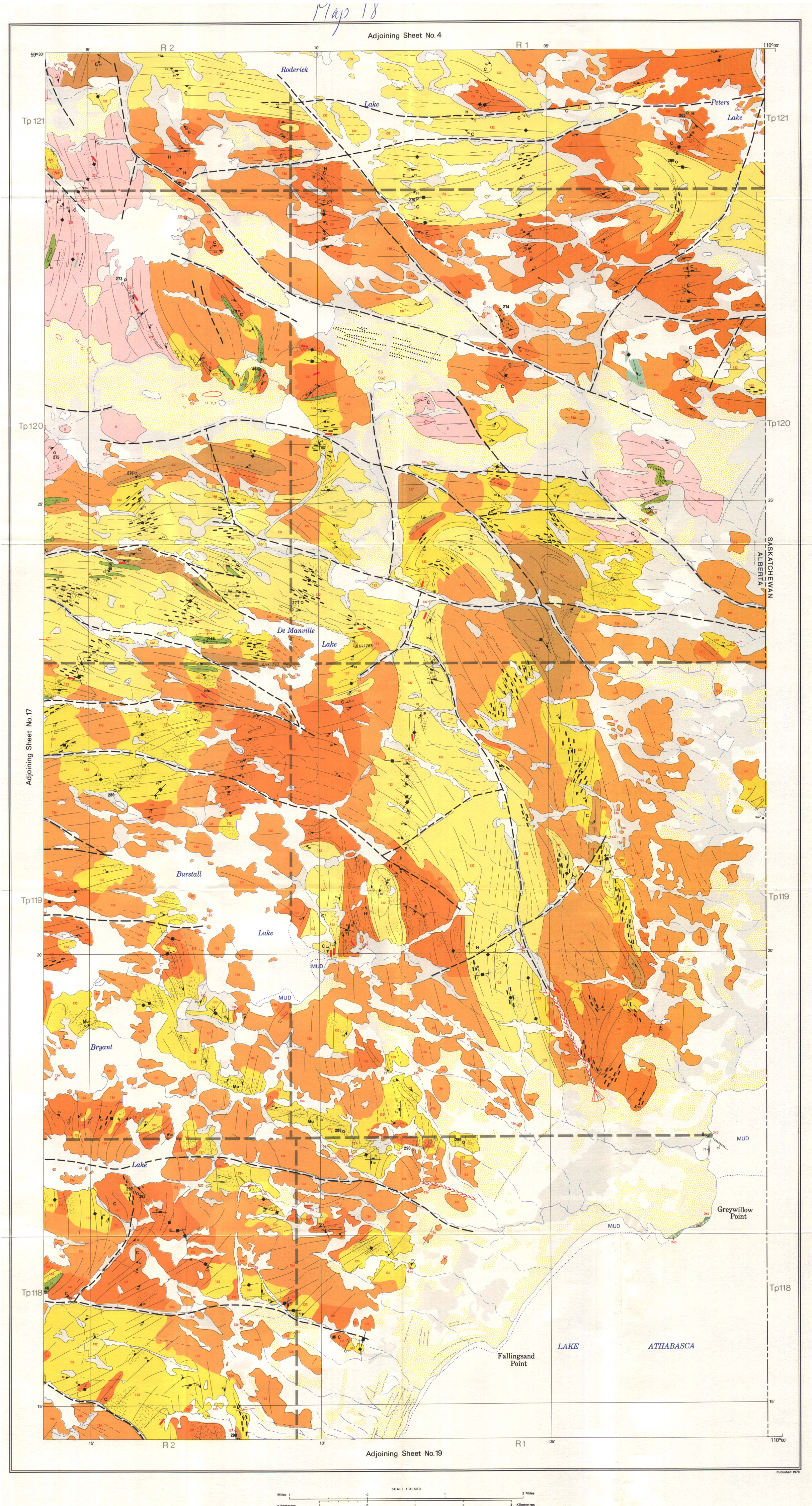
Map 18



Published 1978

SCALE 1:31,680

Miles 1 0 1 2 Miles

Kilometres 1 0 1 2 3 Kilometres

GEOLOGY OF THE WYLIE LAKE DISTRICT, ALBERTA

Sheet No. 18

Alberta RESEARCH COUNCIL

Map 19

Adjoining Sheets No. 17 & 18

Adjoining Sheet No. 23

110°30'

