ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS
IN COOPERATION WITH U.S. BUREAU OF MINES

PUBLIC-DATA FILE 94-55
PLATE 1

DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Modified from Hamilton, 1980

Qal ACTIVE ALLUVIAL DEPOSITS (Quaternary)--Silt, sand and gravel deposited by modern streams; includes flood-plain deposits which are lightly vegetated in some areas.

Qaf ALLUVIAL-FAN DEPOSITS (Quaternary)--Poorly to moderately sorted fluvial silt, sand and gravel forming deltoid fans and aprons where tributaries join higher order streams.

Qu SURFICIAL DEPOSITS, UNDIVIDED (Quaternary)--Includes colluvium and older vegetated alluvial deposits above present stream levels, alluvial fans, and upland silt deposits.

Qm MORAINAL DEPOSITS (Quaternary)--Poorly sorted unstratitified till ranging from clayey stony silt to sandy bouldery gravel, contains large erratic boulders in some places; deposits form subdued to distinct, lightly to heavily vegetated, lateral and terminal moraines that in some places form well defined nested concentric ridges.

Qgu GLACIAL DEPOSITS, UNDIFFERENTIATED (Quaternary)--Stratified and unstratified drift ofvarious glacial intervals. Includes till, outwash and ice-contact deposits.

QTt TERRACE GRAVEL (Quaternary and Tertiary)--Gravel and sandy gravel, forms terraces ranging from 3-4 m above modern stream levels, to high-level terraces.

FOREDEEP DEPOSITS OF THE COLVILLE BASIN

Kto TOROK SHALE (Lower Cretaceous, Albian)--Soft dark-gray to black clay shale and thinly interbedded silty shale, generally exposed only in discontinuous stream cutbanks, most exposures tightly folded, lower portion interfingers with Fortress Mountain Formation.

Kfm FORTRESS MOUNTAIN FORMATION, UNDIVIDED (Lower Cretaceous, Albian)--Dominantly greenish-gray graywacke interbedded with dark-gray mudstone and shale, interfingers with Torok Shale, in places contains differentiated units:

Kfcg--As above, contains thick massive beds of pebble- to boulder- conglomerate, clasts are well rounded and consist dominantly of gray, black, and green chert and a large variety of altered mafic igneous rocks.

ALLOCHTHONOUS ROCKS

ENDICOTT MOUNTAINS ALLOCHTHON

KEY CREEK, AND IVOTUK HILLS SEQUENCES UNDIVIDED

Named for exposures in the western Delong Mountains (Mayfield and others, 1988) and for exposures in the Killik River quadrangle Mull and others, 1994). In map area, exposed along mountain front in eastern part of area, in Ivotuk Hills area, and in structural windows at west end of map area at Safari Creek and at head of tributary of Aniuk River.

KMu CRETACEOUS TO MISSISSIPPIAN ROCKS, UNDIVIDED--mapped in structural window at headwaters of north fork of Aniuk River in western part of map area, and north of mountain front near Story Creek. Generally intensely deformed thrust slivers and isolated exotic blocks of Mississippian to Triassic rocks in areas too small to be delineated at scale of map, in some places probably in a groundmass of Cretaceous mudstone and graywacke.

Ko OKPIKRUAK FORMATION (Lower Cretaceous, Neocomian)--dark gray mudstone, graywacke, and local cobble conglomerate; generally intensely deformed, thickness unknown.

Kcq LIMESTONE COQUINA, (Lower Cretaceous Neocomian)--Gray to reddish gray, thin-bedded limestone, interbedded with dark gray to black shale. Limestone is 1-2 m thick, composed entirely of the pelecypod *Buchia sublaevis* of Valanginian age, commonly weathers a distinctive reddish brown color. Limestone is commonly highly compacted and fossils unrecognizable, unit is identified by distinctive wavy laminated appearance on surface broken across bedding.

JPe ETIVLUK GROUP (Middle Jurassic to Permian)--Divided into:

JTRo OTUK FORMATION (Middle Jurassic to Triassic)--Interbedded fossiliferous black chert, shale, and thin bedded black and tan banded limestone characterized by abundant *Monotis* sp. or *Halobia* sp. pelecypods. The Jurassic Blankenship Member at the top is locally exposed and consists of organic-rich black shale and thin bedded chert. Formation is commonly exposed only as yellow-gray weathering limestone rubble or in structurally complicated partial sections in stream cuts. Thickness <100 m.

Ps SIKSIKPUK FORMATION (Permian)--Dominantly nonresistant thin bedded siltstone, shale, and minor silicified mudstone. Consists of a distinctive thin yellowish-orange weathering basal greenish-gray siltstone that grades up into maroon- to light-green mottled siltstone with scattered thin barite seams and crystal aggregates, a resistant green- to greenish-gray silicified mudstone in beds <10 cm thick, and poorly exposed gray clay shale. Formation is commonly structurally complicated and exposed only as maroon-gray rubble on hill sides or in stream cuts where it is recognized by the conspicuous yellowish-orange weathering beds that overlie Lisburne Group. Thickness <100 m.

