SOILS OF THE CARIBOU-POKER CREEKS RESEARCH WATERSHED INTERIOR ALASKA

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PREFACE

In 1969 the Inter-Agency Technical Committee for Alaska (IATCA), chartered by the Water Resources Council, Washington, D.C., undertook establishment of the Caribou-Poker Creeks Research Watershed. The central interest of the IATCA was in development of a more complete understanding of hydrologic relations of upland areas in the subarctic, discontinuous permafrost regions of interior Alaska.

Work toward establishment of this research area has proceeded as a cooperative effort, with twelve separate agencies (including the USDA Soil Conservation Service, and USA CRREL) directly involved. Initial activities have included access development, hydrometeorologic instrumentation, and planning for specific research activities.

A serious need exists for development of basic environmental information in the area. Knowledge of character and distribution of soils is a fundamental requirement. As a substrate for plant growth, as an indicator of land use, and as a resource for exploitation in terms of plant harvest, soils are an important part of the total environment. Analysis of hydrologic behavior of watersheds presupposes some knowledge of the depth, texture, slope, orientation, permeability, waterholding capacity, areal distribution, and state (frozen or unfrozen) of the various soil types present in the landscape.

Under the leadership of Dr. Samuel Rieger, personnel of the Soil Conservation Service (USDA), headquartered at Palmer, Alaska, have performed a valuable service in mapping the soils of the Caribou-Poker Creeks Research Watershed. USA CRREL is publishing this report in the interests of 1) furthering dissemination of knowledge of cold-dominated environments, 2) making information specific to the Caribou-Poker Creeks activity readily available to project participants and other interested persons, and 3) demonstrating the continued interest of USA CRREL in actively cooperating with this project of the IATCA. It is a pleasure to endorse this report, and to have assisted in making it available for general distribution.

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Setting

The Caribou-Poker Creeks Research Watershed, an area of 26,550 acres about 25 miles north of Fairbanks, Alaska, includes the entire watershed of Poker Creek and its principal tributary, Caribou Creek, above the floodplain of the Chatanika River. It is representative of the forested hills of lower elevations in the Yukon-Tanana Upland and includes, on the ridges bordering the watershed, small areas above the tree line. Elevations range from about 700 feet near the mouth of Poker Creek to more than 2600 feet.

The underlying rock in the area is mica schist of the Birch Creek formation. A thin cap of loess mantles the area but, because the loess is derived from the floodplains of streams draining areas of the same formation, there is no sharp boundary between it and the weathered schist below it. The region has never been covered by glaciers, and has a mature dendritic drainage pattern. Slopes are generally convex, with the steepest slopes bordering secondary drainageways, but slopes are concave adjacent to the lower segments of Poker and Caribou Creeks.

The area has a cold continental climate, with long, cold winters and short, warm summers. No long-term climatic data exist for the immediate watershed area, but it is likely that the mean annual temperature at the lower elevations is about 25°F, with mean July temperatures of 60°F and mean January temperatures of –12°F. The mean annual precipitation is probably between 12 and 14 inches. Almost half of this amount falls in the three summer months (June-August), much of it in the form of heavy showers. Winter precipitation falls almost entirely as snow, most of which runs off in the spring before the soil has thawed.

Several different vegetation types occur in the area. On southerly slopes, the dominant trees are paper birch, quaking aspen and white spruce. On north-facing slopes and in the bottoms of drainageways, the principal tree is black spruce and there is a ground cover of willows, low-growing shrubs, mosses and sedges. High ridges are covered with dwarf birch and willows, with grasses, sedges, mosses and, especially in areas close to the tree line, thick patches of alder.

How soils are named, mapped and classified

Soils are made up of a series of layers, or horizons, that are generally parallel to the soil surface. A soil profile is the sequence of these horizons from the surface down to the underlying material which has not been altered by plant roots or soil-forming processes. Soils that have profiles almost alike make up a soil series. All soils of one series have major horizons that are similar in important characteristics. These include 1) color; 2) texture, or relative proportions of gravel, sand, silt and clay; 3) structure, or arrangement of soil particles into aggregates or clusters; 4) consistence, or degree of compaction and plasticity; 5) aeration and drainage conditions; 6) reaction, or degree of acidity or alkalinity; 7) thickness; and 8) arrangement in the profile. Each soil series is named for a town or other geographic feature near where it was first observed.

Soil series may be subdivided on the basis of other features that are significant to users of the survey. These subdivisions are called phases. In this area, most of the soil series have been divided into slope phases.

