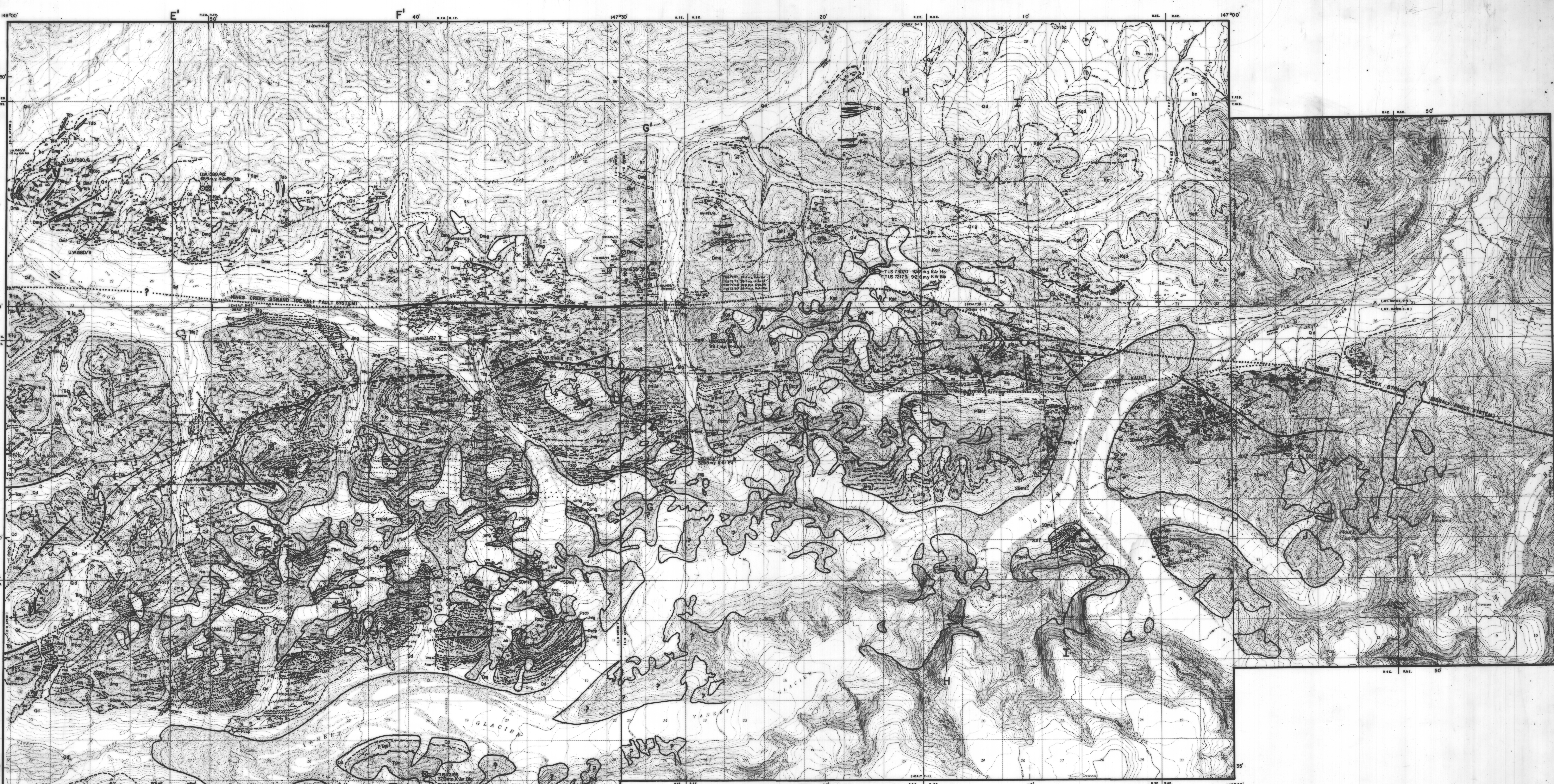
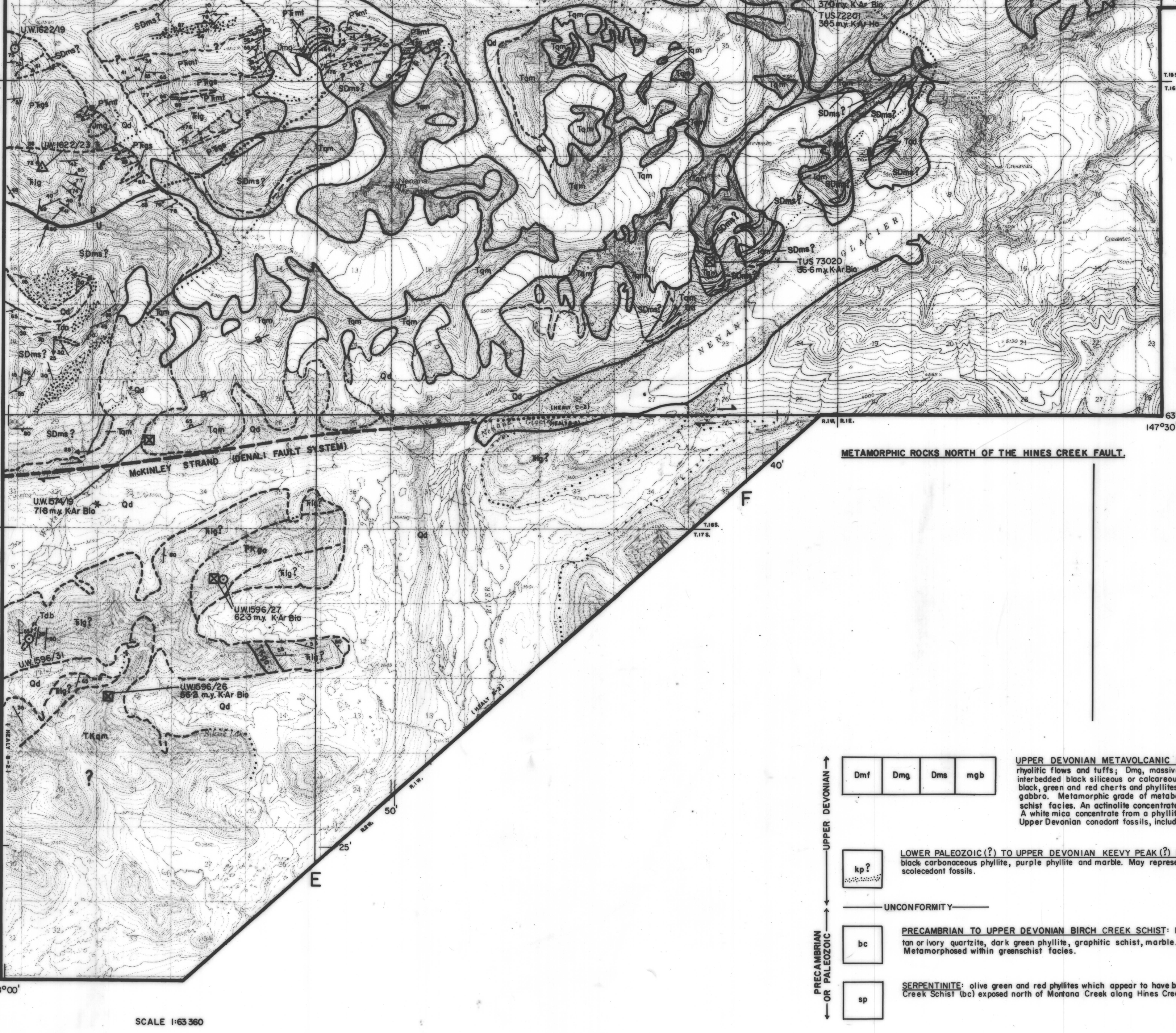
ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

