USDA Natural Resources
Conservation Service

Ecological site F227XY102AK
Laomy High Flood Plains, Frozen Hogan

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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.

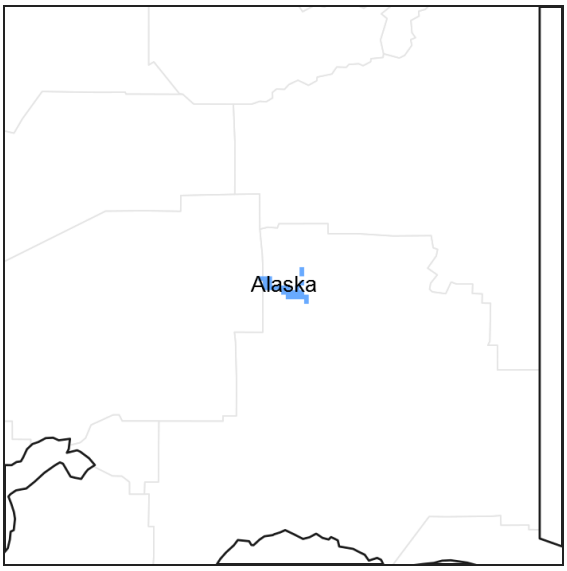

Figure 1. Mapped extent

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) *Picea glauca*
Shrub	(1) *Alnus tenuifolia*
Herbaceous	Not specified

Physiographic features

This site consists of level to moderately sloping, high flood plains formed in stratified loamy alluvium over very gravelly alluvium. Terrace height above the mean summer channel level typically ranges from 5 to 10 feet (1.5 to 3.0 m) and the site is rarely flooded. The surface organic mat is moderately thick and permafrost is usually present within the soil profile. Elevation is generally below about 2400 feet (732 m).

In the Gulkana River area, this site is found along the Main Stem south of canyon rapids and along the lower North and South Branches and the West Fork; to Sourdough. This site undoubtedly occurs along the other low and moderate gradient rivers and streams elsewhere in the Copper River basin.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Terrace

Flooding frequency	Rare
Elevation	564–732 m
Slope	0–6%
Water table depth	91–152 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

The weakly developed soils on this site typically have a mantle of stratified sandy and silty alluvium 12 to more than 60 inches (30 to 152 cm) thick over very gravelly alluvium. The organic mat ranges from 2 to 9 inches (5 to 23 cm) thick and permafrost is usually present at a depth of 14 to 37 inches (36 to 94 cm). Except for a thin saturated zone in spring and early summer, no perched water table is found at the permafrost contact and the soils are well drained.

Table 4. Representative soil features

Surface texture	(1) Very fine sandy loam (2) Loam (3) Silt loam
Family particle size	(1) Loamy
Soil depth	36–94 cm
Available water capacity (0-101.6cm)	0.33–0.41 cm

Ecological dynamics

This site is susceptible to wild fires, which are commonly recurring events in the Copper River basin. In most instances, fire would kill the *Picea glauca* trees and destroy much, if not all, of the existing forest overstory and burn most of the understory back to ground level. Fire also would blacken and at least partially destroy the moss-organic layer on the soil surface, leading to soil warming, a drop in the permafrost level, and increased nutrient availability. It is unlikely, however, that post fire vegetative succession would pass through same seral stages characteristic of flood plain succession that led to the original White spruce/thinleaf alder open forest. The flooding regime, soil moisture patterns, and growing conditions associated with flood plain succession not longer exist. In all probability, vegetative succession would pass through a sequence of scrub and woodland seral stages leading to mixed spruce with *Betula glandulosa* and ericaceous shrubs in the understory and a well-developed moss-organic layer on the soil surface similar to Spruce/shrub birch woodland.
Based on observations and data collected in the Gulkana River area, this site is the end point of site progression and vegetative succession on flood plains within the alder zone. This site develops from site 172Xy100AK - Loamy Flood Plains as additional accretions of alluvium, channel migration, channel down-cutting, or a combination of

these processes increase the height of the terrace surface and decrease the frequency and duration of flooding. White spruce/thinleaf alder open forest on this site is a later successional stage of Balsam poplar-white spruce/thinleaf alder open forest and represents the end point of succession on flood plains.