110°00'

R3 25' 20' R2 15' 10' R1 05'

15'

10'

Tp118

Tp117

Tp116

Wunnifred Lake

Cypress Point

Whitesand Point

Lapworth Point

Fidler Point

Fidler Creek

LAKE ATHABASCA

MUD

SASKATCHEWAN ALBERTA

GEOLOGY OF THE WYLIE LAKE DISTRICT, ALBERTA

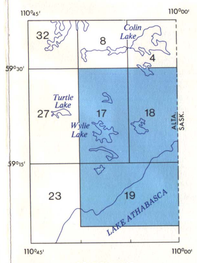
Sheet No. 19

SCALE 1:31,680

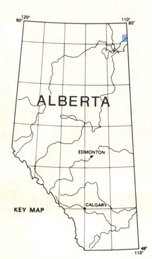
Miles 1 0 1 2 Miles

Kilometres 1 0 1 2 3 Kilometres

LOCATION MAP



KEY MAP



Geological boundary (defined, approximate)

Foliation (defined: dip known, dip vertical; foliation assumed)

Foliation trend*

Extreme contortion (structural trend)

Tight fold (structural trend)

Syncline (showing direction of plunge of fold axis)

Local gneissosity in generally massive to foliated rock

Joint (dip known, vertical; unknown)

Fault (defined, assumed)

Shear

Breccia

Mylonite (local)

Gossan

Rock alternation (possibly fault related) ..... A

Basement regolith ..... Br

Quartz vein

Granitoid standard sample ..... 259 / Q

Metasedimentary band standard sample ..... 46 / ⊕

Radioactivity ..... ●

Yellow stain, mineral ..... Y

Garnet ..... G

Chlorite (abundant) C

Epidote (abundant) ..... E

Allanite ..... Al

Graphite ..... R

Hornblende ..... H

Muscovite ..... Mu

Sericite ..... Ser

Isotopic age (millions of years); biotite (b), muscovite (m); K-Ar; U. of A. Δbk1740

Glacial stria (direction of ice movement indicated)

Wind-cut groove (wind direction indicated)

Esker* (flow direction known)

Glaciofluvial delta*

Drumlin*

Raised beach* (downslope direction indicated)

Kettle*

Dune*

Sand-covered area*

Drainage (permanent, intermittent)

Muskeg

Township boundary

Provincial boundary

Spot elevation in feet above mean sea level 2250

*Aerial photographic interpretation primarily.

Alberta RESEARCH COUNCIL

WYLIE LAKE LEGEND

PRECAMBRIAN*

SEDIMENTARY ROCKS

Rubble

ATHABASCA FORMATION: typically hematite red, to purple to buff; flaggy to rubbly bedded, medium-grained sandstone, with gritty bands and well-rounded quartzite pebbles 2 to 6 cm in diameter.

Underlain in part by highly altered basement regolithic material (Br); shows intense hematite stains, numerous fractures, and minor quartz veinlets.

REGIONAL CATACLASTIC ZONES

Zones of regional cataclasis and recrystallization have principally affected granite gneisses and metasedimentary rocks to produce: ultramylonite, mylonite, cataclasite, blastomylonite, and flaser gneiss; megastructure is typically streaky; may contain rounded or augen rock clasts or feldspar porphyroclasts ( ).

RECRYSTALLIZED CATACLASTIC ROCK: dark colored, with white to gray anhedral feldspar porphyroclasts and euhedral feldspar porphyroblasts 10 to 50 mm long; foliated, locally gneissose; aphanitic matrix, locally medium-grained; minor aplite and pegmatite. Largely Fishing Creek Quartz Diorite and Wylie Lake Granodiorite Phase parent materials.

