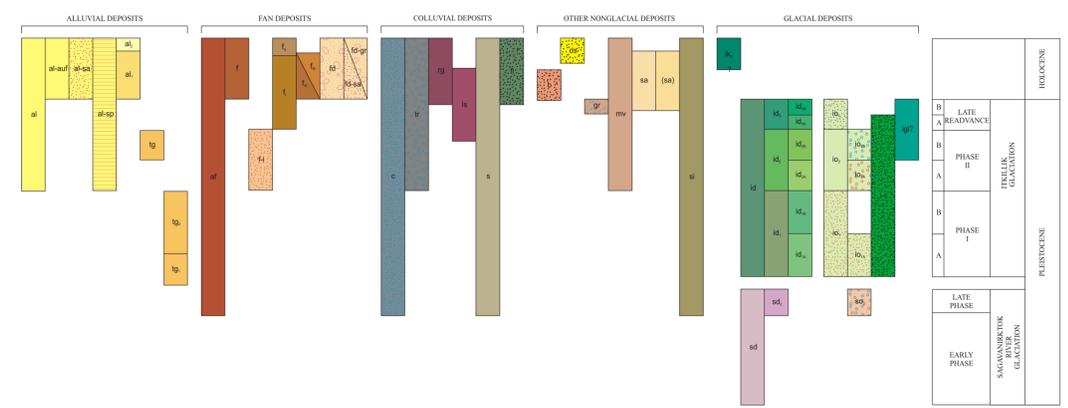




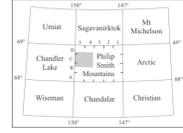
CORRELATION OF SURFICIAL MAP UNITS



DESCRIPTION OF SURFICIAL MAP UNITS

- ALLUVIAL DEPOSITS**
- al** ALLUVIUM, UNDIFFERENTIATED—Ranges from poorly sorted, moderately well stratified, subangular, coarse gravel near heads of mountain valleys to moderately well sorted, gravely sand and sandy, fine gravel along moraine-dammed and slow-flowing stretches of major rivers. Flanked by vegetated floodplain deposits consisting of weakly stratified sand and silt beneath silty peat and sod.
  - al-af** AEFIS FACIES—Alluvium subject to extensive winter aefis formation. Marked by ice accumulations up to several meters thick in early summer and by broad, highly braided, unvegetated, unstable channel reaches in late summer and early fall. Smaller aefis zones are common along other drainage systems, but are not mapped individually.
  - al-sa** SAND FACIES—Alluvium that consists almost entirely of sand. Occurs where Ikillik and Aitgun rivers traverse sandy basin-filling deposits (unit sa).
  - al-sp** SILT AND PEAT FACIES—Thick and continuous floodplain deposits of silt, organic silt, and ice-rich silt, with numerous sand peats. Overlie channel deposits that commonly contain lag boulders. Mapped only along upper Kuparuk River.
  - al** MODERN ALLUVIUM—Channel and floodplain deposits, as described above, along modern courses of Ikillik and Sagavanirktok rivers.
  - al** LOW ALLUVIAL TERRACE DEPOSITS—Channel and floodplain deposits of Ikillik and Sagavanirktok rivers, as described above, mantled with up to 2 m of silt, sand, or peat; and generally vegetated. Generally stand 1-2 m above modern floodplains.
  - tg** TERRACE GRAVEL—Fluvial sand and gravel forming discontinuous surfaces 6-10 m above modern level of Sagavanirktok River and at various levels above Toolik River. Locally covered by collan silt 0.5-1.0 m thick.
  - tg** TERRACE GRAVEL—tg and tg<sub>2</sub> are older and younger, respectively, sets of terrace remnants near Toolik River.
- FAN DEPOSITS**
- af** DEPOSITS OF STEEP ALPINE FANS—Coarse, very poorly sorted, nonstratified to weakly stratified, subangular to subrounded silty sandy gravel at mouths of avalanche chutes and canyons along steep valley walls and mountain fronts. Upper segments generally channelled, with levees of angular to subangular coarse debris. Subject to snow avalanches during winter, slash flows during spring snowmelt season, and debris flows during summer. Surface gradients generally 12° to 25° are intermediate between those of alluvial fans and talus cones.
  - f** FAN DEPOSITS, UNDIFFERENTIATED—Range from very poorly sorted, weakly stratified, subangular, silty, sandy, coarse gravel at mouths of steep canyons to moderately sorted and stratified subrounded to rounded sandy gravel at mouths of large tributary valleys with relatively gentle gradients. Locally subject to scings during winter.
  - f-1** KWASHI FACIES—Fanlike deposit banked up against flank of former Ikillik II glacier 5.5 km south-southeast of Toolik Lake.
  - f** FAN DEPOSITS, ACTIVE—Moderately sorted and stratified sandy gravel. Locally bears thin cover of sand or silty sand that is capped by sod. Mapped only near mouth of Ikillik River.
  - f** FAN DEPOSITS, INACTIVE—Sandy gravel, as described above, beneath thicker and more continuous cover of vegetated sand and silt. Mapped near mouths of Ikillik and Aitgun Rivers near abandoned courses tributary to Ikillik River.
  - f** INACTIVE FAN SEGMENTS—f<sub>1</sub> and f<sub>2</sub> are older and younger inactive fan segments, respectively. Mapped only near mouth of Aitgun River, where the older deposits stand about 5 m above the younger fan deposits and may be capped by collan silt beneath thick and continuous sod cover.
  - fa** FAN-BELT DEPOSITS—Composite deposits consisting of fan gravel (as described above) near valley walls, grading into deltaic and lacustrine facies near valley centers. Mapped primarily along west side of Galbraith Lake basin, with possible additional occurrence in Ikillik valley near southwest corner of map.
