

Ecological site F227XY107AK Glaciolacustrine Uplands, Frozen Kuslined

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.



Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	(1) <i>Picea mariana</i>
Shrub	Not specified
Herbaceous	(1) <i>Carex lugens</i>

Physiographic features

This site occurs on lacustrine terraces, till plains, and hills formed in loamy and clayey lacustrine deposits and gravelly and loamy glacial till. The soil surface has a moderately thick organic mat and permafrost is generally present within 60 inches (152 cm) of the mineral surface. Slope ranges from 0 to 25 percent but are generally less than 10 percent. Elevation is from 1900 to 2800 feet (579 to 853 m).

This site is found throughout the uplands in the Gulkana River Area. It occurs intermittently on the same landscapes with sites without permafrost. This site is extensive at low to mid elevations throughout the Copper River Basin.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Till plain (3) Hill
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Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None
Elevation	1,900–2,800 ft
Slope	0–25%
Ponding depth	0–6 in
Water table depth	0–17 in
Aspect	Aspect is not a significant factor

Climatic features

The subarctic continental climate of this site is characterized by long cold winters and short warm summers. Mean January temperature is -2 °F.; mean July temperature is 54 °F. Mean annual precipitation ranges from 15 to 19 inches. Annual snowfall ranges from 54 to 102 inches. The frost-free season is about 60 to 80 days (28 °F. base temperature). The growing season varies greatly from year to year and frosts can occur during any summer month.

Table 3. Representative climatic features

Frost-free period (average)	80 days
Freeze-free period (average)	0 days
Precipitation total (average)	19 in

Influencing water features

Soil features

The poorly developed soils on this site are formed in gravelly glacial till and fine-grained lacustrine deposits. Some soils have mantles of silty eolian material up to 2 inches thick. In the absence of wild fire, an organic mat about 8 to 16 inches (20 to 41 cm) thick develops on the soil surface and in most places permafrost is present above 60 inches (152 cm). A water table is usually perched on the permafrost and the soils are poorly to very poorly drained. Surface texture is peat. Surface texture ranges from clayey or loamy or sandy, mixed, nonacid.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Clay loam (3) Silt loam
Family particle size	(1) Loamy
Soil depth	4–32 in
Available water capacity (0-40in)	0.16–0.35 in

