DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

U.S. GEOLOGICAL SURVEY
OPEN FILE MAP
OF-77-168-A

PRELIMINARY GEOLOGIC MAP OF CENTRAL ALASKA

COMPILED BY

G.DONALD EBERLEIN, JUDITH S. GASSAWAY, AND HELEN M. BEIKMAN

1977

The compilers acknowledge the helpful assistance of W. P. Brosgé, R. M. Chapman, J. M. Hoare, H. L. Foster and W. W. Patton, Jr.

17 — Outline of area selected under sec. 17(d)(2) of the Alaska Native Claims Settlement Act. Numbers refer to the Four National Systems proposal of the Department of the Interior, December 18, 1973. Compiled from maps prepared by the U.S. Bureau of Land Management, December 1973 and March 1974.

PROPOSAL NAME

10. Yukon-Charley National Rivers
12. Yukon Flats National Wildlife Refuge
Yukon Range
14. Koyukuk National Wildlife Refuge
17. Yukon Delta National Wildlife Refuge
18. Togiak National Wildlife Refuge
21. Porcupine National Forest
22. Yukon-Kuskokwim National Forest
25. Forty-mile National Wild and Scenic River
26. Birch Creek National Wild River
27. Beaver Creek National Wild River
28. Unalakleet National Wild River

Approximate route of Alyeska pipeline

SCALE 1:1,000,000

25 0 25 50 75 100 MILES
25 0 25 50 75 100 KILOMETERS

CORRELATION OF MAP UNITS

MILLIONS OF YEARS BEFORE PRESENT		SEDIMENTARY ROCKS Mostly Continental	SEDIMENTARY ROCKS Mostly Marine	VOLCANIC ROCKS Mostly Subaerial	VOLCANIC ROCKS Mostly Marine	PLUTONIC AND HYPABYSSAL ROCKS Granitic	PLUTONIC AND HYPABYSSAL ROCKS Mafic	PLUTONIC AND HYPABYSSAL ROCKS Ultramafic
2-	CENOZOIC TERTIARY QUATERNARY	Qal						
		Q		Qv				
65-		Tc		QTv		Tgl	Tum	
		TKc		Tkv		TKg	TMzul	
		Kc						
225-	MESOZOIC		Mr		Mv	Mg	Mzul	Mum
			Mr/Pz		Mv/Pzv			Mr Pzum
570-	PALEOZOIC		Pz		Pzv	Pzg	Pzul	Pzum
PRE-CAMBRIAN			Pz/pC					
			pC				mf	um

DESCRIPTION OF MAP UNITS

SEDIMENTARY ROCKS
MOSTLY CONTINENTAL

Qal — HOLOCENE DEPOSITS - Alluvial, glacial, lacustrine, swamp, low terrace, estuarine, landslide, flood plain and beach deposits
Q — QUATERNARY DEPOSITS - Alluvial fan, terrace and pediment, gravel, reworked sand and silt, beach, windblown sand (including dune areas), loess, till, flood plain, beach, deltaic, and outwash deposits
Tc — TERTIARY DEPOSITS - Pebble to boulder conglomerate and coarse sandstone, siltstone, claystone, and coal beds. Includes tuffaceous siltstone, claystone, and coal beds. Includes tuffaceous rocks in the Chickaloon area and the Nenana Gravel
TKc — TERTIARY AND UPPER CRETACEOUS DEPOSITS - Conglomerate, breccia, sandstone, mudstone, shale, tuffaceous rock and lignite beds
Kc — CRETACEOUS ROCKS - Shale, sandstone, and conglomerate. Limestone conglomerate with minor interbeds of limestone, graywacke, and thin coal seams. Sandstone, tuffaceous sandstone, siltstone, shale, tuff and chert