  - af-gr** UPPER PROXIMAL f<sub>1</sub>-gr AND LOWER DISTAL f<sub>2</sub>-sa FACIES—Mapped only on large fan deltas in Galbraith Lake basin. Proximal subunits are coarse gravel, relatively steep, and well drained, with abundant surface stones; distal subunits are sandy, gently sloping, and poorly drained, with surface stones nearly absent.
- COLLUVIAL DEPOSITS**
- c** COLLUVIUM, UNBUNDLED—Mixed talus rubble and soft siltification deposits, as described individually below, in sheets and aprons on steep slopes or near their bases. Commonly mapped where talus on upper slopes interfingers with soft siltification on lower slopes across broad transition zone.
  - tr** TALUS RUBBLE—Angular, unsorted, nonstratified rock debris forming cones and aprons along lower part of southeast face of Slope Mountain near northeast corner of map. Areas of active talus (unvegetated, unvegetated to slightly weathered, with lichen cover sparse to absent) are interspersed with more extensive vegetated talus that may have become stratified following last (Ikillik II) glaciation. Also forms thin (less than 1-2 m) and generally discontinuous sheets over many uplands mapped as "bedrock."
  - tr** ROCK-GLACIER DEPOSITS—Very poorly sorted, nonstratified, coarse, angular rock debris, commonly with matrix of silt and fine rubble. Where active, contains abundant interstitial ice. Frontal slopes are barren, steep, and unstable, meeting upper surfaces at abrupt angle. Where inactive, upper and frontal surfaces are weathered, lichen covered, bear partial sod cover, and grade smoothly into each other. Inactive rock glaciers are recognized south of Aitgun Gorge and along the north flank of Slope Mountain near its west end.
  - tr** LANDSLIDE DEPOSITS—Unsorted rock debris forming lobes at base of steep west wall of Sagavanirktok River valley at east end of Aitgun Gorge. Associated with detachment scars farther up slope. Also includes a possible large slump block in Aitgun Gorge.
  - s** SOFTSLICITION DEPOSITS—Very poorly sorted, nonstratified to weakly stratified, stony, sandy silt to organic silt. Forms sheets and aprons that thicken down slopes and accumulate up to several meters deep along slope bases. Deposits widespread on gentle to moderate slopes beyond limits of Ikillik II glaciation; locally present on Ikillik drift.
  - tr** FLOW DEPOSITS—Very poorly sorted rock debris in abundant muddy matrix. Associated with slumps on walls of kettle in glacial deposits of Ikillik II age 7.5 km south of Toolik Lake. Also mapped on southwest flank of Inigaknit Mountain. Common around margins of active ice masses (see units c, below).
- OTHER NONGLACIAL DEPOSITS**
- bc** BEACH DEPOSITS—Low, slightly sinuous, sandy ridges with steep, ice-shed upper outer faces, overwash fans on inner flanks, and spitlike terminations. Mapped only near north end of Galbraith Lake basin.
  - sa** DUNESAND DEPOSITS—Moderately well sorted, fine to medium sand. Most commonly forms either horseshoe-shaped parabolic ridges associated with unvegetated blowouts or shapeless mounds topped by vegetation. Associated with sandy basin-filling deposits (unit sa). Mapped only on west side of Galbraith Lake and west of Ikillik River in southwest corner of map area.
  - gr** GRAVEL, UNDIFFERENTIATED—Gravel deposits of uncertain origin near north end of Galbraith Lake basin. Probably formed during wastage of glacier ice as kame deposits against glacier front or as deltaic deposits in high-level lakes dammed by glacier.
  - mv** DEPOSITS ON FLOORS OF MOUNTAIN VALLEYS—Include alluvium, talus rubble, colluvium, softsiltification deposits, and glacial drift that form deposits too small to map individually. Mapped only in narrow mountain valleys near south margin of map.
  - sa** SANDY BASIN-FILLING DEPOSITS—Generally stratified, ranges from silty fine sand to coarse sand with granules and sparse small pebbles. Forms low (4-8 m) terraces bordering modern floodplains of sandy alluvium (unit sa) in secondary basins behind moraine drift of Ikillik and Aitgun River valleys. Also forms gently sloping, poorly drained surfaces around Galbraith Lake. Commonly includes lacustrine, deltaic, fluvial, and (or) solonch deposits that are too small or inconspicuous to map separately.