In using the soils map (Appendix A) it must be recognized that it is not possible, even in a detailed map, to show very small areas of a soil. Most mapping units contain patches up to 5 acres in size of soil of some other kind.

Classification of the soil series of the area according to the Soil Taxonomy of the National Cooperative Soil Survey is given at the end of this report.

Seven soil series are recognized in the area.* The location and distribution of the soils are shown in Appendix A. Their acreages and proportionate extent are given in Table I.

Table I. Acreage and proportionate extent of soils of the Caribou-Poker Creeks Research Watershed, Alaska.

Map symbol	*Mapping unit*	*Approx. area (acres)*	*Proportionate extent (%)*
Br	Bradway silt loam	500	1.89
EsD	Ester silt loam, 12 to 20% slopes	695	2.62
EsE	Ester silt loam, 20 to 30% slopes	2000	7.53
EsF	Ester silt loam, 30 to 45% slopes	2375	8.94
FpB	Fairplay silt loam, 3 to 7% slopes	1385	5.22
FpC	Fairplay silt loam, 7 to 12% slopes	1675	6.31
FpD	Fairplay silt loam, 12 to 20% slopes	2575	9.70
FpE	Fairplay silt loam, 20 to 30% slopes	190	.71
GmD	Gilmore silt loam, 12 to 20% slopes	215	.82
GmE	Gilmore silt loam, 20 to 30% slopes	1505	5.68
GmF	Gilmore silt loam, 30 to 45% slopes	1335	5.02
KaB	Karshner silt loam, 3 to 7% slopes	445	1.68
KaC	Karshner silt loam, 7 to 12% slopes	10	.03
OnB	Olnes silt loam, 3 to 7% slopes	20	.08
OnC	Olnes silt loam, 7 to 12% slopes	350	1.31
OnD	Olnes silt loam, 12 to 20% slopes	3810	14.33
OnE	Olnes silt loam, 20 to 30% slopes	5380	20.25
OnF	Olnes silt loam, 30 to 45% slopes	930	3.51
SuB	Saulich silt loam, 3 to 7% slopes	60	.23
SuC	Saulich silt loam, 7 to 12% slopes	955	3.60
SuD	Saulich silt loam, 12 to 20% slopes	140	.54
	TOTAL	26,550	100.00

Bradway series

The Bradway series consists of poorly drained, stratified silty and sandy soils with shallow permafrost. These soils are formed in alluvial materials in the floodplains of Poker and Caribou Creeks. A typical profile has a thin mat of organic materials at the surface over layers of mottled and streaked dark gray, very dark gray, and olive gray silt loam and fine sand. The layers vary in thickness and sequence; some profiles are dominantly silty and others are dominantly sandy. The soil is perennially frozen at a depth of 15 to 24 inches.

* The soil map and this report have not been reviewed by the correlation staff of the Soil Conservation Service, and are therefore tentative and subject to revision.

The soils are almost always wet, with free water perched above the permafrost. Some especially wet areas are the result of springs and seepage water from the adjacent uplands. In some places, gravelly or sandy stream overflow channels cut through areas of Bradway soils.

The natural vegetation consists of willows, low shrubs, sedge tussocks, and black spruce. In a small area above the confluence of Poker Creek and the Chatanika River, paper birch grows on very small, well drained spots included with the Bradway soils in mapping.

Representative profile of Bradway silt loam, in Caribou Creek floodplain about 1.8 miles west of confluence with Poker Creek.

Horizon	*Depth*	*Description*
01	2-0"	Black (5YR 2/1)* mat of organic matter with silt admixture; charcoal fragments; many roots; abrupt smooth boundary.
B21g	0-4"	Dark gray (5Y 4/1) silt loam; dark reddish brown (5YR 3/4) stains along root channels; streaks of very dark gray (5Y 4/1) and few fine distinct mottles of dark reddish brown (5YR 2/2); weak thin platy structure; friable; roots common; medium acid; abrupt smooth boundary.
B22g	4-8"	Very dark gray (5Y 3/1) silt loam; thin dark reddish brown (5YR 2/2) lenses of organic matter; weak thin platy structure; friable; few roots; medium acid; abrupt smooth boundary.
B23g	8-10"	Olive gray (5Y 4/2) loamy fine sand; single grain; loose; no roots; medium acid; abrupt smooth boundary.
B24g	10-17"	Very dark gray (5Y 3/1) silt loam; streaks of dark reddish brown (5YR 3/4) and dark gray (10YR 4/1); weak thin platy structure; friable; medium acid; frozen at 17 inches in late summer.