RECRYSTALLIZED CATACLASTIC ROCK: green to black; granulose (siliceous) to schistose, with biotite, chlorite, sericite; feldspar and minor quartz porphyroclasts in a massive to foliated, finely banded, aphanitic matrix. Largely metasedimentary rock parent material.

RECRYSTALLIZED CATACLASTIC ROCK: mostly light colored, with white to pink feldspar porphyroclasts 5 to 20 mm long making up 2 to 5 percent of the rock, in a foliated, finely banded, aphanitic matrix. Largely granite gneiss parent material.

GRANITOID ROCK GROUP

CHIPEWYAN RED GRANITE: typically red to pink; equigranular, medium-grained but locally fine-grained; massive to poorly foliated, degree of foliation generally increases with biotite (chloritic) content; fairly homogeneous lithology with very few small-scale xenoliths, locally gneissic; minor pegmatites and quartz veins.

WYLIE LAKE GRANITOIDS

LEUCOCRATIC GRANITE: commonly found as small masses intimately mixed with all other Wylie Lake Granitoid rocks. Present in a wide range of proportions in outcrop, only concentrations over 50 percent are shown. White to pink to reddish leucocratic masses of varied textural character; typically equigranular, medium-grained but ranging to coarse- and fine-grained, massive; borders sharp or gradational, simple or complex in outline ( ).

136 UNDIFFERENTIATED GRANITOIDS: lack of local field data does not allow better definition and subdivision of these areas; this broadly defined unit is composed principally of Fishing Creek Quartz Diorite and Wylie Lake Granodiorite Phase; Granodiorite D and Granodiorite E are subordinate.

137 GRANODIORITE D: mottled appearance with gray, white (locally pink) feldspar megacrysts in a gray (locally pink) matrix; subhedral to euhedral feldspar megacrysts 20 to 50 mm long, typically up to 10 to 15 percent abundance, in a medium- to coarse-grained matrix of feldspar, quartz, and biotite; matrix is massive to well foliated. Predominant rock-type is granodiorite, but composition ranges to granite and quartz diorite.

133 FISHING CREEK QUARTZ DIORITE: medium gray overall; mottled grayish white on a medium- to dark-gray background in hand specimen; medium-grained, typically almost megacrystic but locally distinctly megacrystic or equigranular; megacrystic white to gray to pale green feldspars 5 to 10 mm long in a greenish gray matrix of feldspar, quartz, and biotite; typically poorly foliated, locally massive or gneissic. Rock-type is predominantly quartz diorite but composition ranges to quartz-bearing diorite and granodiorite. Schlieren of biotite or metasedimentary rocks may be present.

132 GRANODIORITE E: generally greenish or brownish overall; may be finely mottled; pink to red subhedral feldspars (6 to 8 mm) tend to be megacrystic with occasional megacrysts (10 to 15 mm) in an essentially equigranular, massive to poorly foliated matrix of feldspar, quartz, and biotite (chloritic). Composition ranges to granite.

135 WYLIE LAKE GRANODIORITE PHASE: generally dark greenish or brownish red; may appear finely mottled; medium-grained, typically equigranular except for rare pink feldspar megacrysts (15 mm) in a feldspar, quartz, biotite matrix; typically poorly foliated to massive. Rock-type is predominantly granodiorite with minor quartz diorite.

Megacrystic Phase: white feldspar megacrysts up to 15 mm long and forming up to 15 percent of the rock; either randomly oriented or aligned with the foliation of map-units 131, 132, or 133 ( ).

