

Major Land Resource Area 233X

Upper Kobuk and Koyukuk Hills and Valleys

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Description

The Upper Kobuk and Koyukuk Hills and Valleys MLRA (herein called area) occurs in Interior Alaska. This area makes up 8,405 square miles. The largest tributaries are the Kobuk and the Koyukuk Rivers. Major tributaries of the Kobuk are the Reed, Beaver, Mauneluk, and Pau Rivers. Major tributaries of the Koyukuk River are the Alatna, John, and Kanuti Rivers. This area is primarily undeveloped wildland and sparsely populated. The communities within or near this area are Bettles, Kobuk, and Shungnak. The terrain of this area consists of broad, nearly level river valleys and basins and rolling uplands separated by isolated hills and low rounded mountains. In the river valleys, nearly level flood plains and stream terraces gradually transition to gently sloping to moderately steep slopes leading to the hills and mountains. Basins are on the Pau River Flats between the eastern Zane and Lockwood Hills, on the Kanuti Flats between the Kanuti and Koyukuk Rivers, and along the middle reaches of the Hogatza River. Basins and stream terraces are dotted with hundreds of lakes and interconnecting wetlands. Elevation ranges from about 150 feet in the western part of the area, at the confluence of the Kobuk and Mauneluk Rivers, to 4,765 feet at the summit of Fritts Mountain, in the Angaycuham Mountains. Geology and Soils The northern part of the area was covered repeatedly by Pleistocene glaciers originating in the Brooks Range to the north. Slightly modified to highly modified moraines and drift cover many of the rolling uplands. Glacial ice flowed over most of the hills and low mountains, removing existing deposits and leaving a thin layer of glacial deposits. Today, the lower mountain slopes, hills, and valley bottoms are covered with a variety of material, including glacial drift, colluvium, slope alluvium, fluvial deposits, and silty loess. In the southern part of the area, basins and valleys are filled with Quaternary glaciofluvial and fluvial deposits. Hills and upland slopes are covered with bedrock colluvium and slope alluvium, which are mantled with loess in places. The bedrock geology underlying much of the area consists dominantly of Permian through Lower Cretaceous stratified sedimentary and volcanic rocks. This area is in the zone of discontinuous permafrost. Permafrost is close to the surface in lands with finer textured sediments throughout the area. Isolated masses of ground ice occur on terraces and the lower side slopes of hills. Permafrost does not occur on flood plains, on steep south-facing slopes, or other lands with very gravelly soils. Periglacial features, such as thermokarst pits and mounds, peat plateau, and earth hummocks, are on the lower hill and mountain slopes and in upland valleys. The dominant soil orders in this area are Gelisols, Inceptisols, and Entisols. The Gelisols are shallow or moderately deep to permafrost, occur on finer textured sediments, and are poorly drained or very poorly drained. Common Gelisol suborders are Histels, Orthels, and Turbels. The Histels have thick accumulations of surface organic material and occur in depressions, lake margins, and peat plateau. The Orthels and Turbels have comparably thinner surface organic material and occur on stream terraces and hill and upland slopes. The Inceptisols and Entisols are typically associated with gravelly soils that do not have permafrost within their profile, are deep, and are somewhat poorly drained to well drained. The common Inceptisol suborders are Cryepts and Gelepts both of which occur on upland and mountain slopes. Cryepts occur under forested soils at lower elevations and Gelepts on alpine tundra at higher elevations. Common Entisol suborders are Cryofluvents and Cryorthents both of which occur on alluvium on flood plains. Miscellaneous (nonsoil) areas make up about 8 percent of this MLRA. The most common are rock outcrop, rubble land, and water. For Gelisols, wildfires disturb the insulating organic material at the soil surface and can change the presence and/or depth of permafrost in the soil profile. These fire related changes to permafrost can also change the depth and presence of perched water tables. Gelisols that burn in this area can change soil taxonomic classification. For instance, depending on fire-severity, Histels may change to Orthels and Orthels may change to Inceptisols. Depending on the frequency and intensity of fires, landform position, and soil texture, the soils may or may not revert back to their original taxonomic classification. Climate Short, warm summers and long, cold winters characterize the continental subarctic climate of the area. The average annual precipitation ranges from 15 to 19 inches on valley bottoms and basins and from 19 to 26 inches at the higher elevations in the hills and mountains (PRISM 2018). Most of the precipitation falls as rain between May and September. The average annual snowfall ranges from 65 to 80 inches. The average annual temperature is 22 to 24 degrees Fahrenheit (PRISM 2018). The temperature normally remains above freezing from mid-June through August in river valleys and basins with a freeze-free period ranging from 109 to 125 days. The free-free period is significantly shorter on higher elevation mountain slopes. Vegetation Most of this area is forested below an elevation of 1600 feet. Dominant tree species on slopes are white spruce and black spruce. Black spruce stands dominate on north-facing slopes, stream terraces, and other sites with poor drainage and permafrost. White spruce stands dominate on steep, south-facing slopes with dry soils. At lower elevations, lightning-caused wildfires are common, often burning many thousands of acres during a single fire event. Following wildfires, forbs, grasses, willow, ericaceous shrubs, paper birch, and quacking aspen communities are common until they are eventually replaced by stands of spruce. Tall willow and alder scrub is extensive on low flood plains. White spruce and balsam poplar are common on high flood plains. With increasing elevation, the forests and woodlands give way to subalpine communities dominated by krummholz spruce, shrub birch, willow, and ericaceous shrubs. At even higher elevations, alpine communities prevail which are characterized by diverse forbs, dwarf ericaceous shrubs, and eightpetal mountain-avens. Many of these high elevation communities have a considerable amount of lichen cover and bare ground.