Mapping units. The Bradway soils occur only on nearly level slopes. Bradway silt loam is the only mapping unit in the area.

Ester series

The Ester series consists of poorly drained silty soils on steep, north-facing slopes. These soils have shallow permafrost and are less than 20 inches thick over bedrock. A typical profile has a thick mossy mat on the surface, a thin dark horizon immediately beneath the mat, and mottled dark grayish brown and olive gray horizons at greater depths. The upper mineral horizon is generally not gravelly, but gravel occurs within a few inches and increases with depth. Where the organic mat is thinner than normal or where bedrock is very shallow, there may be no permafrost above the rock.

The soils are usually cold and wet, but the upper part of the mat may dry out in midsummer. The principal trees are black spruce and willows, with some alder and stunted paper birch. Sphagnum, hypnum, and polytrichum mosses, lichens, and low-growing shrubs make up the ground cover. Where the organic mat has been destroyed, as by fire, birch trees become dominant.

* Colors are for moist conditions; Munsell color notations are in parentheses.

Representative profile of Ester silt loam, about 0.3 mile north of Haystack Mountain.

Horizon	*Depth*	*Description*
011	12-8"	Reddish brown (5YR 4/3) undecomposed moss peat; roots common; abrupt smooth boundary.
012	8-4"	Dark reddish brown (5YR 3/2) partially decomposed organic material, mostly derived from mosses; many roots; abrupt smooth boundary.
02	4-0"	Dark reddish brown (5YR 2/2) finely divided organic matter; many charcoal fragments in upper part; many roots; abrupt wavy boundary.
A1	0-½"	Very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; very friable; many roots; a few schist fragments; many roots; very strongly acid; abrupt wavy boundary.
B2	½-4"	Dark grayish brown (2.5Y 4/2) silt loam; few fine to medium faint mottles of dark brown (10YR 3/3); friable; no roots; very strongly acid; abrupt smooth boundary.
C1f	4-10"	Olive gray (5Y 5/2) gravelly silt loam; proportion of gravel increases with depth; massive, with thin lenses of clear ice; no roots; strongly acid.

Mapping units. Three slope phases are recognized:

Ester silt loam, 12 to 20% slopes
Ester silt loam, 20 to 30% slopes
Ester silt loam, 30 to 45% slopes

In general, the organic mat is thicker and the depth to bedrock decreases on the steeper slopes.

Fairplay series

The Fairplay series consists of moderately well drained to somewhat poorly drained silty soils of high ridges above tree line. The soils are moderately deep over bedrock, and apparently have no permafrost. A typical profile has a thin organic mat over mottled olive brown silt loam. Below about 18 inches, the soil contains schist fragments, which become more numerous with depth. Schist bedrock is at depths of 30 to 40 inches.

The Fairplay soils are usually moist, but are not saturated throughout the summer. They support a brushy vegetation made up mostly of dwarf birch and willows, together with some stunted white spruce. Low shrubs, lichens and some mosses cover the surface. Patches of alder are common immediately above the boundary with the forested Gilmore and Olnes soils.

Included in mapped areas of Fairplay soils are small patches of well-drained soils with thin black or very dark gray horizons at the surface and dark brown lower horizons. These soils occur, commonly, in association with small rock outcrops, and are themselves less than 20 inches thick over bedrock. Also included are poorly drained soils with permafrost, similar to those of the Saulich series, in microdepressions on the ridges. Together, these included soils make up less than 5% of the Fairplay mapping units.

Representative profile of Fairplay silt loam, about .75 mile southwest of northernmost point in the Poker Creek watershed.

Horizon	Depth	Description
01	3-0"	Black (5YR 2/1) partially decomposed organic matter; roots common; abrupt smooth boundary.
C1	0-18"	Olive brown (2.5Y 4/4) silt loam; many medium and coarse faint mottles of dark yellowish brown (10YR 4/4) and dark grayish brown (2.5Y 4/2); weak fine subangular blocky structure; friable; roots common; very strongly acid; gradual boundary.
C2	18-30"	Olive brown (2.5Y 4/4) gravelly silt loam; moderate fine subangular blocky structure; friable; few roots; many fine tubular pores; silty coatings on upper surface of pebbles and rock fragments; strongly acid.
R	30-40"	Partially weathered fractured schist; can be removed with a spade, but contains only small quantities of sand and silt.

