

Ecological site F227XY109AK Glaciolacustrine Uplands, Ruptic Swilna; Swilna, thin surface

Accessed: 05/07/2024

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 glauca</i> (2) <i>Picea mariana</i>
Shrub	(1) <i>Betula glandulosa</i>
Herbaceous	Not specified

Physiographic features

This site occurs on glaciolacustrine terraces formed in clayey lacustrine deposits. This site is characterized by surface microtopography consisting of a complex sparsely vegetated ice-cored frost boils and intervening swales and troughs. In most places the frost boils are about 24 inches (61 cm) high and 9 feet (3 m) across. Bare soil material is common on the mounds while the intermound troughs between boils have moderately thick to thick organic mats. The landscape is underlain by permafrost, including ice-rich soil material, ice lenses, vein ice, and probably occasional ice wedges. Slopes generally range from 0 to 8 percent. Elevation is 2300 to 2500 feet (701 to 762 m).

Within the Gulkana River area, this site is of limited extent and found only on lacustrine terraces above the upper South Branch. The occurrence of this site elsewhere in the Copper River basin is not known.

Table 2. Representative physiographic features

Landforms	(1) Terrace
Flooding frequency	None
Elevation	701–762 m
Slope	0–8%
Water table depth	0–61 cm
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)	483 mm

Influencing water features

Soil features

Soils on this site are formed in clayey lacustrine deposits. On frost boils, the soil is sparsely vegetated; the organic mat ranges from 0 to 4 inches (0 to 10 cm), and bare mineral soil is exposed across much of the surface. Soils on frost boils are moderately deep to permafrost and somewhat poorly drained. In intermound swales and troughs, the soils have an organic mat 8 to 14 inches (20 to 36 cm) thick. Permafrost is shallow to moderately deep and the soils are very poorly drained. Soil horizons are mixed by cryoturbation; buried, distorted, and fractured horizons are present in most places. Redoximorphic features indicative of wetness are evident in troughs but less evident in boils.

Table 4. Representative soil features

Surface texture	(1) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Well drained
Soil depth	25–102 cm
Surface fragment cover <=3"	0–5%
Available water capacity (0-101.6cm)	0.46–0.89 cm

Ecological dynamics

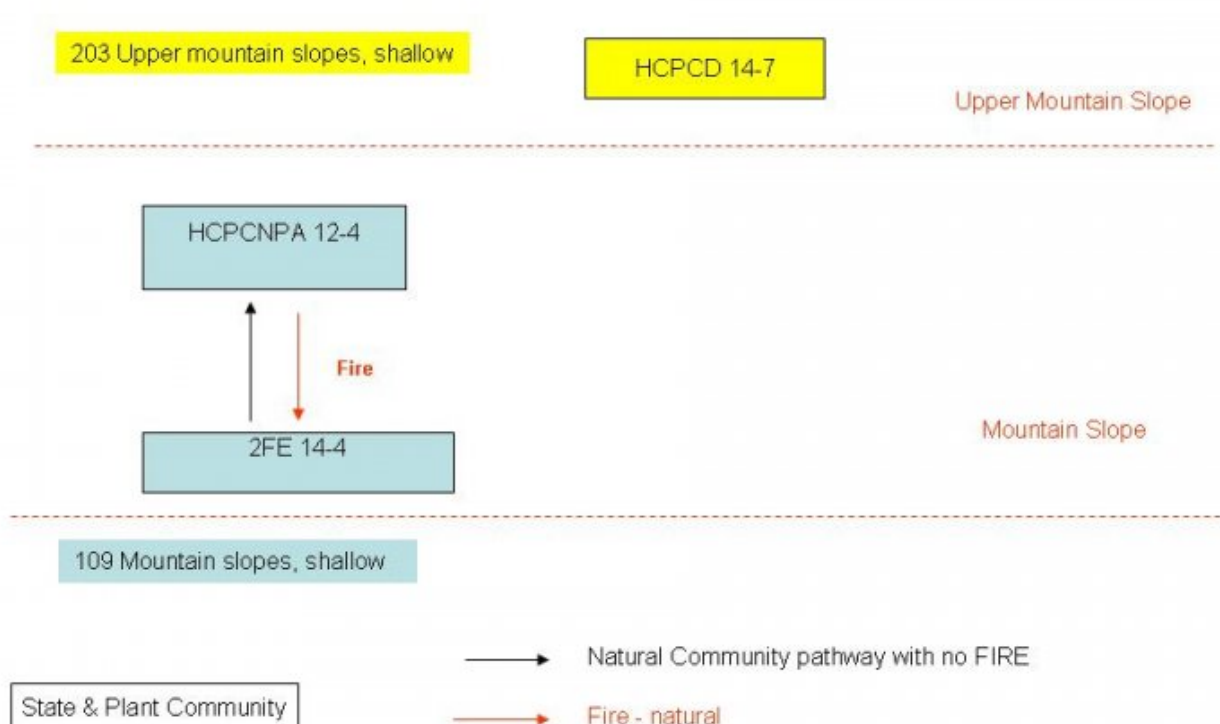
Spruce/shrub birch woodland is the correlated PNC on this site, although dramatic differences in understory composition is evident on the frost boils versus the intermound swales and troughs. On frost boils, the understory in mature stands is characterized by sparse shrubs, herbs, and patches of moss with extensive bare soil. In the swales and troughs, the understory generally has common to abundant low shrubs and a luxuriant moss layer. In many places, the vegetation is similar to the understory of Black spruce/closed sheath cottongrass woodland.