Mld LISBURNE GROUP, DOLOMITE FACIES (Upper Mississippian) (Dumoulin and Harris, 1994)--Dolomite, light to medium gray, thin- to thick-bedded, massive, with white to bluish-gray weathering chert, some bioclastic beds, some beds of spiculitic mudstone and chert, dominantly thin-bedded chert and minor shale in lower part. In some zones, contains abundant pinpoint to vugular porosity filled with tarry oil and solid hydrocarbons. Forms high rubble covered ridges of Ivotuk Hills 20 km north of mountain front in northeastern part of map area. Thickness about 225 m (Dumoulin and Harris, 1994).

Mkn KUNA FORMATION, OF LISBURNE GROUP (Lower amd Upper ? Mississippian)--Interbedded black sooty siliceous mudstone, and shale, minor limestone and dolomite; also contains light-gray bioclastic limestone in western part of map area. Unit is generally shaly and nonresistant in western part of map area but becomes more siliceous to east and forms low resistant ridges near mountain front in eastern part of map area. Type section of formation is located in Safari Creek fenster on a tributary of Kuna River in western part of map area; reference section for formation is located on Otuk Creek 2.5 km north of mountain front in eastern part of map area. Contains Lower Mississippian (Osagean) conodonts in Howard Pass quadrangle (Dumoulin and others, 1994). Thickness <75 m. In places bioclastic limestone is delineated as:

Mlkn KUNA FORMATION, LIMESTONE FACIES (Lower Mississippian)--Light-gray weathering bioclastic limestone, appears to interfinger with sooty black shale in the lower part of the Kuna Formation north of mountain front west of Etivluk River, forms scattered generally low rubble-covered slopes. In many areas includes poorly exposed Kayak Shale at base. Contains Lower Mississippian (Kinderhookian) conodonts (Anita Harris, written communication, 1994). Thickness <20 m.

KAYAK SHALE (Lower Mississippian)--Dark-gray to black fissile clay shale with conspicuous yellowish-brown-weathering thin fossiliferous limestone beds near top, commonly contains conspicuous reddish-brown -weathering nodules; lower part contains interval characterized by greenish-gray siltstone and thinly interbedded phyllitic shale; interval becomes thicker and more prominent west of Etivluk River. In structural window at head of north fork of Aniuk River, contains numerous thin siltstone beds interbedded with phyllitic shale, appears to be transitional with Isikut unit in Aniuk River sequence. West of Etivluk River, unit contains extrusive volcaniclastic and apparently intrusive felsic rocks that become more abundant westward. Unit is generally poorly exposed on bare black-weathering hillsides or in stream cuts where it is complexly deformed by isoclinal folding. Contains Lower Mississippian (Kinderhookian) conodonts in Howard Passs quadrangle (Anita Harris, written communication, 1994; Dumoulin and others, 1994). Igneous rocks locally differentiated as:

Mv VOLCANIC ROCKS (Lower Mississippian)--Extrusive volcaniclastic rocks, felsic to intermediate, range from coarse agglomerate to rhyolitic tuff, light gray to dark greenish gray, fine grained, partly laminated, closely associated with and apparently interbedded with Kayak Shale in a number of localities in Fay Creek and Tukuto Creek area north of mountain front, and in structural window at head of tributary of Aniuk River. Gradationally overlain by black phyllitic Kayak Shale at one locality on upper Tukuto Creek. Thickness probably >100 m in some areas.

MDk KANAYUT CONGLOMERATE (Lower Mississippian? to Upper Devonian)--Thick succession of gray- to brown-weathering quartzitic sandstone and minor quartz- and chert-pebble conglomerate, forms highest mountain peaks in western Endicott Mountains. At eastern edge of map area north of Toyuk thrust unit is probably >800 m thick, thins rapidly to south and west of East Fork Etivluk River; south of Toyuk thrust in southeast corner of map is 228 m thick (T.E. Moore, written communication, 1994). North of Toyuk thrust is differentiated into::

Dksl SHAININ LAKE MEMBER (Upper Devonian)--Quartzitic sandstone and minor pebble conglomerate, generally forms steep dark gray to black weathering mountain slopes, probably includes unrecognized Stuver Member at top, grades down into Ear Peak Member.

Dke EAR PEAK MEMBER (Upper Devonian)--Shale, siltstone, quartzitic sandstone, ,and conglomerate, forms steep brown- to gray-weathering slopes with resistant ledges and cliffs.

Dn NOATAK SANDSTONE (Upper Devonian)--Light gray- to light-brown, fine- to coarse-grained thick bedded sandstone and quartzite in units up to 20 m thick; interbedded with dark-gray to brown shale with ironstone nodules; sandstone commonly crossbedded, contains scattered limonitic spots, upper part generally forms steep tan-weathering rubble-covered mountain slopes, becomes thinner bedded downward in section. South of Toyuk thrust formation is locally differentiated into:

Dnl NOATAK SANDSTONE, LOWER PART (Upper Devonian)--Gray to greenish-gray, medium-bedded sandstone, generally fine-grained, calcareous, finely micaceous, contains abundant yellow-orange limonitic spots, commonly contains conspicuous cross beds and ripple marks; beds up to 2 m thick, interbedded with gray silty micaceous shale and local thin silty limestone beds; interval forms generally smooth, dark reddish-brown to brown weathering, rubble-covered slopes in mountains northeast of Nigu River , probably >500 m thick. At base contains Late Devonian (Famennian) brachiopods and conodonts (J. T. Dutro and others, in press).