  - sa** THIN SANDY BASIN-FILLING DEPOSITS—Sandy deposits, as described above, near north end of sand basin in Ikillik River valley. Deposit west of river forms westward tapering wedge above lateral moraine of latest Ikillik readvance. Deposit east of river is draped over bedrock knob.
  - sa** ICE-BERTH SILT DEPOSITS—Silt up to several meters thick, derived from airfall loess mixed with softsiltification deposits. Abundant ice present as disseminated grains and as lenses and wedges. Numerous small thin lakes on surface. Occupies elongate basins along drainage gullies. Forms thick and extensive mappable units only on deposits of Sagavanirktok River age.
- GLACIAL DEPOSITS**
- Unit designations in parentheses indicate thin and discontinuous glacial deposits that overlie bedrock.
- Ikillik II Glaciation**
- id<sub>1</sub>** ACTIVE KETTLES—Kettle depressions in drift of Ikillik II age that appear to be actively enlarging. Distinguished by turbid water, deep-seated flows and slumps around margins, and highly unstable flanks that commonly steepen downward to water edge.
  - id<sub>2</sub>** DRIFT OF Ikillik II AGE, UNDIFFERENTIATED—Unsorted to poorly sorted, generally nonstratified, compact boulder till. Mixed sand-silt matrix, with silt generally dominant. Contains local meltwater-washed ice-contact deposits of moderately sorted sandy gravel.
  - id<sub>3</sub>** DRIFT OF LATEST Ikillik II READVANCE—Till and ice-contact deposits, as described above. Forms arcuate to lobate deposits within Ikillik II valley, north of Galbraith Lake, and at east end of Aitgun canyon. Galbraith and Ikillik moraines have abundant fine-grained matrix, and they include extensive sandy basin-filling deposits (unit sa). Aitgun glacier dammed similar basin fill in upper valley of Sagavanirktok River.
  - id<sub>4</sub>** DRIFT OF EARLY PHASE OF LATEST Ikillik II READVANCE—Older and younger moraines, respectively, of latest Ikillik II readvance in Ikillik River valley and north of Galbraith Lake.
  - id<sub>5</sub>** DRIFT OF Ikillik II PHASE II—Till and ice-contact deposits, as described above. Form narrow-crested (1-5 m) end moraines, prominent knob and kettle terrain, and conspicuously channelled outwash terraces. Flanking slopes are as steep as 15°-22°. Crests and upper slopes lack leech and softsiltification cover, and exposed stones are only slightly weathered. Most swales lack softsiltification deposits.
  - id<sub>6</sub>** SUBUNITS OF Ikillik II PHASE II DRIFT—id<sub>6a</sub> and id<sub>6b</sub> are older and younger advances, respectively, of Ikillik II age in Ikillik River valley, between Toolik and Galbraith Lake, and in Sagavanirktok River valley southeast of Slope Mountain. Younger drift does not commonly distinguish from older drift by steep moraine fronts and associated outwash terraces in valley centers and by flanking meltwater channels along valley sides. Meltwater from glaciers, when covered, bear partial sod cover, and grade smoothly into each other. Common around margins of active ice masses (see units c, below).
  - id<sub>7</sub>** DRIFT OF Ikillik II AGE—Till and meltwater deposits, as described above. Morphology irregular, but smoother than on features of Ikillik II age. Moraine crests 5-10 m wide; flanking slope angles as steep as 15°-21°, but lower slopes are smoothed by softsiltification. Terrane boulders common, and topographic crests commonly have exposures of bare gravel.
  - id<sub>8</sub>** SUBUNITS OF Ikillik II DRIFT—id<sub>8a</sub> and id<sub>8b</sub> are drift deposits of older and younger advances, respectively, of Ikillik II age north of Toolik Lake and near head of Kuparuk River. Conspicuous meltwater channel system separates the older and younger drift components north of Toolik Lake.
  - id<sub>9</sub>** OUTWASH OF LATEST Ikillik II READVANCE—Moderately well sorted sandy gravel. Generally lacks leech or peat cover, and underlies to only 20-30 cm depth. Occurs in front of or marginal to drift lobes of latest Ikillik II readvance. Forms conspicuous terraces along Ikillik and Sagavanirktok rivers.