METASEDIMENTARY ROCK GROUP

21 METASEDIMENTARY ROCKS: the high-grade metasedimentary rock-types included in this map-unit are lithologically and texturally gradational, and in part intermixed on outcrop scale. Typically impure quartzite; dark greenish (bluish) gray (fresh surface); fine-grained; layered, with ferruginous and garnetiferous zones, locally scattered pyrite, gossans, and milky or bluish gray quartz pods and veins. Minor amphibolite may be present. Common local lithologic gradational variations to: (1) fine- to medium-grained, metamorphic quartzo-feldspathic (granitic and minor pegmatitic) phase ranging from individual white feldspar porphyroblasts 5 to 15 mm long, to nebulous or distinct aggregations and masses; commonly foliated to locally gneissic ( ); (2) fine-grained, retrograde phyllite and schist (biotite, chlorite, sericite, and uncommonly hornblende), and phyllonite.

AMPHIBOLITE

20 Dark brownish green (fresh surface) to grayish green; typically medium grained; biotite may be common; composition ranges from essentially amphibole pure or amphibole rich to a feldspathic biotite amphibolite; commonly foliated but may be banded where feldspar rich; minor pyrite common.

GRANITE GNEISS GROUP

12 HORNBLENDE GRANITE GNEISS: typically pink to reddish with dark green bands; quartz-feldspar bands interlayered with mafic-rich bands (hornblende, with biotite; generally chloritic) on hand-specimen scale; fine- to medium-grained, typically equigranular, uncommonly megacrystic; typically well banded, uncommonly poorly banded, and rarely foliated. Composition is predominantly granite, with minor granodiorite, and quartz diorite. Large areas are migmatitic, particularly where intimately associated with minor lenses, pods, or bands of metasedimentary rocks, pegmatite, or amphibolite.

11 BIOTITE GRANITE GNEISS: typically pink to reddish; quartz-feldspar bands interlayered with mafic-rich bands (biotite, possibly with subordinate hornblende; generally chloritic) on hand-specimen scale; fine- to medium-grained, generally equigranular, rarely megacrystic; commonly well banded but may be locally poorly banded to foliated, and leucocratic phases may be nearly massive. Composition is predominantly granite, with minor granodiorite, quartz diorite, and quartz monzodiorite. Large areas are migmatitic, particularly where intimately associated with minor lenses, pods, and bands of metasedimentary rocks, pegmatite, or amphibolite.

*NOTE: Rock groups are arranged in approximate chronological sequence. Nomenclature follows Streckeisen (1967): Classification and Nomenclature of Igneous Rocks; Neues Jahrbuch für Mineralogie, Abhandlungen, 107, No. 2, p. 144-240.

Base maps compiled from planimetric sheets published by Alberta Energy and Natural Resources, Edmonton.

Aerial photographs covering this area are obtainable from the Technical Division, Alberta Energy and Natural Resources, Edmonton; or the Mapping and Surveys Branch of Energy, Mines and Resources, Ottawa.

Approximate magnetic declination 24°49' East in 1978, decreasing approximately 4' annually.

Geology by John D. Godfrey, Peter Klewchuk, and Maurice B. Dusseault, 1971.

Map drafted by D.E. Jacobs and C. Parent
Cartographic editing by A.R. Campbell
Scale 1:31,680 or 1 inch to ½ mile.
Published 1978

Map to accompany Report 78-1.

LEGEND

PRECAMBRIAN*

REGIONAL CATACLASTIC ZONES

Zones of regional cataclasis and recrystallization have principally affected granite gneisses and metasedimentary rocks to produce: ultramylonite, mylonite, cataclasite, blastomylonite, and flaser gneiss; megastructure is typically streaky; may contain rounded or augen rock clasts or feldspar porphyroclasts (1%).

RECRYSTALLIZED CATACLASTIC ROCK: dark colored, with white to gray anhedral feldspar porphyroclasts and euhedral feldspar porphyroblasts 10 to 50 mm long; foliated, locally gneissose; aphanitic matrix, locally medium grained; minor aplite and pegmatite. Largely Granodiorite D type parent material.

RECRYSTALLIZED CATACLASTIC ROCK: green to black; granulose (sericeous) to schistose, with biotite, chlorite, sericite, feldspar and minor quartz porphyroclasts in a massive to foliated, finely banded, aphanitic matrix. Largely metasedimentary rock parent material.