Ecological dynamics

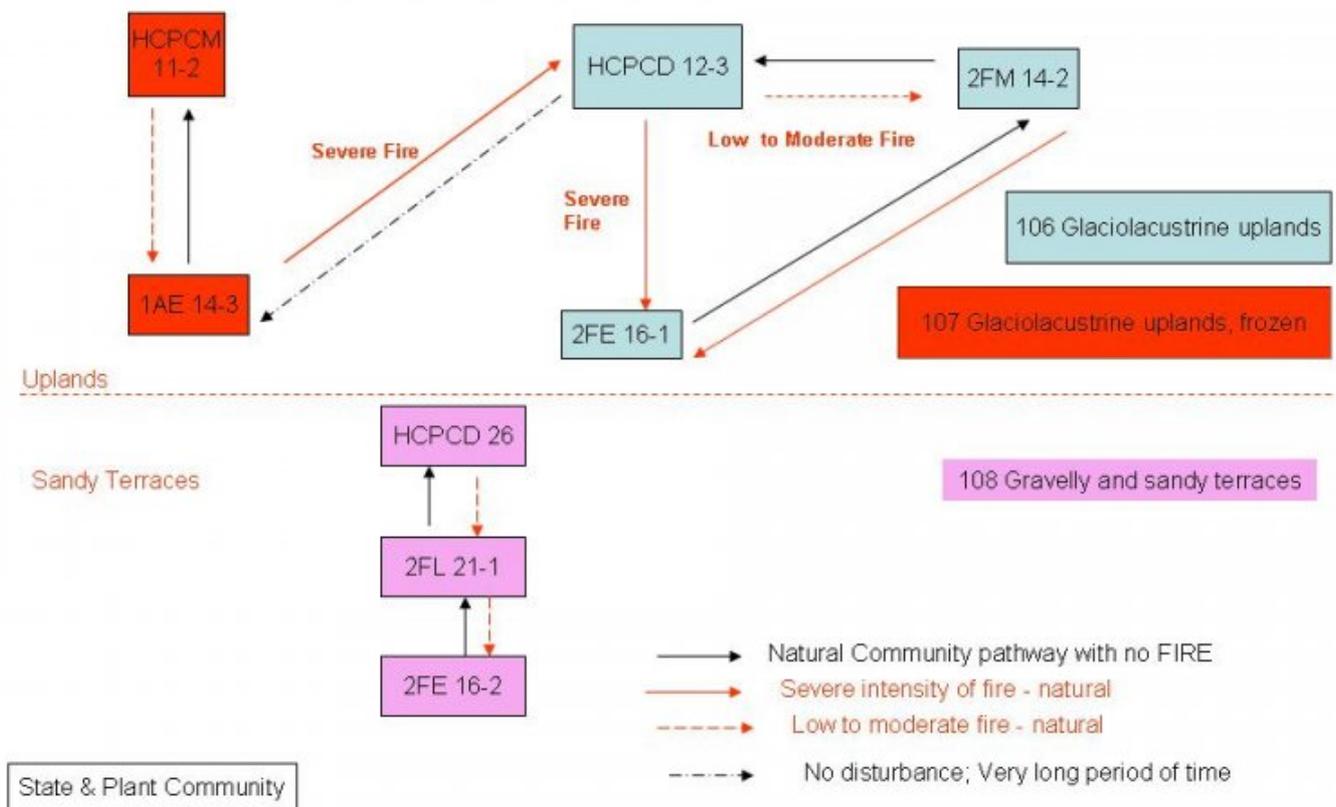
Following wild fire, post-fire succession would likely begin with a short lived herb stage in which *Betula glandulosa* and ericaceous shrubs from the original forest vegetation would sprout and regenerate. Within about 5 to 10 years, Low shrub birch scrub, often with common to abundant tall willows and spruce seedlings and saplings, would dominate the site. Depending on pre-fire overstory composition and available fire seed sources, tree regeneration may also include *Populus tremuloides*. Vegetation succession would lead to Spruce/shrub birch woodland and eventually to the Spruce/spruce muskeg sedge open forest. Wild fire on this site could be expected to impact both the structure and composition of the vegetation and the characteristics of the site. Moderate to severe burns in which the moss-organic layer on the soil surface is blackened and partially to completely destroyed would favor a

rapid and long-term warming of the soil profile. Over a relative short period of time, the permafrost level would drop and soil drainage should improve. In this situation, the site would be expected to retrogress to 172Xy106AK - Glaciolacustrine Uplands and Spruce/shrub birch woodland vegetative potential.

Absence of fire for an extended period of time and development of the moss-organic layer, would allow for permafrost development and site progression back to the original 172Xy107AK - Glaciolacustrine Uplands, Frozen and Spruce/spruce muskeg sedge open forest. The length of time necessary for this progressive change in site conditions is not known.

State and transition model

Relationship between permafrost and non-permafrost ecological sites on uplands and terraces



State 1 Spruce/Spruce Muskeg Sedge Open Forest

Community 1.1 Spruce/Spruce Muskeg Sedge Open Forest

Spruce/spruce muskeg sedge open forest consists of open to moderately open stands of spruce, with occasional woodland and moderately closed stands. Spruce/spruce muskeg sedge open forest represents late seral to potential vegetation on sites where it occurs. Sites that have remained undisturbed by wildfire for a long period generally have shallow permafrost and a perched water table. This type develops from Low shrub birch scrub and Spruce/shrub birch woodland. Riparian-Wetland Status Classification: varies from upland to Palustrine needle-leaved evergreen scrub-shrub and forested (Cowardin et al. 1979)

Forest overstory. Overstory composition varies from *Picea mariana* to mixed *P. mariana* and *P. glauca*. Tree canopy cover ranges from 10 to 55 percent. Trees are typically 15 to 35 feet (4.6 to 10.7 m) in height and 4.0 to 6.5

inches (10.0 to 16.5 cm) in diameter at ground level. Trees and small stands to 60 feet (18 m) in height occasionally occur. Basal area of trees varies considerably between stands, ranging from 30 to 125 feet²/acre (6.9 to 28.7 m²/ha) in 13 sample stands.

Forest understory. Compared to Spruce/shrub birch woodland and Spruce/lichen woodland, herbs are abundant to very abundant in the ground layer of Spruce/spruce muskeg sedge open forest. *Carex lugens* typically ranges from 15 to occasionally over 70 percent canopy cover. Other important herbs include *Petasites frigidus*, *Equisetum* spp., *Rubus chamaemorus*, *Eriophorum brachyantherum*, and *Arctagrostis latifolia*. Mosses and lichens are well-represented to more commonly abundant on the soil surface.