  - id<sub>10</sub>** OUTWASH OF Ikillik II PHASE II—Sandy gravel, as described above. Stones etched, fractured, and pitted to 10-40 cm below surface; matrix oxidized to 30-45 cm depth. Forms extensive aprons and valley trains in front of or along flanks of Phase II moraines.
  - id<sub>11</sub>** SUBUNITS OF Ikillik II PHASE II OUTWASH—id<sub>11a</sub> and id<sub>11b</sub> are outwash associated with older and younger moraines, respectively, of Ikillik II age. The younger outwash forms terraces that originate as forms of id<sub>10</sub> moraines and are inset within drift of id<sub>10</sub> age.
  - id<sub>12</sub>** OUTWASH OF Ikillik II PHASE I—Sandy gravel, as described above, generally with thin to moderate (0.3 to 2.5 m) leech and softsiltification cover. Upper 1-1.5 m oxidized, with silty illuvial sand and softsiltification cover. Forms discontinuous low terraces along Toolik River near north margin of map.
  - id<sub>13</sub>** SUBUNIT OF Ikillik II PHASE I OUTWASH—Outwash of older Ikillik II Phase I advances. Mapped only near Kuparuk River near north margin of map.
  - id<sub>14</sub>** ICE-CONTACT DEPOSITS—Moderately well sorted coarse sand to sandy fine gravel, with sparse boulders and some inclusions of poorly sorted silt, collapse structures common. Upper surface irregular to terracelike with abundant lentils; becoming smooth (sheet-like) east of Ikillik River and on drift lobe at east end of Aitgun canyon. Surface boulder litter common where deposited by meltwater streams flowing beneath glacier; steep, bouldery ice-contact facies present where deposition was against glacier flank.
  - id<sub>15</sub>** GLACIAL-LAKE DEPOSITS—Fine-grained sediments possibly deposited in lakes as veneers or glacial drift of Ikillik II age in Ikillik River valley and over drift of Ikillik II readvance near Galbraith Lake. Probably thickened toward valley centers and thin in upslope direction.
- Sagavanirktok River Glaciation**
- sd** DRIFT OF SAGAVANIRKTOK RIVER AGE, UNDIFFERENTIATED—Till and meltwater deposits, probably as described above, entirely covered by collan silt (loess) on ridge crests and by stony silt and organic silt (softsiltification deposits) on flanking slopes. Forms distinct but very subdued nested moraine ridges 50-100 m high, with crests 150-300 m wide and flanking slopes generally 2° to 4°. Large, erratic boulders sparsely scattered on moraine crests and upper slopes.
  - sd** DRIFT OF SAGAVANIRKTOK RIVER AGE, LATE ADVANCE—Poorly sorted, nonstratified boulder till, probably with local patches of moderately well sorted gravel (meltwater deposits). Forms subdued moraine topography intermediate in character between that of Ikillik II drift and that of older Sagavanirktok River age. Some ridge crests lack leech and softsiltification cover; they expose weathered residual gravel (resistant lithologies from which finer sediments have been eroded). Mapped along upper Kuparuk drainage and its west valley side. May also occur along Toolik River north margin of map.
  - sd** OUTWASH OF LATE SAGAVANIRKTOK RIVER ADVANCE—Moderately well sorted and stratified oxidized sandy gravel. Associated with moraine deposits and meltwater channels of sd<sub>1</sub> age in upper Kuparuk valley.

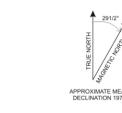
LOCATION INDEX



MAP SYMBOLS

- B** Bedrock, undifferentiated
- (B)** Bedrock with thin and discontinuous drift and/or colluvial cover
- Prominent end moraine
- Moraine crest
- Meltwater drainage channel
- Direction of glacier flow across topographic divide
- - -** Contact, dashed where approximate or inferred
- Water-eroded drift, generally lag deposit of bouldery coarse gravel
- Radiocarbon sample locality

Base from U.S. Geological Survey, Philip South Mountain R-4, B-2, C-4, C-5, D-4, and D-5 quadrangles (1971, photorevised 1975). Universal Transverse Mercator projection, zone 18, 1927 North American Datum.



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SURFICIAL GEOLOGIC MAP OF THE DALTON HIGHWAY (ITKILLIK-SAGAVANIRKTOK RIVERS) AREA, SOUTHERN ARCTIC FOOTHILLS, ALASKA

by  
Thomas D. Hamilton  
2003