RECRYSTALLIZED CATACLASTIC ROCK: mostly light colored, with white to pink feldspar porphyroclasts 5 to 20 mm long making up 2 to 5 percent of the rock, in a foliated, finely banded, aphanitic matrix. Largely granite gneiss parent material.

GRANITOID ROCK GROUP

WYLIE LAKE GRANITOIDS

UNDIFFERENTIATED GRANITOID: lack of field data and local cataclasis do not allow better definition and subdivision of these areas; this broadly defined map unit includes both Fishing Creek Quartz Diorite and Wylie Lake Granodiorite Phase.

WYLIE LAKE PO GRANITE PHASE: reddish-over all; mottled to light spotted, with white to pink to red abundant feldspar megacrysts 5 to 8 mm in size in a medium-grained, massive to foliated matrix of biotite, feldspar, and quartz; minor sericite.

FISHING CREEK QUARTZ DIORITE: medium gray over all; mottled grayish white on a medium- to dark-gray background in hand specimen; medium grained, typically almost megacrystic but may be locally distinctly megacrystic or equigranular; megacrystic white to gray to pale green feldspars from 5 to 10 mm long in a greenish-gray matrix of feldspar, quartz, and biotite; typically poorly foliated, locally massive, or gneissic. Rock-types are predominantly quartz diorite but range to quartz-bearing diorite and granodiorite. Minor, irregularly shaped small bodies of leucocratic, predominantly fine-grained aplite-pegmatite and microgranite, and schlieren of biotite or metasedimentary rocks may be present.

WYLIE LAKE GRANODIORITE PHASE: generally dark greenish or brownish red; may appear finely mottled; medium grained, typically equigranular except for rare 15-mm pink feldspar megacrysts in a feldspar, quartz, biotite matrix; typically poorly foliated to massive. Rock-types are predominantly granodiorite with minor quartz diorite.

COLIN LAKE GRANITOIDS

COLIN LAKE LEUCOCRATIC GRANITE PHASE: pink to red anhedral feldspar in an equigranular fine- to coarse-grained matrix; massive to locally foliated; includes minor microgranite and aplite-pegmatite; local sericite. Typically found as small masses intermixed with other Colin Lake Granitoids.

GRANODIORITE D: mottled appearance with gray, white, or pink to red feldspar megacrysts in a gray or pink matrix; subhedral to euhedral feldspar megacrysts 25 to 100 mm long, typically up to 10 to 15 percent abundance, in a medium- to coarse-grained matrix of feldspar, quartz and biotite; matrix is massive to well foliated. Predominant rock-type is granodiorite, but composition ranges to granite and quartz diorite. Includes minor small bodies of aplite, microgranite, and pegmatite.

QUARTZ DIORITE C: spotted appearance with gray white (locally pink) feldspar megacrysts in a dark gray matrix; feldspar megacrysts (locally augen) 5 to 15 mm long, typically up to 20 percent abundance, in a medium-grained, mafic-rich matrix of feldspar, quartz, biotite, and hornblende; matrix is typically fairly well foliated. Predominant rock-type is quartz diorite, but ranges to granodiorite. Includes minor aplite-pegmatite and microgranite.

METASEDIMENTARY ROCK GROUP

METASEDIMENTARY ROCKS: the high-grade metasedimentary rock-types included in this map-unit are lithologically and texturally gradational, and in part intermixed on a small outcrop scale. Typically impure quartzite; fresh surface is dark, greenish (bluish) gray; fine grained, layered, with ferruginous and garnetiferous zones, locally scattered pyrite, gossans, and milky or bluish-gray quartz pods and veins. Minor, common lithologic gradational variations to: (1) fine- to medium-grained, metamorphic quartzo-feldspathic (granitic) phase ranging from individual feldspar megacrysts to nebulous or distinct aggregations and masses; locally gneissic; (2) fine-grained phyllite and schist (biotite, chlorite, sericite, and uncommonly hornblende) and phyllonite. Minor amphibolite may be present.