Eventually periodic flooding all but ceases because of increased terrace height. Continued development and thickening of the organic mat results in a decrease in soil temperatures, a rise in the level of the pemafrost, and a reduction in nutrient availability and cycling. White spruce/ericaceous shrub open forest represents a transitional cover type in the flood plain-stream terrace site progression. This type develops as growing conditions on the site continues to deteriorate and the original white spruce forest on the flood plains begins to die off and be replaced by less productive white and black spruce characteristic of stream terraces. Tall white spruce snags and large diameter downfall are frequent in these stands. Labrador tea, bog blueberry, and other ericaceous shrub and willow, which are well adapted to the nutrient poor sites and begin to increase in abundance and dominate the understory.

Ultimately, site progression and vegetation succession would lead to site 172Xy104AK - Stream Terraces and Spruce/shrub birch woodland and/or 172Xy103AK - Stream Terraces, Frozen and Spruce/spruce muskeg sedge open forest

State and transition model

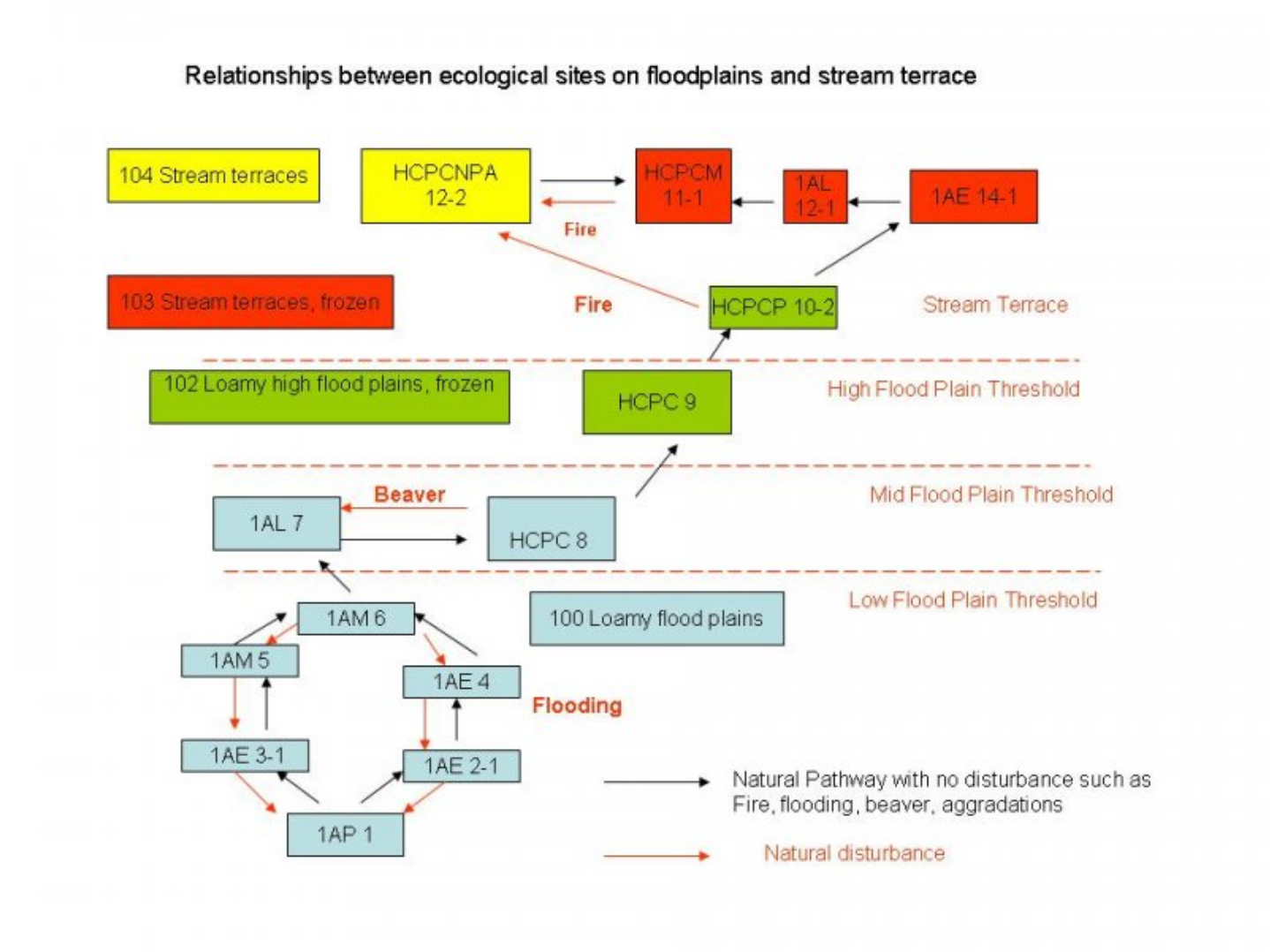

Figure 3. Frozen floodplain and terraces

State 1
White spruce/thinleaf alder open forest

Community 1.1

White spruce/thinleaf alder open forest

White spruce/thinleaf alder open forest is the end point of succession on flood plains. On stream terraces and other sites where permafrost is beginning to form in the soil, this type represents a preliminary stand condition leading to White spruce/ericaceous shrub woodland. With permafrost development, existing *Picea glauca* begin to die out and are replaced by slower growing *P. glauca* and *P. mariana*. Alnus tenuifolia and other species characteristic of flood plains succession begin to be replaced by ericaceous shrubs, feathermoss, and other species characteristic of upland spruce woodland.