MOSTLY MARINE; IN PART METAMORPHOSED

Mr — MESOZOIC ROCKS - Shale, carbonaceous shale, sandstone, quartzite, conglomerate, graywacke, argillite, mudstone and claystone. Mafic lava, volcanic graywacke and conglomerate, agglomerate and tuff in the Talkeetna area
Mr/Pz — MESOZOIC AND PALEOZOIC ROCKS - Siltstone, chert, and mafic volcanic rocks including tuff and pillow lavas, with lesser sandstone, shale, quartzite, limestone, conglomerate, and limestone. Includes the Jumbo Group of Permian to Cretaceous age in southwestern Alaska
Pz — PALEOZOIC ROCKS - Graywacke, sandstone and shale, siltstone, mudstone, conglomerate, calcareous shale and sandstone, limestone, and dolomite. Includes rocks in the Nixon Fork area with subordinate greenstone. In places metamorphosed to greenschist and amphibolite facies. Limestone, marble and dolomite most common in the Seventymile River area, the Ogilvie Mountains, and the Mount Hayes and Delta quadrangles. Limestone of the Nikolai Greenstone and dolomitic limestone of the Hoholitna Group in the central Kuskokwim Mountains and limestone and volcanic rocks in the lime hills and north of the Kuskokwim River. In east-central part of area includes Tonzona Group and some of the unnamed metasedimentary and metavolcanic rocks of Permian age included in the Birch Creek Schist in the Yukon-Tanana upland
Pz/pC — LOWER PALEOZOIC (MAINLY) PRECAMBRIAN SEDIMENTARY AND VOLCANIC ROCKS - Mainly phyllite, sandstone, siltstone, chert, quartzite, carbonate, quartz schist, phyllite slate and quartzite. Includes phyllite, sandstone, siltstone, chert, quartzite, and mafic volcanic rocks in the White Mountains area, and schist and gneiss of many different compositions, primarily of sedimentary origin, in the Ruby area. Rocks in the area formerly included in the Birch Creek Schist in the southeast part of the map area. Quartzose grit and maroon and green slate in the Ray Mountains synclinorium area of probable Precambrian (Proterozoic) age
pC — PRECAMBRIAN SEDIMENTARY AND VOLCANIC ROCKS - Limestone, dolomitic sandstone and shale, basaltic volcanic rocks, and schist and gneiss exposed in the Nixon Fork area and parts of the Tindir Group in southeast Alaska. Includes rocks considered to be of Precambrian age in the area; intercalated sedimentary, mafic volcanic, and mafic and granitic intrusive rocks metamorphosed to upper greenschist and lower almandine amphibolite facies in the Yukon-Tanana terrane, southwestern part of map area

VOLCANIC ROCKS
MOSTLY SUBAERIAL - IN PART HYPABYSSAL

Qv — QUATERNARY VOLCANIC ROCKS - Alkali olivine basalt with minor tholeiite and basanite on Nunivak and Nelson Islands and in the Yukon delta-St. Michael region. Olivine basalt, containing pantellitic and granulitic inclusions, in Taos County, New Mexico, and Catron County, New Mexico
QTv — QUATERNARY AND(OR) TERTIARY VOLCANIC ROCKS - Basaltic and andesitic flows and associated pyroclastic rocks. Includes:
Tertiary - basalt flows and pyroclastic rocks of Miocene age on western Nunivak Island, olivine basalt in the west of Seward Peninsula, and basaltic flows and pyroclastic rocks of Tertiary and(or) Cretaceous age in northeast part of map area
Tkv — TERTIARY AND(OR) CRETACEOUS VOLCANIC ROCKS - Lava, tuff (in part welded), tuff breccia, breccia, and volcanic conglomerate of rhyolitic to andesitic composition. Includes: Tuff and breccia of Upper Cretaceous(?) rhyolitic and andesitic porphyritic flows, tuffs, and breccias northwest of Lake Minchumina; mafic and felsic flows, tuffs, and breccias of Tertiary and Cretaceous age, volcanic conglomerate, and tuffaceous sedimentary rocks in the Yukon-Tanana upland and west of McGrath; Tertiary and Cretaceous rhyolite and latite porphyritic flows, tuffs, breccia, conglomerate, and tuff of acidic and intermediate composition in the Yukon-Tanana upland; and rhyolite, latite and dacite flows, tuffs, and associated hypabyssal intrusive rocks of Tertiary and Cretaceous age in the lower Koyukuk River region and Yukon-Tanana upland