PLATE 2 GEOLOGIC MAP OF THE WOOD RIVER, YANERT GLACIER AND GILLAM GLACIER AREAS, CENTRAL ALASKA RANGE, ALASKA.





SCALE 1:63 360

1 0 1 2 3 4 miles

1 0 1 2 3 4 5 kilometers

CONTOUR INTERVAL 100 FEET

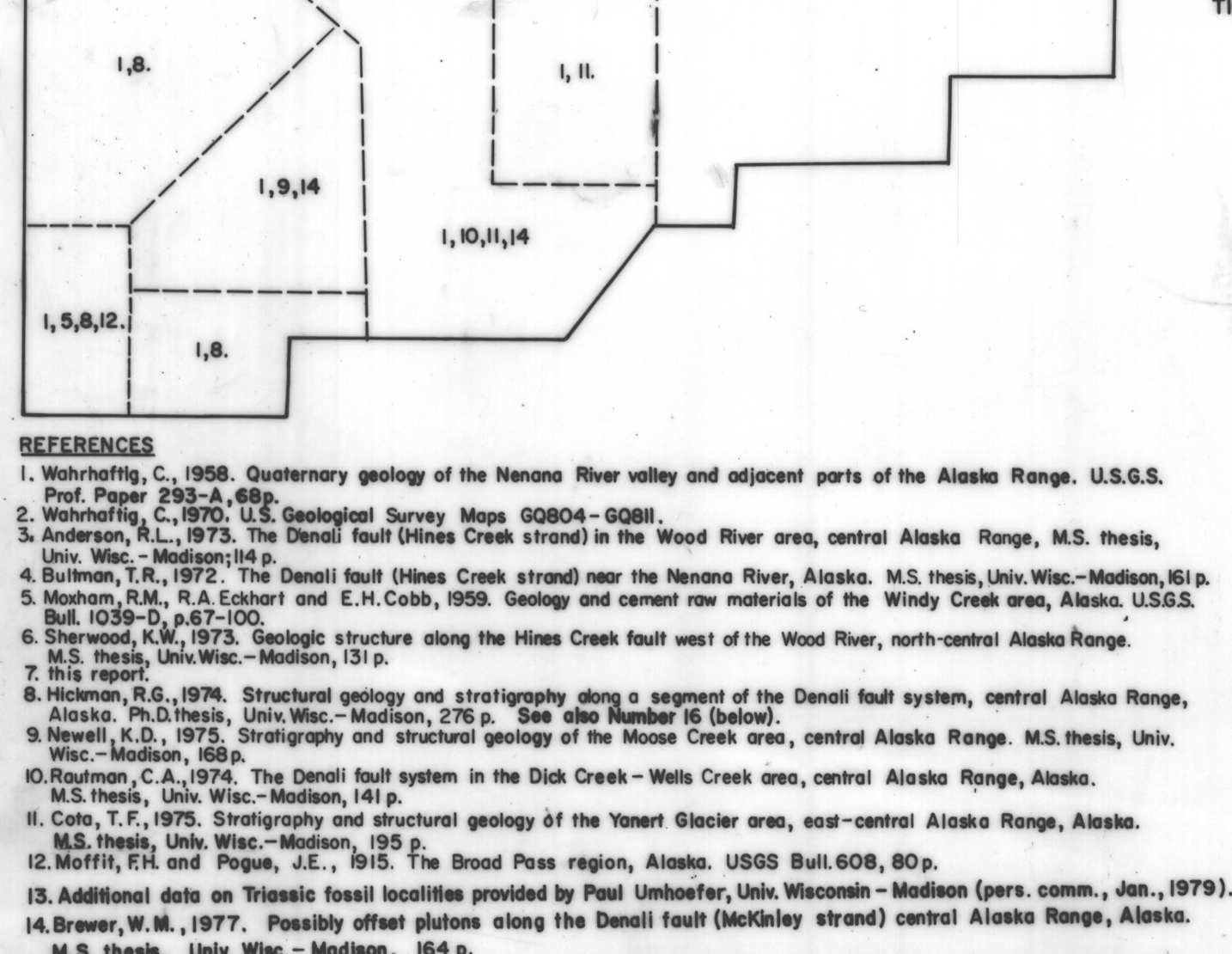
TOPOGRAPHIC BASE FROM U.S. GEOLOGICAL SURVEY HEALY B-2, C-1, C-2, D-1 AND D-2 QUADRANGLES AND MT. HAYES C-6 AND D-6 QUADRANGLES.

APPROXIMATE MEAN DECLINATION, 1954

K.W. SHERWOOD, 1976

MAP LOCATION

MAP INDEX



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SEQUENTIAL ORDERS OF TERTIARY INTRUSIVE ROCK UNITS IN COLUMNS TO RIGHT DO NOT NECESSARILY REFLECT RELATIVE AGE RELATIONSHIPS. THE USE OF THE SAME SYMBOL IN SEPARATE COLUMNS DOES NOT NECESSARILY IMPLY CORRELATION OF ROCK UNITS.