Dnc CONGLOMERATE AND SANDSTONE UNIT, UNNAMED (Upper Devonian)--Massive, thick-bedded, white to light-gray weathering pebble conglomerate and quartzitic sandstone; conglomerate contains matrix-supported white quartz and black and gray chert pebbles to 2 cm diameter; sandstone is dominantly fine- to medium-grained, quartzose, siliceous cemented, locally calcareous, contains abundant yellowish-brown limonite spots in places. Local conspicuous cliff-forming marker horizon up to 25 m thick between Ivotuk Creek and Iteriak Creek in western part of Killik River Quadrangle.

Dnh NOATAK SANDSTONE AND HUNT FORK SHALE, UNDIVIDED (Upper Devonian)--Transitional facies south of Toyuk thrust in south-western part of Killik River Quadrangle; consists of gray to greenish-gray medium-bedded micaceous and calcareous sandstone as in overlying Noatak Sandstone, beds up to 1 m thick, interbedded with dolomitic siltstone and gray silty micaceous shale; interval forms generally smooth dark reddish-brown to brown weathering mountain slopes with local micaceous sheen. Thickness probably about 300 m.

Dhf HUNT FORK SHALE (Upper Devonian)--Dark gray- and olive-green shale, with interbedded thin bedded quartz-chert wacke, quartzite, sandstone, and minor conglomerate in upper part north of Toyuk thrust, grades upward into Noatak Sandstone; dominantly micaceous phyllitic shale in lower part. South of Toyuk thrust, unit grades progressively down from thinly interbedded greenish-gray micaceous sandstone and phyllite into dominantly micaceous phyllite that forms smoothly weathered slopes with a conspicuous micaceous sheen, forms base of exposed seqiemce. Thickness > 500m.

ANIUK RIVER SEQUENCE

Here named for the Aniuk River area on the south side of the western Endicott Mountains in western part of map area.

Ko OKPIKRUAK FORMATION (Lower Cretaceous)--Dark gray shaly mudstone and thin-bedded fine grained graywacke, at base locally contains thin interval of maroon and greenish gray clay shale that may be correlative with Valanginian coquinoid limestone horizon on Key Creek and Ivotuk Hills sequences, but no limestone observed. Exposed only locally in rubble-covered slopes on north side of Rough Mountain Creek north of Iikhkluk Mountain, and in stream cutbank southwest of Isikut Mountain.

JPe ETIVLUK GROUP (Middle Jurassic to Permian)--exposed in bare slopes and stream cuts in broad valleys east and west of Nigtun Lake in Howard Pass, commonly tightly folded; locally differentiated into:

JTRo OTUK FORMATION (Middle Jurassic to Triassic)---Thin-bedded black chert, shale, and thin-bedded black and tan banded limestone characterized by abundant *Monotis* sp. or *Halobia* sp. pelecypods. The Jurassic Blankenship Member at the top of the formation has not been recognized on this sequence owing to poor exposures but is probably present. Exposed in bare slopes east of Nigtun Lake, in valley southwest of Isikut Mountain, and north of Rough Mountain Creek.

Ps SIKSIKPUK FORMATION (Permian)--Chert and siliceous mudstone, green to greenish gray, evenly bedded in 2-10 cm-thick beds, underlain by maroon to greenish-gray siliceous and phyllitic shale, unit <30 m thick. Exposed locally on south side of mountains west of Howard Pass on low resistant ridges and bare slopes in area of headwater tributaries of Fauna Creek.

Mkn KUNA FORMATION (Lower Mississippian)--soft black sooty shale and minor silicified mudstone, generally poorly exposed, <10 m thick, contains lower Mississippian (Osagean) conodonts (Dumoulin and Harris, 1994). Light gray bioclastic limestone at base locally differentiated as:

Mknl BASAL LIMESTONE OF KUNA FORMATION (Lower Mississippian)--Bioclastic limestone, light gray, fine to medium grained, abundant crinoidal debris, in beds to 10 cm thick with a few thin black chert interbeds, weathers light gray, lower part contains gray to greenish-gray silty limestone, weathers yellowish-brown. Discontinuously exposed as low rubble covered ridges and hilltops north of Rough Mountain Creek, southwest of Isikut Mountain, and along south side of Howard Hills west of Howard Pass. Contains Lower Mississippian (Kinderhookian) conodonts (Anita Harris, written communication, 1993). Unit <10 m thick.

Mi ISIKUT UNIT (Lower Mississippian)--dominantly greenish-gray thin bedded, platy siltstone and interbedded phyllitic shale; siltstone commonly flaser bedded, contains abundant feeding traces on bedding surfaces; commonly intensely folded. Base of unit locally marked by light-gray weathering quartzose sandstone overlain by black phyllitic shale. Overlying beds contain scattered very fine-grained sandy limestone beds to 2 m thick that commonly contain scattered brachiopods and crinoid debris. Upper part of unit contains increasing amounts of phyllitic shale. Locally contains minor undifferentiated felsic intrusive rocks. Unit is coeval with and occupies stratigraphic position of the Kayak Shale in Key Creek Sequence. Contains basal Mississippian (Kinderhookian) conodonts and brachiopods at several localities (Anita Harris, written communication, 1994; John Carter, written communication, 1994). Forms conspicuous reddish-brown to orangish-brown weathering bare rubble-covered slopes along south side of western Endicott Mountains from Isikut Mountain west to the north fork of Aniuk River, and in area on north side of mountains from Story Creek to Safari Creek. Measured thickness >105 m on south side of Isikut Mountain (68°11.5'N, 156°39'W) and >216 m on tributary of Aniuk River (68°12.7'N, 157°41.5'W) (T.E. Moore, written communication, 1994). Areas with more abundant igneous rocks locally differentiated as:

Miv ISIKUT UNIT AND VOLCANIC ROCKS UNDIVIDED (Mississippian)--Isikut unit as above, with intervals of light gray to greenish gray extrusive volcaniclastic rock and dark green possibly intrusive, mafic igneous rock; mapped on north side of mountains between Ipnavik River and Safari Creek and locally on south side of mountains.

MDkn KANAYUT CONGLOMERATE AND NOATAK SANDSTONE, UNDIVIDED--greenish-gray quartzitic sandstone, calcareous sandstone, and minor conglomerate. In Aniuk River Sequence, Kanayut Conglomerate and Noatak Sandstone appear to be lithologically similar to the units in the Killik River and Key Creek Sequences in the eastern Endicott Mountains, but are much thinner. Forms high mountains between Ipnavik River and Feniak Lake. In northern part of mountains, imbricated by numerous thrust faults and difficult to differentiate owing to rubble cover; structurally less complicated in trend south of upper Ipnavik River near southern edge of map area. Locally differentiated into:

MDk KANAYUT CONGLOMERATE (Lower Mississippian? to Upper Devonian)--Dark gray- to black-weathering fine- to coarse-grained quartzitic sandstone and minor quartz- and chert- pebble conglomerate, supports heavy growth of black lichens, interfingers downward with Noatak Sandstone. In western part of map area northeast of Feniak Lake and upper Story Creek area, top of unit consists of about 75 m of several fine-grained quartzitic sandstone intervals to 5 m thick, with thicker interbedded intervals of black phyllitic shale to silty mudstone with reddish-brown concretions and one 1-2 m-thick coal bed, interval overlain by Isikut unit. Measured thickness 183 m at Isikut Mountain in central part of map area (68°14'N, 156°36'W), and 112 m on tributary of Aniuk River at western end of map area. (68°13.4'N, 157°46'W) (T.E. Moore, written communication, 1994).

Dn NOATAK SANDSTONE (Upper Devonian)--Light gray- to light-brown, fine- to medium grained thick bedded cross-bedded and ripple-marked sandstone in beds up to 1 m thick; interbedded with dark-brownish gray to black shale intervals that become thicker downward in section. Some sandstone beds contain conspicuous small red shale clasts and occasional thin red clay laminae and clay drapes over ripple marked sandstone. Forms most of high mountains in upper Ipnavik River area where it generally forms steep tan-weathering rubble-covered mountain slopes. Measured thickness about 138 m at Isikut Mountain in central part of map area, (68°14'N, 156°36'W) and 215 m near tributary of Aniuk River (68°14.5'N, 157°39'W) (T.E. Moore, written communication, 1994).

Dnh NOATAK SANDSTONE AND HUNT FORK SHALE, UNDIVIDED (Upper Devonian)--Transitional facies, consists of limonitic and calcareous sandstone in beds to 1 m thick as in Noatak Sandstone, interbedded with siltstone and gray silty micaceous shale; forms brownish-gray to yellowish brown weathering slopes in lowlands of western part of map area.

Dhf HUNT FORK SHALE (Upper Devonian)--Dark gray- and olive-green shale, with interbedded thin bedded sandstone, and dominantly micaceous phyllitic shale in lower part. Forms smoothly weathered slopes with a conspicuous micaceous sheen beneath higher ridges of Noatak Sandstone. Thickness >100 m.

Di IGNEOUS ROCKS (Devonian ?)--Basalt or andesite, dark-greenish gray, fine grained, dense; probable sill within Kanayut on south side of Koiyaktot Mountain in eastern part of map area, and an isolated body within Hunt Fork Shale on north fork of Aniuk River in western part of map, but contacts not exposed.

ANIUK RIVER SEQUENCE, UPPER IPNAVIK PANEL

Dknu KANAYUT CONGLOMERATE AND NOATAK SANDSTONE, UNDIVIDED (Upper Devonian)--Sandstone, minor conglomerate, reddish brown silty mudstone, and phyllitic shale; characterized in places by conspicuous slaty cleavage in sandstone and conglomerate. Generally fine grained quartz sandstone, in units up to 3 m thick, is calcareous, platy, evenly laminated to cross bedded, with conspicuous limonitic spots; some beds have abundant red shale ripup clasts and red clay laminae. Conglomerate is composed of quartz and black chert pebbles to 1 cm diameter and some red shale ripup clasts, in beds to 2 m thick with prominent trough cross bedding, forms 20 m thick interval. Map unit consists of resistant black-weathering low ridges and tan to reddish-brown weathering slopes separated by tundra, is probably cut by numerous unmapped thrust faults. Forms lowland area in upper Ipnavik River valley and west to Feniak Lake.