MOSTLY MARINE

Mv — MESOZOIC VOLCANIC ROCKS - Basaltic and andesitic flow, flow breccia, pillow lava, and tuff, in part interbedded with graywacke, tuffaceous sandstone and volcanic graywacke, many of dacitic and(or) Cretaceous age. Includes: basalt flows underlain by serpentinite breccia south of the Intrana-Kluane faults; an andesitic volcanic assemblage composed predominantly of volcaniclastic rocks and minor flows in the Kandik area; hypabyssal rock largely of rhyolite age in the Yukon-Koyukuk province; volcaniclastic rocks and porphyritic gorosene andesite of Late Cretaceous age in the Kuskokwim Mountains; Cape Sabine, porphyritic pyroxene andesite and trachyte flows, andesitic crystal and tithic tuffs, tuffaceous volcanic graywacke, volcanic breccia, agglomerate and conglomerate of Upper Cretaceous age west of the Seward Peninsula and on the Kuyukuk River
Mr/Pzv — MESOZOIC AND PALEOZOIC VOLCANIC ROCKS - Igneous complex of mafic volcanic and intrusive rocks, in large part ophiolitic. Comprises: Basalt, diabase, gabbro, and minor amounts of graywacke, chert, slate, serpentinized peridotite and dunite ranging in age from Permian to Jurassic. In places includes pillow lava, breccia, tuffs, breccia, and interbedded volcaniclastic sedimentary rocks of the Kahiltna Assemblage and Strelna Volcanics
Pzv — PALEOZOIC VOLCANIC ROCKS - Mafic volcanic and intrusive rocks with minor interbedded pyroclastic rocks for the most part altered to greenstone. Includes: ophiolitic complex of Devonian and Silurian age in the Slana area; basalt of Permian age on Cape Newenham in southwest Alaska; Devonian splitic basalt and lapilli tuff with interbedded dolomite, limestone, and chert of the Skookum Volcanics in the eastcentral part of the area; the Skookum Volcanics in the southeast part of the area

PLUTONIC AND HYPABYSSAL ROCKS
GRANITIC ROCKS

Tkg — TERTIARY AND CRETACEOUS GRANITIC ROCKS - Mostly rocks ranging to granite in composition to quartz diorite, with local aplite, alaskite and pegmatite
Mg — MESOZOIC GRANITIC ROCKS - Mainly granodiorite and quartz diorite of Cretaceous age. Includes: Granodiorite, quartz diorite, and diorite and associated fine-grained hypabyssal rocks of Triassic and Cretaceous age. Includes subordinate migmatite; granodiorite bodies in and along the central Alaska Range
Pzg — PALEOZOIC GRANITIC ROCKS - Biotite granite and quartz monzonite of Carboniferous age in northeast part of map area

MAFIC INTRUSIVE ROCKS

Tml — TERTIARY MAFIC ROCKS - Pyroxene diorite, gabbro, diabase, and subordinate pyroxenite
TMzul — TERTIARY AND(OR) MESOZOIC MAFIC ROCKS - Gabbro, basalt, and minor andesite. Probably mostly of Tertiary age
Mzul — MESOZOIC MAFIC ROCKS - Gabbro and diorite with subordinate basalt and andesite. Includes: Gabbro, diorite, and diabase in most places but probably Mesozoic in Yukon-Tanana upland
Pzul — PALEOZOIC MAFIC ROCKS - Mainly gabbro, diorite, and diabase. Includes: Intrusive mafic rocks of pre-late Devonian age in the Livengood area
mf — MAFIC INTRUSIVE ROCKS OF UNKNOWN AGE - Primarily gabbro and diabase

ULTRAMAFIC ROCKS

Tum — TERTIARY ULTRAMAFIC ROCKS - Dunite and serpentinite
Mum — MESOZOIC ULTRAMAFIC ROCKS - Serpentinite, mainly of Cretaceous age
MzPzum — MESOZOIC AND PALEOZOIC ULTRAMAFIC ROCKS - Serpentinized peridotite
PZum — PALEOZOIC ULTRAMAFIC ROCKS - Serpentinite, peridotite, dunite, and pyroxenite
um — ULTRAMAFIC ROCKS OF UNCERTAIN AGE - Serpentinized dunite, peridotite, and pyroxenite

MAP SYMBOLS

Contact, approximately located
Dotted where concealed or inferred

Fault, approximately located. Dotted where concealed or inferred. Bar and ball on downthrown side. Arrows indicate relative not horizontal movement. Teeth on upper plate of thrust faults

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey standards and nomenclature.

Modified and adapted from parts of the following:

Beikman, Helen M., 1974, Preliminary geologic map of the southwest quadrant of Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-611, 2 sheets, scale 1:1,000,000.

Beikman, Helen M., 1974, Preliminary geologic map of the southeast quadrant of Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-612, 2 sheets, scale 1:1,000,000.

Beikman, Helen M., and Lathram, Ernest H., 1975, Preliminary geologic map of northern Alaska: U.S. Geol. Survey Misc. Field Studies Map MF-709, 2 sheets, scale 1:1,000,000.

Location map