EXPLANATION

BEDDED ROCKS AND DEPOSITS OF CENOZOIC AGE

PLEISTOCENE AND HOLOCENE — Qd | Qls | Qrg — QUATERNARY DEPOSITS: Qd, unconsolidated glacial and glaciofluvial deposits, Holocene colluvium and stream alluvium; Qls, landslide deposits; Qrg, rock glaciers.

UNCONFORMITY

PLIOCENE(?) — Tn — PLIOCENE(?) NENANA GRAVELS: brown or tan semi-consolidated conglomerates and sandstone, in small exposures along the Yanert Fork near the mouth of Dick Creek.

UNCONFORMITY

PALEOCENE — Tcv, f, Tcs — PALEOCENE CANTWELL FORMATION: Tcv, zeolitized basalt and andesite flows, agglomerates, volcanic breccia and light green tuffs. Exposures near Dick Creek consist predominantly of dacitic flows (shown separately as subunit "f") and tuffs interbedded with sandstones. Two K-Ar radiometric dates on flow rocks have yielded ages of 49·5 m.y. and 62·9 m.y. The Upper Cantwell volcanic member may locally unconformably overlie the lower sedimentary member (Tcs).

Tcs, well-consolidated dark gray polymictic conglomerates, tan to black sandstones, black shales and minor coal of continental origin. Conglomerates are composed of clasts of white quartz, quartzite and chert. Sandstones are chert-lithic arenites. Shales locally contain abundant plant fossils. The Cantwell Formation overlies all older rock units with angular unconformity.

METAMORPHIC ROCKS NORTH OF THE HINES CREEK FAULT.

UPPER DEVONIAN — Dmf | Dmg | Dms | mgb — UPPER DEVONIAN METAVOLCANIC SCHISTS: Dmf, light gray to light green schists derived from rhyolitic flows and tuffs; Dmg, massive, fragmental, pillowed or vesicular greenstones with minor interbedded black siliceous or calcareous siltstones and cherts; Dms, black carbonaceous phyllites, black, green and red cherts and phyllites, minor quartzite and marble; mgb, greenish-black metamorphosed gabbro. Metamorphic grade of metabasites ranges from pumpellite-actinolite facies to greenschist facies. An actinolite concentrate from a metagabbro (mgb) yielded a K-Ar age of 309 m.y. A white mica concentrate from a phyllite (Dms) yielded a K-Ar age of 112 m.y. Marbles contain Upper Devonian conodont fossils, including *Polynathus* sp. and *Palmatolipis triangularis*.

kp? — LOWER PALEOZOIC (?) TO UPPER DEVONIAN KEEVY PEAK (?) FORMATION: strained conglomerate (stippled), quartzite, black carbonaceous phyllite, purple phyllite and marble. May represent basal phase of (Dms) above. Marbles contain scolecedont fossils.

UNCONFORMITY

PRECAMBRIAN OR PALEOZOIC — bc — PRECAMBRIAN TO UPPER DEVONIAN BIRCH CREEK SCHIST: light gray to green quartz-sericite schist, light green, gray, tan or ivory quartzite, dark green phyllite, graphitic schist, marble. No microfossils have been found within marbles. Metamorphosed within greenschist facies.

sp — SERPENTINITE: olive green and red phyllites which appear to have been derived from harzburgitic peridotite; within Birch Creek Schist (bc) exposed north of Montana Creek along Hines Creek fault. Age is unknown.

METAMORPHIC ROCKS SOUTH OF THE HINES CREEK FAULT AND NORTH OF THE MCKINLEY FAULT.

JURASSIC(?) — sp — ULTRAMAFIC ROCKS: coarse-grained clinopyroxenites associated (?) with gabbro intrusives (Jmg) south of the Wood River.

Jmg — JURASSIC (?) METAMORPHOSED GABBRO: massive, medium-grained to pegmatoidal dark green metagabbro; intrudes Upper Triassic limestones and graywackes (T̄rlg) and is intruded by Middle Cretaceous granodiorite (Kgd). Gabbros are metamorphosed within prehnite-pumpellyite to greenschist facies. Numerous attempts to date these rocks by radiometric means (K-Ar) have yielded ages ranging from 136 m.y. to 3295 m.y. Most of these dates are considered unreliable.