Forest overstory. White spruce/thinleaf alder open forest consists of open to occasionally moderately closed stands of Picea glauca. Many stands also have scattered Populus balsamifera.Tree canopy cover ranges from 25 to 70 percent. Occasional woodland stands (10 to 25 percent tree canopy cover) also occur. In the most productive stands, mature white spruce trees are typically 60 to 75 feet (18 to 23 m) in height and 10 to 15 inches (25 to 38 cm) in diameter at breast height. Occasional trees over 80 feet (24 m) in height and 17.5 inches (45 cm) in diameter occur in some stands. Tree basal area ranges from around 132 to 303 feet2/acre (30.3 to 69.5 m2/ha) in 6 sample stands.

Forest understory. A sparse to occasionally moderately closed layer of Alnus tenuifolia (Alnus crispa in some places) 12 to 20 feet (3.7 to 6.1 m) in height characterizes the forest understory. Alder canopy cover ranges from 15 to 70 percent. Most stands have a low and dwarf shrub layer below the alder layer.Important species in this layer include Vaccinium uliginosum, V. vitis-idaea, Rosa acicularis, Salix spp., Ledum spp., and Empetrum nigrum. The herb layer in White spruce/thinleaf alder open forest generally is sparse to moderately open. Important herbs in most stands include Equisetum spp., Calamagrostis canadensis, Arctagrostis latifolia, and Petasites frigidus. The ground surface typically has an open to moderately closed layer of feathermoss. Herbaceous and woody litter cover most of the remainder of the ground surface.