Unit probably represents a deeper structural level of the stratigraphically lower part of a transitional marine facies of Kanayut , Noatak , and minor Hunt Fork that has been thrust northward over more proximal upper Kanayut and Noatak, and is apparently structurally overlain by the entire Aniuk River sequence.

PICNIC CREEK ALLOCHTHON

Named for exposures in the Picnic Creek fenster in the eastern DeLong Mountains of the western Brooks Range (Mayfield and others, 1988). Contains new formations named by Mull and others (1987).

Ko OKPIKRUAK FORMATION (Lower Cretaceous, Neocomian)--Dominantly greenish-gray graywacke with interbedded mudstone and shale, generally forms low rubble- and tundra-covered hills.

JMa AKMALIK CREEK SEQUENCE, UNDIVIDED (Jurassic to Lower Mississippian)--Mapped in poorly exposed rubble-covered hills between East Fork Etivluk River and Ivotuk Creek. Consists of, in descending order, Imnaitchiak Chert, Akmalik Chert, Kayak Shale, Kurupa Sandstone.

JPi IMNAITCHIAK CHERT, OF ETIVLUK GROUP (Jurassic to Pennsylvanian)--Gray to greenish gray bedded chert or silicified mudstone in beds 2-15 cm thick, and greenish-gray to maroon siliceous silty mudstone, interbedded with gray to greenish-gray siliceous shale, exposed mostly as rubble. Distinguishable from Imnaitchiak Chert on Ipnavik River allochthon only by stratigraphic position above Akmalik Chert or by presence of maroon siilicified mudstone. Contains Pennsylvanian to Late Triassic radiolarians (Mull and others, 1987); a few samples contain Jurassic radiolarians (C. F. Blome, written communication, 1994). Unit commonly structurally contorted, thickness probably <75 m thick.

PMa AKMALIK CHERT, OF LISBURNE GROUP (Lower Pennsylvanian to Lower Mississippian) (Mull and others, 1987)--Bedded black chert with finely disseminated pyrite, in beds to 10 cm thick with thin siliceous shale partings. Thickness <75 m. Locally includes underlying thin Kayak Shale, which is generally poorly exposed and not mappable at scale of map. In Howard Pass quadrangle, contains Early to Late Mississippian conodonts (Dumoulin and others, 1994).

Mku KURUPA SANDSTONE (Lower Mississippian)--Sandstone, fine grained, light brownish gray to tan, quartzose, calcareous in places, contains scattered poorly preserved brachiopods near Otuk Creek. Exposed mostly as rubble slabs in low ridges surrounded by tundra in Otuk Creek and Ivotuk Creek area. Thickness probably < 25 m.

IPNAVIK RIVER ALLOCHTHON

Named for exposures in Ipnavik River area in central Howard Pass quadrangle (Mayfield and others, 1982) north of map area. Altered basalt and diabase sills and dikes intruded into Carboniferous to Triassic rocks are a conspicuous characteristic of the allochthon.

ZEBRA CREEK AND ITERIAK CREEK SEQUENCES UNDIVIDED

Named for exposures in the Iteriak and Otuk Creek area in the eastern part of the map area, and for exposures in the central Killik River quadrangle (Mull and others, 1994). Forms mostly rubble-covered ridges with few good outcrops.

Ko OKPIKRUAK FORMATION, UNDIVIDED (Lower Cretaceous, Neocomian)--Dominantly greenish-gray graywacke with interbedded mudstone and shale, forms extensive outcrops in foothills between Tukuto Creek and Kutchaurak Creek. In places contains:

Kocg--cobble to boulder conglomerate, clasts are dominantly well rounded altered gabbro and fine-rained mafic igneous rock, light gray micritic limestone, dark-gray to black chert, and some light gray diorite or granodiorite; clasts mostly 2-16 cm diameter, but scattered diorite boulders range up to 75 cm diameter. Exposed mostly as rubble, thickness estimated < 100 m.

JMc IMNAITCHIAK CHERT AND UNNAMED LISBURNE LIMESTONE AND CHERT, UNDIVIDED (Jurassic to Mississippian)-- gray silicified mudstone or chert, and silicified limestone, weathers white, forms small rubble patches surrounded by tundra.

JPi IMNAITCHIAK CHERT, OF ETIVLUK GROUP (Jurassic to Pennsylvanian)--Gray to greenish gray bedded chert or silicified mudstone, beds 2-13 cm thick, exposed mostly as rubble. Distinguishable from Imnaitchiak Chert on Picnic Creek allochthon only by stratigraphic position above unnamed siliceous limestone of Lisburne Group. Contains Pennsylvanian to Late Triassic radiolarians (Mull and others, 1987); a few samples contain Jurassic radiolarians (C. F. Blome, written communication, 1994). Thickness <100 m.

Mcl UNNAMED GRAY SPICULITIC LIMESTONE AND CHERT OF LISBURNE GROUP (Mississippian)--Thinly interbedded gray to dark gray siliceous fine-grained limestone and gray to black siliceous mudstone; limestone contains abundant conspicuous sponge spicules in places; siliceous mudstone frequently weathers white; limestone weathers gray. Informally named the Rim Butte unit by Dumoulin and others (1994), who report conodonts no older than Osagean or Meramecian. Forms smooth rubble covered hillsides with few bedrock exposures. Thickness probably less than 80 m in Howard Pass quadrangle north of map area (Dumoulin and others, 1994).