Like other spruce cover types, medium, low, and dwarf shrubs are also important in Spruce/spruce muskeg sedge open forest. Total shrub canopy cover ranges from around 30 to 70 percent or more. *Betula glandulosa* approximately 4.5 to 6 feet (0.4 to 1.8 m) in height and *Ledum* spp. and *Vaccinium uliginosum* 2 to 3.5 feet (0.6 to 1.1 m) in height are the most important shrubs. In most stands, *Salix planifolia* also is a common medium shrub. *S. glauca* and other tall willows are common to well-represented in many stands. Common low shrubs include *V. vitis-idaea*, *Empetrum nigrum*, *Arctostaphylos rubra*, and *S. myrtilifolia*.

Table 5. Ground cover

Tree foliar cover	40%
Shrub/vine/liana foliar cover	5-30%
Grass/grasslike foliar cover	1-55%
Forb foliar cover	1-2%
Non-vascular plants	5-60%
Biological crusts	0%
Litter	5%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 6. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	–	–	–
>0.5 <= 1	–	–	–	–
>1 <= 2	–	–	15-80%	15-80%
>2 <= 4.5	–	35-70%	–	–
>4.5 <= 13	–	–	–	–
>13 <= 40	10-45%	–	–	–
>40 <= 80	–	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

Figure 3. Plant community growth curve (percent production by month). AK0001, MLRA 172 Balsam poplar-whitespruce/thinleaf alder. Mixed forest shrub on floodplains..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	15	30	45	10	0	0	0	0

State 2 Low Shrub Birch Scrub

Community 2.1 Low Shrub Birch Scrub

Low shrub birch scrub consists of moderately open to closed stands of medium and low shrubs dominated by *Betula glandulosa*, *Ledum* spp., and *Vaccinium uliginosum*. Dwarf shrub, primarily *Vaccinium vitis-idaea* and *Empetrum nigrum*, also are usually abundant. In most places, Low shrub birch scrub appears to be an early, post-fire seral stage leading to Spruce/shrub birch woodland or Spruce/spruce muskeg sedge open forest. Most stands have common to well-represented scattered trees and unburned woodland to reseed the stand, and *Picea glauca* and *P. mariana* seedlings and saplings are common. At higher elevations and on steep slopes, seed trees and seedlings are generally absent to uncommon, suggesting that progression toward the woodland stages in these stands may take a long time. Above about 2,700 feet (823 m), Low shrub birch scrub, where present, is probably the potential vegetation. The *Carex lugens* understory phase appears to be a condition associated with crown fires in which the woodland understory was essentially unburned or only lightly burned. These are the stands which more than likely have permafrost and a water table present in the soil profile. Riparian-Wetland Status Classification: usually upland; occasionally Palustrine broad-leaved deciduous scrub-shrub, saturated, mineral and organic (Cowardin et al. 1979)

Forest overstory. In many stands, *Picea glauca* and/or *P. mariana* saplings, small trees, and relic trees are common to well-represented.

Forest understory. *B. glandulosa* is typically 4.5 to 7 feet (1.4 to 2.1 m) in height and forms an irregular, broken upper shrub layer. Other shrubs are usually about 3 feet (0.9 m) in height or less and fill in the spaces between and below the birch. Canopy cover of the upper shrub layer ranges from 25 to 70 percent. Total shrub canopy cover is usually between 50 and 90 percent.

In most stands, the herb layer is sparse to open. The number of different herb species is usually fairly high; however, no species are particularly abundant. Important herbs include *Equisetum* spp., *Petasites frigidus*, *Epilobium angustifolium*, *Arctagrostis latifolia*, and *Calamagrostis canadensis*. A mosaic of feathermoss, lichen, and litter covers the ground surface. In some stands on more mesic sites, *Carex lugens* is abundant to very abundant, and lichen is usually considerably more abundant. Most stands show evidence of recent burns, and snags and woody litter are common to well-represented.

Table 7. Ground cover

Tree foliar cover	1-20%
Shrub/vine/liana foliar cover	1-65%
Grass/grasslike foliar cover	1-75%
Forb foliar cover	1-65%
Non-vascular plants	1-55%
Biological crusts	0%
Litter	1-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	1-15%

Additional community tables

Contributors

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**