Wild fire on this site would be expected to potentially 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. Melting vein ice and ice wedges could lead to thermokarsting, liquifaction, and debris flows, especially on steeper slopes. Post-fire vegetative succession would probably begin with a herb-shrub sprout stage, followed by a Low shrub birch scrub stage. The rate and degree of tree regeneration would depend in part on the availability of seed sources following burning.

State and transition model

Relationship between ecological sites on mountain slopes



State 1

Spruce/Shrub Birch Woodland

Community 1.1

Spruce/Shrub Birch Woodland

Spruce/shrub birch scrub is the correlated PNC on this site. At the elevation of this site, *Picea glauca* is the usually the only spruce found. Seral Low shrub birch scrub is present in many places.

Forest overstory. Spruce/shrub birch woodland consists of woodland to occasionally moderately open stands of spruce. Overstory composition varies from *Picea glauca* to mixed *P. glauca* and *P. mariana*. 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 to 6.5 inches (10 to 16.5 cm) in diameter at ground level. Trees and small stands to 60 feet (18.3 m) in height occasionally occur. Basal area of trees varies considerably between stands, ranging from 23 to 130 feet²/acre (5.3 to 29.8 m²/ha) in 18 sample stands. Snags and charred boles and downfall are well-represented in burned stands.

Forest understory. The understory is dominated by abundant to very abundant medium, low, and dwarf shrubs. There are usually two relatively distinct shrub layers. The upper layer is approximately 4.5 to 6 feet (1.4 to 1.8 m) in height. The overall dominant medium shrub is *Betula glandulosa*; however, *Salix planifolia* is common in most stands. *S. glauca* and other tall willows are common to well-represented in many stands. The lower shrub layer is composed of a number of low and dwarf ericaceous shrub 0.5 to 3.5 feet (0.2 to 1.1 m) in height. Common to abundant species include *Ledum* spp., *Vaccinium uliginosum*, *V. vitis-idaea*, *Empetrum nigrum*, and *Arctostaphylos rubra*. Total shrub canopy cover ranges from around 45 to 90 percent or more.

Herbs generally are of minor importance in Spruce/shrub birch woodland. Commonly occurring species include *Petasites frigidus*, *Arctagrostis latifolia*, *Equisetum* spp., *Rubus chamaemorus*, and *Carex lugens*. Mosses and lichens on the ground surface range from sparse, scattered patches to nearly continuous, luxuriant cover, depending on fire history and stand age.

Table 5. Ground cover

Tree foliar cover	1-20%
Shrub/vine/liana foliar cover	1-45%
Grass/grasslike foliar cover	1-10%
Forb foliar cover	1-15%
Non-vascular plants	15-60%
Biological crusts	0%
Litter	5-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	2-15%

Table 6. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	–
>0.15 <= 0.3	–	–	–	–
>0.3 <= 0.6	–	–	15-30%	15-30%
>0.6 <= 1.4	–	35-65%	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	10-20%	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

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 described above 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 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. In many stands, *Picea glauca* and/or *P. mariana* saplings, small trees, and relic trees are common to well-represented. 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	1-10%
Shrub/vine/liana foliar cover	1-65%
Grass/grasslike foliar cover	1-65%
Forb foliar cover	1-10%
Non-vascular plants	2-40%
Biological crusts	0%
Litter	1-30%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	1-5%

Figure 4. 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

Additional community tables

Animal community

Habitat is suitable for Moose, Caribou and Grizzly for certain periods of time.

Contributors

Michelle Schuman

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:**
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