Mku KURUPA SANDSTONE (Lower Mississippian)--Sandstone, fine grained, light brownish gray to tan, quartzose, calcareous in places, Exposed mostly as rubble slabs on low ridges in tundra or on lower slopes beneath siliceous limestone of unnamed unit in Lisburne Group. Distinguishable from Kurupa Sandstone on Picnic Creek allochthon only by stratigraphic position. Thickness probably < 25 m.

Dl DEVONIAN LIMESTONE, UNNAMED (Middle or Late Devonian)-- Limestone, light gray, coarse grained, weathers light gray to white, forms isolated low pinnacles in tundra on north side of mountains near Lake Betty (68°28'N, 156°30'W) and near Otuk Creek at east end of map area. Outcrop near Lake Betty contains late Middle or early Late Devonian (Givetian or Frasnian) fossils (J.T. Dutro, Jr., in Chapman and others, 1964)

mi MAFIC INTRUSIVE AND EXTRUSIVE IGNEOUS ROCKS, UNDIVIDED---Basalt and andesite, dark green, fine-grained and dense, to vesicular in places, commonly severely altered, clearly intrusive in some places, extrusive in others; some areas of poorly exposed fragmental volcanic breccia may be part of Itkilikruich Ridges sequence. Thickness probably quite variable but generally <10 m. Commonly closely associated with unnamed spiculitic limestone and silicified limestone of Lisburne Group, but in two localities clearly intruded into or interbedded with Imnaitchiak Chert. Age uncertain.

COPTER PEAK AND NUKA RIDGE ALLOCHTHONS, UNDIVIDED

Named for Copter Peak and Nuka Ridge in the DeLong Mountains of the western Brooks Range (Mayfield and others, 1982).

Pmi UNNAMED MAFIC IGNEOUS ROCKS (Pennsylvanian ?)--Basalt, dark green, fine grained, massive; forms rubble-covered hill west of Iteriak Creek in northeastern part of map area, where it overlies and is apparently associated with Nuka Formation. Dated by analogy to similar rocks with Pennsylvanian fossils in Killik River quadrangle (Mull and others, 1994).

PMn NUKA FORMATION (Pennsylvanian-Mississippian)--Arkosic fine-to medium grained limestone, characterized by conspicuous orthoclase feldspar grains and glauconite in limestone matrix. Exposed locally in three resistant pinnacles west of Iteriak Creek .

COPTER PEAK ALLOCHTHON

Named for Copter Peak in the DeLong Mountains of the western Brooks Range (Mayfield and others, 1982). Exposed in large synformal klippe on south side of western Endicott Mountains, along east side of Siniktanneyak Mountain, and rocks north of Memorial Creek on north side of western Endicott Mountains.

MzPzb BASALT (Mesozoic and Paleozoic)--dark-brown to dark-greenish-gray-weathering basalt, vesicular and amygdaloidal in part, locally contains well developed pillows on Siniktanneyak Mountain, locally contains volcanic breccia, tuff, volcaniclastic sedimentary rocks, and minor tuff. Near base at Siniktanneyak Mountain contains interbedded limestone with Devonian fossils (Nelson and Nelson, 1982), north of Memorial Creek contains Jurassic radiolarians (C. D. Blome, written communication, 1993); in Killik River quadrangle contains Pennsylvanian(?) radiolarians (Katherine Reed, written communication, 1988).

Pzl PALEOZOIC LIMESTONE, UNNAMED (Mississippian ? and Devonian)--Limestone, light-gray, coarse-grained recrystalized, weathers white, exposed discontinuously beneath basalt at base of allochthon. Lithologically similar to Baird Group in Schwatka Mountains and Kugururok Formation in DeLong Mountains. Limestone at Memorial Creek contains possible Mississippian fauna (I.L. Tailleur, written communication, 1993), similar limestone elsewhere contains Devonian fossils (J.T. Dutro, Jr., in Chapman and others, 1964).