Mapping units. Four slope phases are recognized. In general, within each slope group, the more gentle gradients are near the top of the ridge and the gradient increases downslope.

Fairplay silt loam, 3 to 7% slopes
Fairplay silt loam, 7 to 12% slopes
Fairplay silt loam, 12 to 20% slopes
Fairplay silt loam, 20 to 30% slopes

Gilmore series

The Gilmore series consists of well drained silty soils that are very shallow over shattered schist bedrock. These soils occur on southerly slopes and are free of permafrost. They differ from the Olnes soils principally in color and in shallower depth to shattered bedrock. A typical profile has a thin surface mat of forest litter and 10 to 20 inches of dark yellowish brown or dark brown silt loam containing rock fragments over shattered bedrock. The proportion of rock fragments in the silt loam horizons increases with depth.

The Gilmore soils, because of their shallowness, have a low moisture supplying capacity. In years with less than normal rainfall they are dry in midsummer. Most areas have been burned over during the last century and are covered mostly with paper birch and quaking aspen, with patches of alder. Young white spruce trees are also present and, barring new fires, will eventually become dominant. A few remnants of older white spruce forest also exist.

About 25% of the mapped areas of Gilmore soils are actually included areas of the closely similar Olnes soils. These occur in an irregular pattern on all slopes. Also included in the Gilmore mapping units are a few outcrops of bare rock.

Representative profile of Gilmore silt loam, about 2 miles north of confluence of Poker and Caribou Creeks.

Horizon	Depth	Description
011	2-1"	Dark reddish brown (5YR 2/2) forest litter; many roots; abrupt smooth boundary.
012	1-0"	Dark reddish brown (5YR 2/2) partially decomposed forest litter; many roots; abrupt smooth boundary.
A1	0-1"	Dark brown (7.5YR 3/4) silt loam; weak fine crumb structure; very friable; roots common; angular schist fragments make up 5 to 10% of the soil volume; medium acid; abrupt wavy boundary.
B2	1-6"	Dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky structure; very friable; roots common; angular schist fragments make up 5 to 10% of the soil volume; medium acid; clear wavy boundary.
B3	6-11"	Dark brown (10YR 4/3) gravelly silt loam; weak medium subangular blocky structure; very friable; roots common; schist fragments make up 15 to 30% of the soil volume; medium acid; clear wavy boundary.
C1	11-17"	Dark grayish brown (2.5Y 4/2) very gravelly silty loam; weak medium subangular blocky structure; very friable; few roots; schist fragments make up 35 to 50% of the soil volume; slightly acid; clear wavy boundary.
C2	17-30"	Angular schist fragments, averaging less than 10 inches in long axis; unconsolidated and can be removed with hand tools; thin silty coatings on some fragments, especially in upper part of horizon.

Mapping units. Three slope phases are recognized:

Gilmore silt loam, 12 to 20% slopes
Gilmore silt loam, 20 to 30% slopes
Gilmore silt loam, 30 to 45% slopes

Karshner series

The Karshner series consists of poorly drained, stratified silty and very gravelly sandy soils with shallow permafrost. These soils are formed in narrow floodplains bordering the upper courses of streams in the area.

A typical profile includes a few inches of organic matter on the surface and layers of mottled and streaked dark grayish brown silt loam and very gravelly sandy loam or loamy sand. The upper part of the profile commonly has layers of dark reddish brown very gravelly sandy loam. Depth to permafrost is between 20 and 30 inches, but may be less where the surface mat is thicker than normal.

The Karshner soils are nearly always wet, with free water close to the surface. Areas of the soil are dissected by overflow and seepage water channels. The vegetation is mainly sedge tussocks, mosses, willows, black spruce and low-growing shrubs.

Representative profile of Karshner silt loam, Caribou Creek floodplain about 2.5 miles west of confluence with Poker Creek.