UPPER TRIASSIC — T̄rlg — UPPER TRIASSIC METASEDIMENTARY ROCKS: medium to thick-bedded graywacke, black to dark gray cross-laminated calcarenite, slate and minor massively-bedded light gray quartzite. Calcareous rocks contain *Epigondolella* sp. and *Gladigondolella* sp. conodont fauna, including *E. bidentata* and *E. abneptis*. Slates locally contain abundant trace fossils, including *Chondrites*, *Helminthoida* and *Phycosiphon*.

UNCONFORMITY (?)

PENNSYLVANIAN TO TRIASSIC — P̄T̄rvt | P̄T̄rmf | P̄T̄rgs | P̄T̄rmt — PENNSYLVANIAN TO UPPER TRIASSIC METAVOLCANIC AND METASEDIMENTARY ROCKS: P̄T̄rvt, gray-green to yellow to red phyllitic tuffs, agglomerate and conglomerate; P̄T̄rmf, light green or light gray felsic metatuffs and metarhyolite schists; P̄T̄rgs, moderate to dark olive-green fragmental, pillowed and massive greenstones, with minor thin-bedded limestones and black cherty tuffs; P̄T̄rmt, dark gray to black cherty vitroclastic metatuff, crystal tuff, lapilli tuff and epiclastic rocks. Conglomeratic or agglomeratic phases shown by stippled pattern. Metamorphic grade of greenstones ranges from prehnite-pumpellyite to greenschist facies. Limestones west of the Nenana River have yielded productid brachiopods, corals and bryozoans.

UNCONFORMITY (?)

SILURIAN OR DEVONIAN — SDms | SDmv | SDl — SILURIAN-DEVONIAN METASEDIMENTARY AND METAVOLCANIC ROCKS: SDms, strained chert-pebble conglomerate (indicated by stippled pattern), phyllite and quartzite, primarily epiclastic but contains abundant volcanogenic material south of Yanert Fork; SDmv, light green, light gray to dark gray phyllites and schists derived from felsic tuffs, agglomerates (indicated by stippled pattern) and flows; SDl, thin-bedded to massive light or medium gray limestone containing (west of Yanert Fork) the following fossils: rugose corals *Tryplasma* sp., *cf. Lyrielasma* sp., *cf. Zelophyllum(?)* sp.; stromatoporoid *Clavidictyon* sp. (ramose); and *Thamnopora* sp., *cf. T. cervicornis* de Blainville; *Amphipora* sp., *cf. A. ramosa* Phillips; *Anostylostroma(?)* sp.; *Hammatostroma* sp. *cf. H. albertende* Stein. Some rocks south of the Yanert Fork mapped with the Silurian-Devonian sequence may belong to the Pennsylvanian to Upper Triassic metavolcanic group.

UNCONFORMITY

LOWER (?) PALEOZOIC — Pzcp — LOWER PALEOZOIC (?) METACHERTS AND PHYLLITES: light gray, light green phyllites and cherts; maroon, gray, green and black banded cherts; minor black phyllite. Phyllites locally contain pyrophyllite and appear to be metamorphosed within the greenschist facies. A white mica concentrate from a phyllite yielded a K-Ar age of 104 m.y.

METAMORPHIC ROCKS SOUTH OF MCKINLEY FAULT.

JURASSIC OR CRETACEOUS — JKa — JURASSIC TO CRETACEOUS METASEDIMENTARY ROCKS: dark gray to black volcanogenic graywackes, argillite, gray pebble conglomerate, pebbly mudstone and minor black limestone. Metamorphosed within prehnite-pumpellyite facies. Fossils collected at a single locality along the Jack River include *Inoceramus* sp., belemnites and brachiopods.

UNCONFORMITY(?)

UPPER TRIASSIC (?) — T̄rlg? — UPPER TRIASSIC (?) METASEDIMENTARY ROCKS: medium to thick-bedded dark gray cross-laminated calcarenites, graywacke and slate, extensively recrystallized adjacent to major intrusives. Lithologically identical to Upper Triassic rocks exposed north of the McKinley fault. Conodont fragments resembling *Epigondolella* sp. but possibly of species ranging from Pennsylvanian to Upper Triassic in age have been recovered from a single specimen of metamorphosed carbonate.

UNCONFORMITY(?)