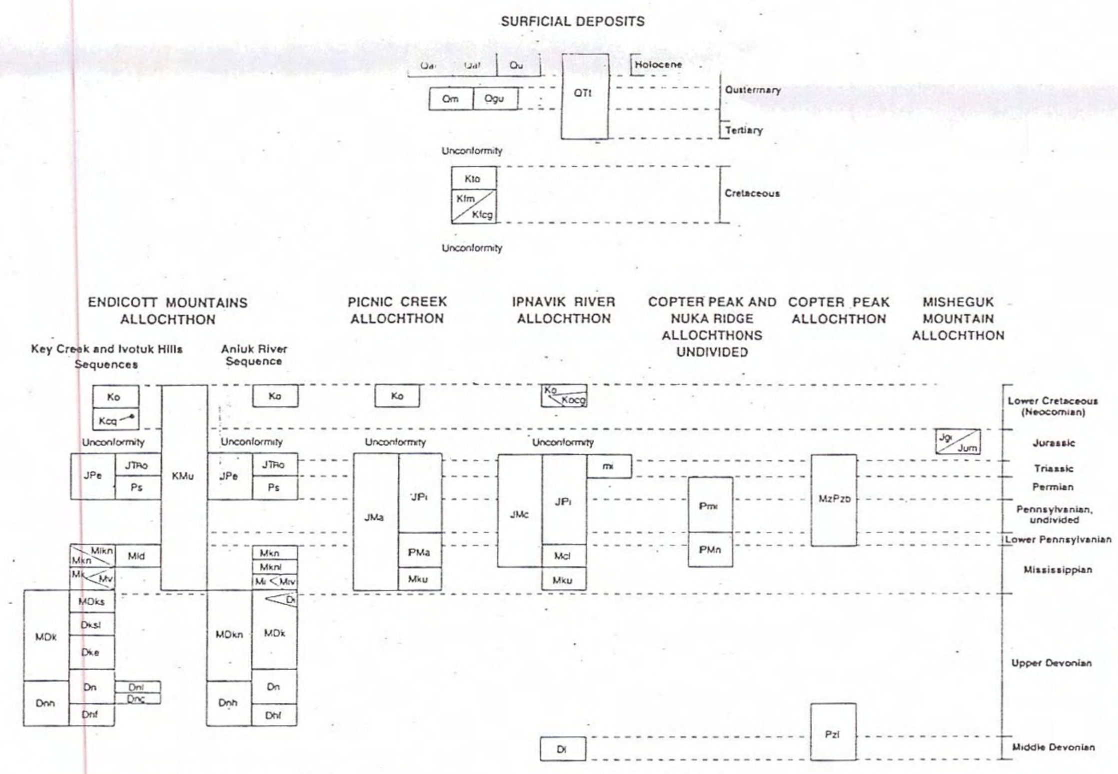
MISHEGUK MOUNTAIN ALLOCHTHON

Named for Misheguk Mountain, in the central DeLong Mountains 120 km west of map area (Mayfield and others, 1982).. Allochthon forms Siniktanneyak Mountain at west end of map area and constitutes a dismembered ophiolite that forms the top of the structural stack of allochthons in the central and western Brooks Range.

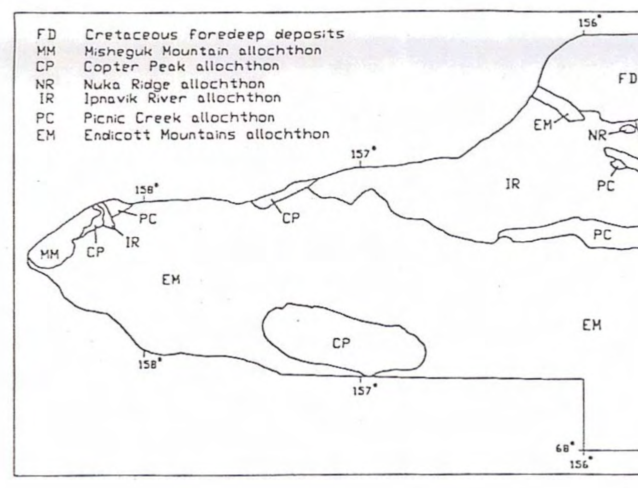
Jg GABBRO (Jurassic)-- Medium- to coarse-grained cumulate olivine gabbro and noncumulate clinopyroxene gabbro intruded by minor plagiogranite, weathers light- to medium-gray, forms top of Siniktanneyák Mountain. Plagiogranite yields a 170±3 Ma U-Pb date (Moore and others, 1993); gabbro and a hornblende pegmatite dike have yielded 151±14 Ma -161± 8.1 Ma K-Ar dates (Nelson and Nelson, 1982).

Jum ULTRAMAFIC ROCKS (Jurassic)--Medium-grained dunite, wehrlite, harzburgite, and olivine pyroxenite, weathers a conspicuous orange, forms lower part of southeast side of Siniktanneyak Mountain (Nelson and Nelson, 1982).