Ecological site keys

Life Zone Key - MLRA 233X - Upper Kobuk and Koyukuk Hills and Valleys

I. Elevations above 1600 feet. In this area, the subalpine and alpine life zones typically occur above 1600 feet.

A. The alpine life zone is where trees no longer occur and all shrubs are dwarfed or lay prostrate on the ground

B. The subalpine life zone has sparse stunted trees and birch and willow shrub species grow at ? 3 feet in height

II. Elevations below 1600 feet.

A. The boreal life zone is a place where stands of trees dominate and typically occurs below 1600 feet. On warm slopes, this life zone transition can occur at higher elevations. On cold slopes, this life zone transition can occur at lower elevations.

B. Arctic Biome - MLRA 243X - Western Brooks Range Mountains, Foothills, and Valleys At low elevations in the far western portion of this MLRA, forests no longer prevail. Arctic vegetation dominates, which are shrubby and sedge dominant communities.

Alpine Life Zone - MLRA 233X - Upper Kobuk and Koyukuk Hills and Valleys

I. Streams and drainageways ... R233XY152AK – High-elevation Scrub Gravelly Flood Plains

II. All other landforms

A. Wetland soils. These include soils that pond, have a water table at very shallow to shallow depths for long durations of time (0 to 20 inches), and/or are classified as very poorly to poorly drained.

1 Depressions often with ? 40 cm of saturated organic material

2 Not as above

i. Turf hummocks are common landform features. Under the surface peat layer, there is deep, frozen silts. ...

R233XY115AK – Alpine Sedge Silty Frozen Slopes

ii. Circles and stripes are common landform features. Under the surface peat layer, there is silty, gravelly, frozen soils. ...

R233XY134AK – Alpine Dwarf Scrub Gravelly Frozen Slopes

B. Not as above, non-wetland soils.

1 Dry and gravelly soils without permafrost. ... R233XY101AK – Alpine Dwarf Scrub Gravelly Slopes

2 Moist soils without permafrost. Commonly associated with swales. ... R233XY148AK – Subalpine Scrub Gravelly Moist Slopes

Subalpine Life Zone - MLRA 233X - Upper Kobuk and Koyukuk Hills and Valleys

I. Streams and drainageways ... R233XY152AK – High-elevation Scrub Gravelly Flood Plains

II. All other landforms

A. Wetland soils. These include soils that pond, have a water table at very shallow to shallow depths for long durations of time (0 to 20 inches), and/or are classified as very poorly to poorly drained.

1 Depressions with ? 40 cm of saturated organic material ...

B. Not as above, non-wetland soils.

1 Dry and gravelly soils. ... R233XY164AK – Subalpine Scrub Gravelly Slopes

2 Moist and gravelly soils. Commonly associated with swales. ... R233XY148AK – Subalpine Scrub Gravelly Moist Slopes

Boreal Life Zone - MLRA 233X - Upper Kobuk and Koyukuk Hills and Valleys

I. The site occurs on a drainageways, flood plain, or stream terrace.

A. The site occurs on flood plains. Flooding happens at least one time in one hundred years.

1 Depressions. Often with ? 40 cm of saturated organic material ... R233XY207AK – Boreal Sedge Peat Depressions

2 not as above, level surfaces.

i. Low floodplain; frequent flooding, shrubby communities ... R233XY130AK – Boreal Scrubland Gravelly Floodplain

ii. high flood plain; occasional to rare flooding. Comparatively drier soils with more productive stands of trees ... F233XY131AK – Boreal Forest Gravelly Floodplain

B. This site occurs on stream terraces. No flooding in one hundred years. Thermokarst is common. ... F233XY171AK – Boreal Woodland Loamy Frozen Terraces

II. This site occurs on sloping landforms like hills, plains, and mountains.

A. This site occurs on cold slopes with permafrost. Cold slopes are northwest to east facing slopes, occur in shaded slope positions, and/or occur in low-lying areas that are cold air sinks.

1 broad slopes, commonly summits and footslopes. Supports mixed shrub-sedge tussock bog

2 Not as above, supports woodlands and forests.

i. Under the surface peat layer, there is deep, frozen silts. ... F233XY111AK – Boreal Forest Loamy Frozen Slopes

ii. Under the surface peat layer, there is gravelly, frozen soils. ... F233XY160AK – Boreal Forest Gravelly Frozen Slopes

B. This site occurs on warm slopes without permafrost. Warm slopes are southeast to west facing slopes, moderate to very steep (>10% slope), and are not shaded by the surrounding landscape.

1 Dry soils, commonly well drained. Supports more productive stands of white spruce. ... F233XY182AK – Boreal Forest Gravelly Slopes

2 Moist soils, commonly somewhat poorly drained. Supports less productive stands of white spruce. ... F233XY183AK – Boreal Forest Gravelly Moist Slopes

