

Scale 1:50,000

Miles 1 0 1 2 Miles
Metres 1000 0 1000 2000 3000 Metres



NATIONAL TOPOGRAPHIC SYSTEM REFERENCE AND INDEX TO ADJOINING GEOLOGICAL SURVEY OF CANADA MAPS

BIG BALD MOUNTAIN
NEW BRUNSWICK

N.B. Big Bald Mountain
1:50,000
Map 1220 A
1970

1220A