Horizon	*Depth*	*Description*
01	4-2"	Dark reddish brown (5YR 3/2) moss peat; many roots; abrupt smooth boundary.
02	2-0"	Black (5YR 2/1), partially decomposed peat; many roots; abrupt smooth boundary.
B21	0-6"	Dark grayish brown (10YR 4/2) silt loam; patches and streaks of very dark brown (10YR 2/2) organic matter and few medium faint mottles of dark brown (7.5YR 3/2); weak thin platy structure; very friable; few roots; strongly acid; abrupt smooth boundary.
B22	6-8"	Dark reddish brown (5YR 3/4) very gravelly sandy loam; single grain; loose; no roots; medium acid; abrupt smooth boundary.
B23	8-10"	Dark grayish brown (10YR 4/2) silt loam; streaks of dark brown (7.5YR 3/2) and very dark gray (5YR 3/1) mottles; weak thin platy structure; friable; no roots; medium acid; abrupt smooth boundary.
B24	10-11"	Dark reddish brown (5YR 3/4) very gravelly sandy loam; single grain; loose; no roots; strongly acid; abrupt smooth boundary.
B25	11-17"	Dark grayish brown (2.5Y 4/2, with patches of 10YR 4/2) very gravelly loamy sand; single grain; loose; no roots; medium acid; abrupt smooth boundary.
B26	17-24"	Dark gray (5Y 4/1) silt loam; weak thin platy structure; friable; no roots; rests on permafrost.

Mapping units. Two slope phases are recognized:

Karshner silt loam, 3 to 7% slopes
Karshner silt loam, 7 to 12% slopes

In places, the texture of the upper mineral horizon is gravelly sandy loam rather than silt loam.

Olnes series

The Olnes series consists of well drained silty soils that are shallow over shattered bedrock. These soils have not developed the colors of mature soils of the area. They occur on southerly slopes and have no permafrost. They differ from the Gilmore soils mostly in color and in their greater depth to shattered bedrock.

A typical profile has a thin mat of forest litter over dark grayish brown silt loam, commonly with schist fragments. The proportion of rock fragments increases with depth. Consolidated bedrock is deep.

The Olnes soils have a low moisture supplying capacity and, in years with low rainfall, are dry in midsummer. Most areas have been burned over during the last century and are covered mostly with paper birch, quaking aspen and patches of alder. Young white spruce trees are also present and, barring new fires, will eventually become dominant. A few patches of older white spruce forest also exist.

About 15% of the area mapped as Olnes consists of included Gilmore soils. These occur in an irregular pattern, especially on the steeper slopes.

Representative profile of Olnes silt loam, about 1 mile north of confluence of Poker and Caribou Creeks.

Horizon	*Depth*	*Description*
01	½-0"	Dark reddish brown (5YR 3/2) forest litter; many roots; charcoal fragments; abrupt smooth boundary.
C1	0-½"	Grayish brown (10YR 5/2) silt loam; weak, very thin platy structure; friable; roots common; medium acid; abrupt broken boundary.
C2	½-19"	Dark grayish brown (2.5Y 4/2) silt loam; weak fine platy to weak fine subangular blocky structure; friable; few roots; contains 5 to 15% schist fragments by volume, with thin coating of silt on upper surface of fragments; medium acid; gradual boundary.
C3	19-40"	Dark grayish brown (2.5Y 4/2) very gravelly silt loam; weak fine subangular blocky structure; very friable; few to no roots; contains 35 to 50% schist fragments by volume; medium acid.

Mapping units. The Olnes soils occur on a wide range of slopes. Five slope phases are recognized:

Olnes silt loam, 3 to 7% slopes
Olnes silt loam, 7 to 12% slopes
Olnes silt loam, 12 to 20% slopes
Olnes silt loam, 20 to 30% slopes
Olnes silt loam, 30 to 45% slopes

Saulich series

The Saulich series consists of poorly drained soils on the foot slopes of hills. The soils have shallow permafrost. They differ from the Ester soils in that they are deeper over bedrock and are not as acid.

A typical profile has a thick mat of moss peat over a thin layer of mixed mineral and organic matter and, beneath that, dark grayish brown silt loam. Depth to permafrost ranges from a few inches to 30 inches, depending largely on the thickness of the mossy mat on the surface. A few "frost scars" with little or no vegetation occur; the depth to permafrost is greater under the scars. Shattered bedrock is at depths of 20 to 40 inches.

The Saulich soils are almost always wet. The vegetation is a sparse stand of black spruce and willows, with a ground cover of mosses, sedges and low-growing shrubs.

Representative profile of Saulich silt loam, about 1.3 miles west of the confluence of Poker and Caribou Creeks.

Horizon	*Depth*	*Description*
01	13-3"	Relatively undecomposed sphagnum moss peat; abrupt smooth boundary.
02	3-0"	Dark reddish brown (5YR 3/2) finely divided peat; many roots; charcoal fragments; abrupt wavy boundary.
A1	0-3"	Very dark grayish brown (2.5Y 3/2) silt loam mixed with lenses of moss peat and charcoal fragments; massive; roots common; strongly acid; abrupt wavy boundary.
C2f	3-12"	Dark grayish brown (2.5Y 4/2) silt loam; frozen, with clear ice lenses; medium acid; no roots.