Table 5. Ground cover

Tree foliar cover	1-75%
Shrub/vine/liana foliar cover	1-70%
Grass/grasslike foliar cover	1-20%
Forb foliar cover	1-60%
Non-vascular plants	1-95%
Biological crusts	0%
Litter	5-85%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	1-5%

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	–	–	40-80%	40-80%
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	10-20%	–	–
>4 <= 12	–	–	–	–
>12 <= 24	25-75%	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

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

State 2
White spruce/ericaceous shrub open forest

Community 2.1
White spruce/ericaceous shrub open forest

White spruce/ericaceous shrub open forest represents a transitional stage between White spruce/thinleaf alder open forest (and occasionally White spruce/willow open forest)—the late seral stage of flood plain succession, and Spruce/shrub birch woodland—the major cover type on adjacent stream terraces. In White spruce/ericaceous open forest, the productive *Picea glauca* overstory is dying out and being replaced by a less productive stand of mixed *P. glauca* and *P. mariana*. Flood plain understory species are decreased in abundance while ericaceous shrub, mosses, and other upland species are increased. Changes in the vegetation are likely the effects of the development of permafrost within the soil profile.

Forest overstory. White spruce/ericaceous shrub open forest consists of a woodland to open tall tree layer of mostly decadent Picea glauca and a lower woodland to open tree layer of younger, slower growing P. glauca. P. mariana codominates the lower tree layer in some stands. Trees range from 40 to 70 feet (12.2 to 21.3 m) in height in the upper layer and from 20 to 35 feet (6.1 to 10.7 m) in height in the secondary layer. Total tree canopy cover ranges from 20 to 55 percent in most stands, and up to 70 percent on occasion. Tree basal area in 15 sample stands ranged from 62 to 200 feet2/acre (14.2 to 45.9 m2/ha).

Forest understory. The aspect of the understory is dominated by an open to moderately closed layer of low ericaceous shrubs. Vaccinium uliginosum, V. vitis-idaea, Ledum spp., Empetrum nigrum, and Arctostaphylos rubra are all common to abundant. In many stands, Rosa acicularis, Betula glandulosa, and Salix spp. also are important. Low shrub canopy cover generally ranges from 30 to 65 percent. Height of the low shrub layer is typically between 2 and 4 feet (0.6 and 1.2 m).

The ground layer is dominated by mosses and lichen characteristic of boreal spruce forests. Herbs are generally only common to occasionally abundant. Important herbs include Equisetum spp., Calamagrostis canadensis, Arctagrostis latifolia, and Petasites frigidus. Herbaceous litter and mulch is common, and in places woody litter consisting of medium and large diameter boles of fallen trees is abundant.

Table 7. Ground cover

Tree foliar cover	1-45%
Shrub/vine/liana foliar cover	1-55%

Grass/grasslike foliar cover	1-10%
Forb foliar cover	1-15%
Non-vascular plants	1-85%
Biological crusts	3%
Litter	3-40%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	1-5%

Figure 5. 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

This site is utilized by a wide variety of wildlife. Migrating caribou frequently pass through areas of this site. Limited observations suggest that caribou generally pass through areas closely adjacent to both the river channel and the lacustrine uplands, apparently avoiding extensive dense tall shrub and forest vegetation. Salix alexensis and other willows are occasional to common in many stands and provide limited moose browse. Mature stands of *Picea glauca* provide habitat for marten and weasels, particularly areas with abundant woody debris on the forest floor. Bald Eagles use tall Populus balsamifera and occasionally *Picea glauca* for nest trees; both trees are utilized for perches. The spruce forest provides high quality Spruce Grouse habitat.

Recreational uses

Deteriorating spruce stands in the transitional zone between high flood plains and stream terraces often contain abundant downfall suitable for firewood. Standing dead trees will provide a future source of firewood.

Other information

Insects and Disease Pests and Animal Damage: Porcupine damage to smaller spruce trees is evident in occasional stands. In most observed instances, damage is not extensive enough to kill the trees.

Table 8. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
white spruce	*PIGL*	50	80	11	32	–	–	–	

Contributors

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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):**

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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:

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

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

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

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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:**

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17. **Perennial plant reproductive capability:**