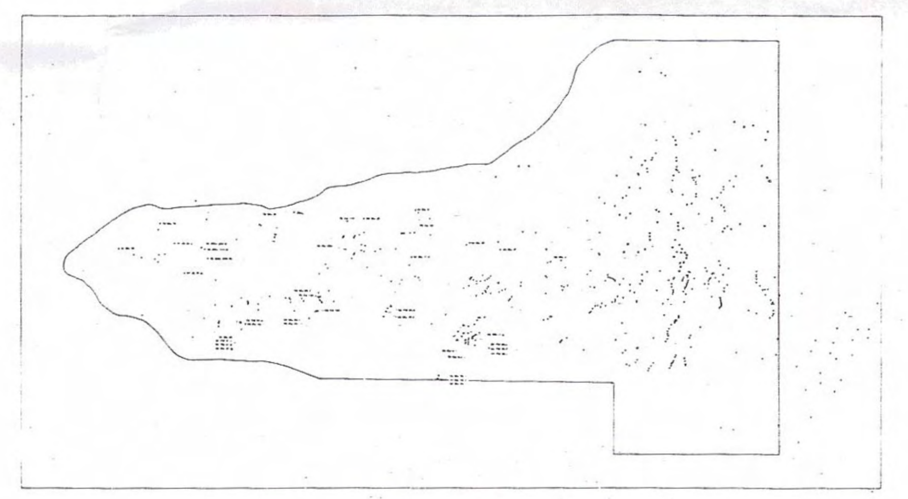
CORRELATION OF MAP UNITS



MAP SHOWING DISTRIBUTION OF ALLOCHTHONS

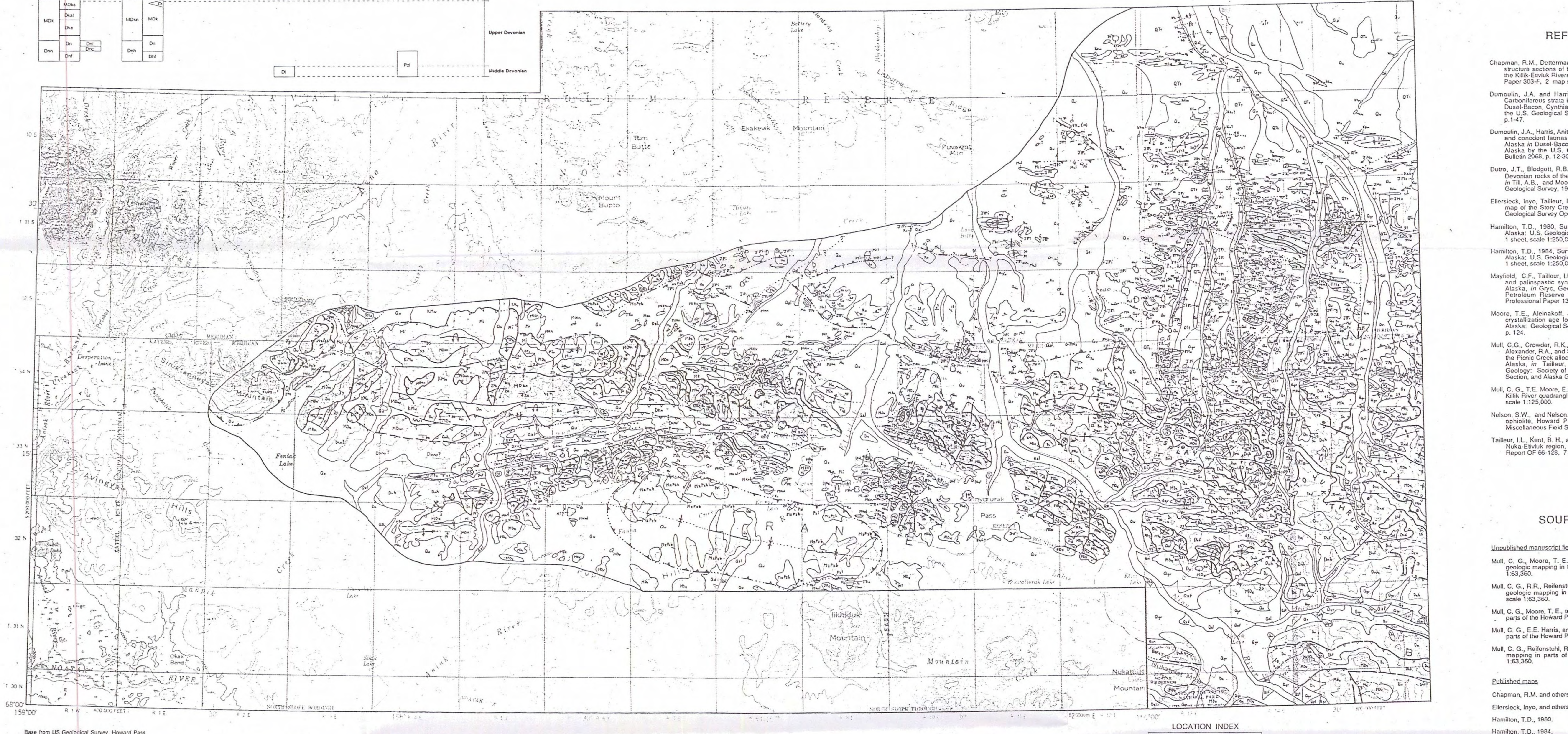


STATION AND TRAVERSE MAP



MAP SYMBOLS

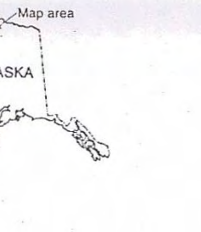
Symbol	Explanation
———	Contact
———	High angle fault
⇌	Fault--arrows show relative horizontal movement
—△—△..	Thrust fault--sawteeth on upper plate dashed where inferred, dotted where concealed
—▲—▲..	Major thrust fault bounding allochthons--sawteeth on upper plate, dashed where inferred, dotted where concealed.
←↕— ..	Fold axis showing direction of plunge, dotted where approximate or concealed.
—↕—	Anticline
—✕—	Syncline
	Strike and dip of beds
⊥70	Inclined bedding
⊕	Horizontal bedding



Base from US Geological Survey, Howard Pass (1956) and Killik River (1956) quadrangles.
Universal transverse Mercator projection.
1927 North American Datum

SCALE 1:250 000

CONTOUR INTERVAL 200 FEET



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GENERALIZED GEOLOGIC MAP OF THE WESTERN ENDICOTT MOUNTAINS, CENTRAL BROOKS RANGE, ALASKA

By
C.G. Mull and M.B. Werdon

1994

This report has not been reviewed for technical content (except as noted in text) or for conformity to the editorial standards of DGGS.