Mapping units. Three slope phases are recognized:

Saulich silt loam, 3 to 7% slopes
Saulich silt loam, 7 to 12% slopes
Saulich silt loam, 12 to 20% slopes

Estimated physical properties of soils

The estimated textural and engineering classifications of the soils of the area, and their estimated permeabilities, available water capacities, and reaction range are presented in Table II. These estimates are based on limited data from areas outside the Caribou-Poker Creeks Watershed, and are subject to revision as more data are accumulated from research within the watershed.

Permeability, as used here, refers to the rate at which the soil will transmit water under saturated conditions. It is equivalent to the saturated hydraulic conductivity of the soil. Available water capacity refers to water in the range between the permanent wilting point and field capacity (roughly water held against tensions between 15 and 1/3 atmospheres).

Soil classification

The classification of soils according to the Soil Taxonomy of the U.S. Cooperative Soil Survey, as revised in 1971, is shown in Table III. A complete discussion of this classification scheme, including definitions of all taxa, will be published by the U.S. Department of Agriculture within the next year.

Table II. Estimated physical properties of soils of the Caribou-Poker Creeks Research Watershed.

Soil series	*Depth from surface (typical profile) (in.)*	*USDA texture**	*Unified*	*AASHO*	*Permeability† (in./hr)*	*Available water capacity† (in./in. of soil)*	*Reaction pH*
Bradway	0-8	sil	ML	A-4	0.6 to 2.0	.18 to .23	5.6 to 6.0
	8-10	lfs	SM	A-2	2.0 to 6.0	.04 to .06	5.6 to 6.0
	10-17	sil	ML	A-4	0.6 to 2.0	.18 to .23	5.6 to 6.0
	17+	Silty or sandy permafrost					
Ester	0-4	sil	ML	A-4	0.6 to 2.0	.18 to .23	4.5 to 5.0
	4-10	Gravelly permafrost					
	10+	Fractured bedrock					
Fairplay	0-18	sil	ML	A-4	0.6 to 2.0	.18 to .23	4.5 to 5.0
	18-30	gsil	ML	A-4	0.6 to 2.0	.13 to .17	5.1 to 5.5
	30-40	Fractured bedrock					
Gilmore	0-6	sil	ML	A-4	0.6 to 2.0	.18 to .23	5.6 to 6.0
	6-11	gsil	ML	A-4	0.6 to 2.0	.13 to .17	5.6 to 6.0
	11-17	vg sil	GM	A-1	0.6 to 2.0	.06 to .08	6.1 to 6.5
	17-30	Fractured bedrock					
Karshner	0-6	sil	ML	A-4	0.6 to 2.0	.18 to .23	5.1 to 5.5
	6-24	Stratified sil, vgsl, vgls	Stratified ML, GM, GW	Stratified A-4, A-1			5.1 to 6.0
	24+	Gravelly permafrost					
Olnes	0-19	sil	ML	A-4	0.6 to 2.0	.18 to .23	5.6 to 6.0
	19-40	vg sil	GM	A-1	0.6 to 2.0	.06 to .08	5.6 to 6.0
Saulich	0-3	sil	ML	A-4	0.6 to 2.0	.18 to .23	5.1 to 5.5
	3-12+	Silty permafrost					

* sil – silt loam; gsil – gravelly silt loam; vg sil – very gravelly silt loam; lfs – loamy sand; vgsl – very gravelly sandy loam; vgls – very gravelly loamy sand

† Estimates subject to verification, at completion of ongoing research at University of Alaska.

Table III. Classification of soils of the Caribou-Poker Creeks Research Watershed according to the Soil Taxonomy of the U.S. Cooperative Soil Study.

Soil series	*Family*	*Subgroup*	*Order*
Bradway	Loamy, mixed, nonacid	Pergelic cryaquepts	Inceptisols
Ester	Loamy, mixed, acid	Histic lithic cryaquepts	Inceptisols
Fairplay	Coarse-loamy, mixed, acid	Aquic cryorthents	Entisols
Gilmore	Loamy-skeletal, mixed	Typic cryochrepts	Inceptisols
Karshner	Loamy-skeletal, mixed, acid	Pergelic cryaquepts	Inceptisols
Olnes	Loamy-skeletal, mixed, nonacid	Typic cryorthents	Entisols
Saulich	Loamy, mixed, nonacid	Histic pergelic cryaquepts	Inceptisols