GRANITIC METASEDIMENTARY ROCK: typically mottled-with-white feldspar megacrysts in a darker, fine-grained (metasedimentary) matrix; fairly homogeneous in character, commonly foliated to locally gneissic; may contain garnet, white feldspar megacrysts (or augen) 5 to 15-mm long, and medium-grained, quarzo-feldspathic (granitic to pegmatitic) segregations as nebulous or distinct irregularly shaped small masses; commonly includes minor small bands of metasedimentary rocks.

GRANITE GNEISS GROUP

HORNBLENDE GRANITE GNEISS: typically pink to reddish with dark green bands; quartz-feldspar bands interlayered with mafic-rich bands (hornblende, with biotite; generally chloritic) on hand specimen scale, fine to medium-grained, typically equigranular, uncommonly megacrystic; typically well banded, uncommonly poorly banded, and rarely foliated. Composition includes granite, granodiorite, and quartz diorite. Large areas are migmatitic, particularly where intimately associated with minor lenses, pods, or bands of metasedimentary rocks, pegmatite, or amphibolite.

BIOTITE GRANITE GNEISS: typically pink to reddish; quartz-feldspar bands interlayered with mafic-rich bands (biotite, possibly with subordinate hornblende; may be chloritic) on hand specimen scale; fine to medium grained, generally equigranular, rarely megacrystic; commonly well banded but may be locally poorly banded to foliated, and leucocratic phases may be nearly massive. Rock-types include granite, quartz monzonite, granodiorite, quartz diorite, and monzodiorite. Large areas are migmatitic, particularly where intimately associated with minor lenses, pods, and bands of metasedimentary rocks, pegmatite, or amphibolite.

AMPHIBOLITE

Dark brownish green (fresh surface) to grayish green; typically medium grained; biotite may be common, essentially amphibole pure, to amphibole rich, to, less commonly, feldspathic biotite amphibolite; commonly foliated but may be banded where feldspar rich; minor pyrite common.

*NOTE: Rock groups are arranged in approximate chronological sequence. Nomenclature follows Streckeisen (1967): Classification and Nomenclature of Igneous Rocks; Neues Jahrbuch für Mineralogie, Abhandlungen Band 107, No. 2, p. 144-240

Geological boundary (defined, approximate)
Foliation (defined: dip known, dip vertical; foliation assumed)
Foliation trend*
Extreme contortion (structural trend)
Tight fold (structural trend)
Local gneissosity in generally massive to foliated rock
Fault (defined, assumed)
Shear
Quartz vein
Joint (dip known, vertical)
Crystalline standard sample — Zr_D
Metasedimentary band standard sample — Zr_B
Garnet — G
Chlorite, abundant — C
Epidote, abundant — E
Actinolite — Act
Allanite — Al
Muscovite — Mu
Glacial striæ (direction of ice movement known)
Wind-cut groove (wind direction shown)
Dune*
Sand-covered area
Raised beach (downslope indicated)*
Kettle*
Drainage (permanent, intermittent)
Muskeg
Township boundary