PALEOZOIC OR MESOZOIC — PMs | Pmv — UPPER PALEOZOIC OR LOWER MESOZOIC METASEDIMENTARY AND METAVOLCANIC ROCKS: PMs, black or green chert and slate, with minor graywacke, chert-pebble conglomerate and limestone; PMv, greenish black porphyritic basaltic and andesitic flows and tuffs. Many of these rocks superficially resemble rocks of the Pennsylvanian to Upper Triassic metavolcanic sequence exposed north of the McKinley fault. Unidentifiable conodont fragments were recovered from a limestone specimen from the eastern Reindeer Hills, indicating a post-Ordovician, pre-Jurassic age for these rocks.

UNCONFORMITY(?)

SILURIAN OR DEVONIAN — SDms | SDl — SILURIAN TO DEVONIAN METASEDIMENTARY ROCKS: SDms, light gray to black limestones, dark gray slates, graywackes, and pebble conglomerates; SDl, thicker limestone beds containing fragments of corals, stromatoporoids, gastropods, bryozoans, crinoids and body spicules of *Astraeospongia* sp. May locally include rocks of unit (PMs).

CENOZOIC — MESOZOIC — PALEOZOIC

INTRUSIVE IGNEOUS ROCKS NORTH OF THE HINES CREEK FAULT.

TERTIARY — Tdb | Tb — Dark olive-green diabase and basalt, probably coeval and equivalent to that south of the Hines Creek fault. A single K-Ar (whole rock) date on a specimen obtained from a dike intruding the Birch Creek Schist (bc) near the Nenana River yielded an apparent age of 53·2 m.y.

Tvb — Vent breccia composed tan-colored, aphanitic felsite rock fragments.

Tf — Undifferentiated tan porphyritic rhyolite, dacite and latite in plugs and dikes near the Nenana River.

TERTIARY OR CRETACEOUS — TKgd | TKda — TKgd, medium-grained hornblende-biotite granodiorite in stock north of Wood River; TKda, dikes and plugs of fine-grained porphyritic dacite peripheral to main pluton. A biotite concentrate from a single specimen of granodiorite yielded a K-Ar age of 68·9 m.y.

CRETACEOUS — Kb — Small swarm of dikes of black porphyritic basalt north of Dean Creek. A hornblende concentrate yielded a K-Ar age of 77·0 m.y.

Kgd | Kda — Kgd, medium to coarse-grained hornblende granodiorite with minor porphyritic quartz monzonite in large stock near Gillam Glacier; Kda, dikes of fine-grained dacite and monzonite peripheral to western margin of main plutonic body. Seven separate K-Ar dates on amphibole and biotite concentrates have yielded ages ranging from 92·6 m.y. to 99·1 m.y. for rocks of the main body of the pluton.

Km — Dikes of light gray-green fine to medium-grained monzonite near the confluence of Grizzly Creek and the Wood River. An amphibole concentrate yielded a K-Ar apparent age of 98·4 m.y.

INTRUSIVE IGNEOUS ROCKS SOUTH OF THE HINES CREEK FAULT AND NORTH OF THE MCKINLEY FAULT.

TERTIARY — Ti — Undifferentiated intermediate to felsic dikes and sills within the Cantwell Formation south of Pyramid Mt.

Tta | Tr | Trd | Tda — Dikes and sills of trachyandesite (Tta), rhyolite, rhyolite porphyry and microgranite (Tr), rhyodacite (Trd) and dacite (Tda).

Tf — Sills, dikes and small plugs of tan-colored, porphyritic rhyolite and dacite, undifferentiated. A single radiometric date (K-Ar) on a feldspar concentrate from a specimen collected north of Wells Creek yielded an age of 22·9 m.y.; this can only be considered a minimum age.

Tvb — Vent breccia composed of tan-colored volcanic rock fragments cemented by chalcedony and travertine.

Tan — Sills, dikes and plugs of light gray or light green andesite porphyry containing phenocrysts of hornblende or plagioclase. Intrudes the Cantwell Formation. A hornblende concentrate from a specimen obtained near Carlo Creek yielded a K-Ar age of 82·6 m.y. This date is rather high and may be unreliable.

Tdb — Dikes and sills of olive green to black diabase and basalt. A single K-Ar (whole rock) date on a specimen from the vicinity of Mt. Fellows yielded an apparent age of 58·8 m.y.

Tqd — Stock composed of medium-gray hornblende quartz diorite at Pyramid Mt. A hornblende concentrate from a specimen from this stock yielded a radiometric age of 35·7 m.y. (K-Ar).