*Aerial photographic interpretation

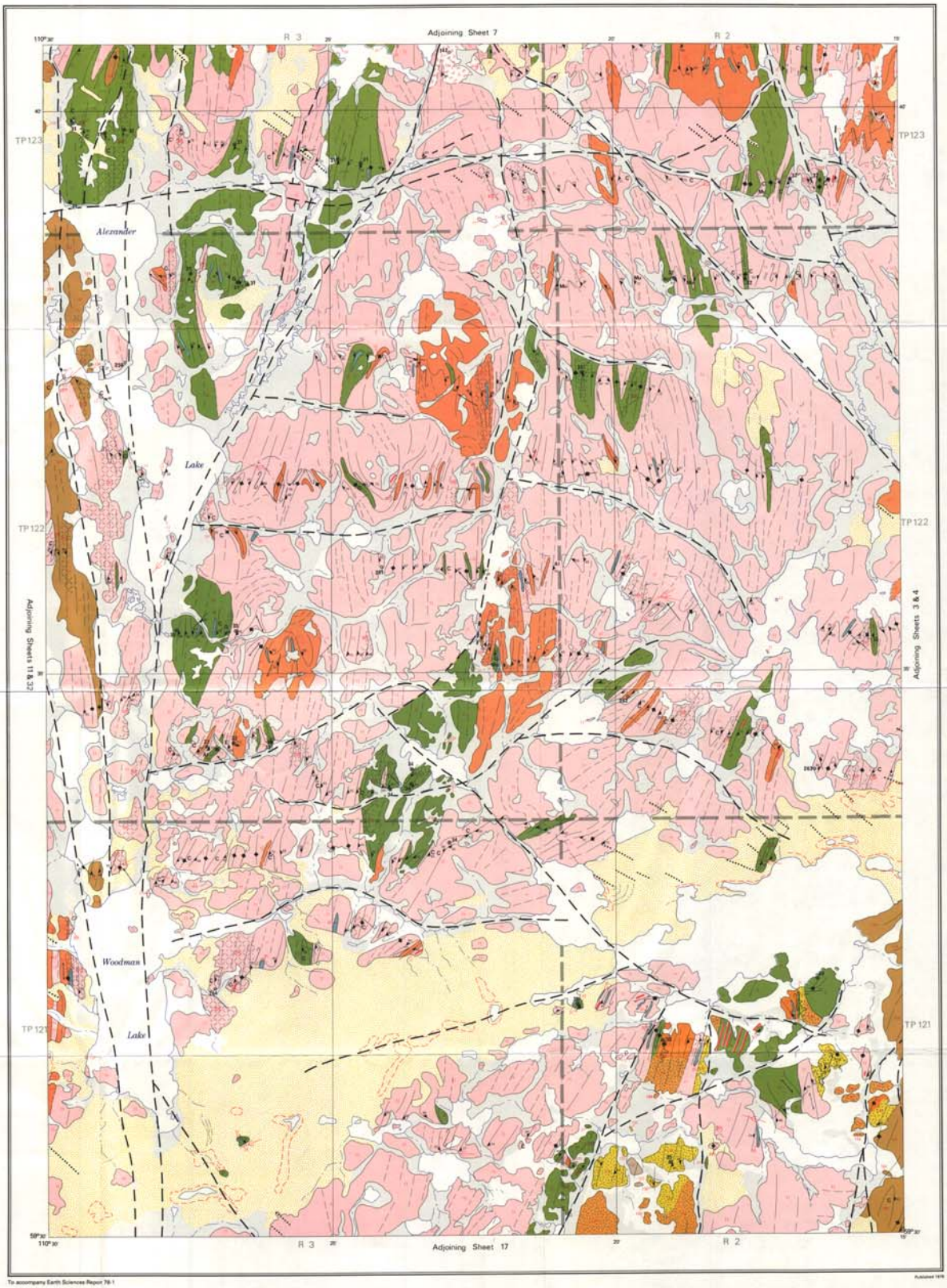
Base maps compiled from planimetric sheets published by Alberta Energy and Natural Resources, Forestry Division, Edmonton.

Air photographs covering this area obtainable from the Technical Division, Alberta Energy and Natural Resources, Edmonton and the National Air Photographic Library, Ottawa.

Approximate magnetic declination 24° 34' East in 1978 decreasing 6' annually

Geology by John D. Godfrey, Maurice B. Dusseault and Peter Klewchuk, 1971.

Map drawn by D. E. Jacobs
Cartographic editing by A. Campbell
SCALE 1:31,680
1 inch to 1/2 mile



To accompany Earth Sciences Report 78-1

Published 1978

SCALE 1:31680
Miles
Kilometres

GEOLOGY OF THE ALEXANDER LAKE DISTRICT, ALBERTA

Sheet No. 8

Alberta Research Council