Tgd — Medium-grained biotite-hornblende granodiorite occupying two stocks near Panorama Mt. and a single small stock along Moose Creek. Biotite concentrates from two specimens from the large stock near Panorama Mt. have yielded K-Ar ages of 36·9 m.y. and 38·1 m.y.

Tqm — Medium to coarse-grained quartz monzonite in a large stock at Nenana Mt. Three radiometric (K-Ar) age determinations on biotite and hornblende concentrates have yielded ages ranging between 36·6 m.y. and 38·5 m.y. A fourth radiometric date of 71·8 m.y. is considered unreliable.

TERTIARY OR CRETACEOUS — TKgd — Medium-grained biotite granodiorite occupying two small stocks which intrude the Cantwell Formation near McKinley Village. A biotite concentrate from the eastern stock yielded a K-Ar age of 76·6 m.y.

INTRUSIVE IGNEOUS ROCKS SOUTH OF THE MCKINLEY FAULT.

TERTIARY — Tf — Dikes and plugs of tan-colored porphyritic rhyolite and rhyodacite.

Tda — Dikes of tan-colored, aphanitic dacite.

Tdb — Diabase dikes and sills.

Tan — Sills and plugs of gray porphyritic hornblende andesite.

Tqd — Fine-grained, medium-gray quartz diorite in small plug in western Reindeer Hills.

TERTIARY OR CRETACEOUS — TKgd | TKgr | TKqm? — Composite stock near Pyramid Peak. TKgd, hornblende-biotite granodiorite; TKgr, medium-grained biotite granite, intrudes and encloses granodiorite and forms predominant rock type of pluton; TKqm, quartz monzonite in two small stocks northeast of main Pyramid Peak pluton. A biotite concentrate from a specimen of granite yielded a K-Ar age of 55·7 m.y.

TKqm — Medium to coarse-grained quartz monzonite in small stock near Thief Creek. Stock may extend southward to include 55·8 m.y. "granite" pluton mapped by Turner and Smith (1974, Ak. Div. Geol. Geoph. Surv. Open File Report 72). A biotite concentrate from a specimen of quartz monzonite yielded a K-Ar age of 56·2 m.y.

TKga — Medium-grained olive-green olivine gabbro; a biotite concentrate from a specimen obtained from a large sill near the terminus of the Nenana Glacier yielded a K-Ar age of 62·3 m.y.

SYMBOLS

CONTACT — Dashed where approximate; dotted where concealed; queried where probable or inferred.

STEEPLY INCLINED FAULT — U = upthrown side; D = downthrown side. Arrows indicate sense of lateral movement. Small arrow indicates inclination of fault plane.

THRUST FAULT — sawteeth on upper plate

FOLD AXES — anticline, syncline, overturned, monoclinal flexure. Arrows indicate direction of plunge. axial culmination, axial depression

MINOR FOLD AXES — anticline, syncline, small-scale fold, crenulation, lineation.

STRUCTURAL ATTITUDES OF PLANAR SURFACES — Bedding, Foliation, Slip cleavage, or kink band, Joints — inclined, vertical, overturned, horizontal, coincident with bedding, with related lineation

RADIOMETRIC AGE SITE: U.W.1633/87 99·1 m.y.* K-Ar Ho, Act, Bio, WR, Px, Fs — Site locality with reference number, age (asterisk if date considered unreliable), method (K-Ar), and material dated (Ho = hornblende; Act = actinolite; Bio = biotite; WR = whole rock; Px = pyroxene; Fs = feldspar). Data for localities with reference number with prefix "U.W." tabulated in Appendix 2. Localities with reference number with prefix "TUS" are from: Turner, D.L., D. Grybeck, and F.H. Wilson, 1975. Radiometric dates from Alaska-A 1975 compilation. Alaska Div. Geol. Geoph. Surv. Special Report 10, p.14-16.

FOSSIL LOCALITY WITH STRATIGRAPHIC AGE: U.W.1633/21 D; USGS2 T̄r; M-P F13AMI D — Data for "U.W." and "USGS" localities tabulated in Appendix 4. "USGS" localities from reference (5) below; M-P localities from reference (12) below.

CHEMICAL ANALYSIS LOCALITY: U.W.1633/19 — Results of chemical analyses tabulated in Appendix 3.