USDA Natural Resources Conservation Service

Ecological site XA232X01Y221
Boreal Forest Loamy Terraces

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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.

MLRA notes

Major Land Resource Area (MLRA): 232X–Yukon Flats Lowlands

The Yukon Flats Lowlands MLRA is an expansive basin characterized by numerous levels of flood plains and terraces that are separated by minimal breaks in elevation. This MLRA is in Interior Alaska and is adjacent to the middle reaches of the Yukon River. Numerous tributaries of the Yukon River are within the Yukon Flats Lowlands MLRA. The largest are Beaver Creek, Birch Creek, Black River, Chandalar River, Christian River, Dall River, Hadweenzic River, Hodzana River, Porcupine River, and Sheenjek River. The MLRA has two distinct LRU—lowlands and marginal uplands. The lowlands have minimal local relief and are approximately 9,000 square miles in size (Williams 1962). Landforms associated with the lowlands are flood plains and stream terraces. The marginal uplands consist of rolling and dissected plains that are a transitional area between the lowlands and adjacent mountain systems. The marginal uplands are approximately 4,700 square miles in size (Williams 1962).

This MLRA is bounded by the Yukon-Tanana Plateau to the south, Hodzana Highlands to the west, Porcupine Plateau to the east, and southern foothills of the Brooks Range to the north (Williams 1962). These surrounding hills and mountains partially isolate the Yukon Flats Lowlands MLRA from weather systems affecting other MLRAs of Interior Alaska. As a result, temperatures are generally warmer in summer and colder in winter than is characteristic in other areas at comparable latitude. There is a moisture and temperature gradient in which the lowlands region tends to be drier and colder and the surrounding marginal uplands region tends to be moister and warmer (PRISM Climate Group 2006).

The Yukon Flats Lowlands MLRA is mostly undeveloped lands that are sparsely populated and not accessible by a road system. A number of villages, including Beaver, Birch Creek, Chalkyitsik, Circle, Fort Yukon, Stevens Village, and Venetie, are adjacent to the Yukon River or one of its major tributaries. The largest village is Fort Yukon, which according to the 2010 U.S. Census has 583 residents that are dominantly Gwich'in Alaska Natives.

LRU notes

Alaska has no officially recognized LRU. However, there appear to be two distinct LRU in the Yukon Flats Lowlands MLRA. These LRU are thought to have differing climatic regimes, landforms, and soil types (STATSGO and Jorgensen and Meidinger 2015). The two LRU were previously discussed in the MLRA notes section above and are termed the lowlands LRU and the marginal uplands LRU.

This ecological site is associated with the lowlands LRU.

Classification relationships

Yukon Flats Lowlands MLRA.

Ecological site concept

This ecological site is associated with moderately well to well drained soils on the tread of stream terraces in the Yukon Flats Lowlands MLRA. A water table is typically not observed in the soil profile during the growing season. The reference state supports multiple community phases related to a fire regime.

Reference plant community 1.1 is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of mature white spruce. Commonly observed understory species include grayleaf willow, russet buffaloberry, twinflower, purple reedgrass, false toadflax, splendid feathermoss, Ptilidium liverwort, and greygreen reindeer lichen.

Associated sites

XA232X01Y229	**Boreal Scrub Loamy Terrace Swales** This ecological site is associated with swales on stream terraces in lowlands region of the Yukon Flats Lowlands MLRA. Associated soils are considered very poorly drained. The reference plant community is characterized as open tall scrub (Viereck et al. 1992) and the dominant shrubs are willow (Salix spp.) and shrub birch (Betula glandulosa).
XA232X01Y280	**Boreal Scrub Loamy Flood Plain Wet** This ecological site occurs on the flood plain and adjacent terraces of minor, low-gradient tributaries in the lowlands region of the Yukon Flats Lowlands MLRA. The reference plant community is associated with soils that both pond and flood. The reference plant community phase is characterized as closed tall scrub (greater than 75 percent shrub cover; Viereck et al. 1992) primarily composed of a mixture of willow (Salix spp.).
XA232X01Y219	**Boreal Forest Loamy Terraces Moist** This ecological site is associated with somewhat poorly to moderately well drained soils on the treads of stream terraces in the Yukon Flats Lowlands MLRA. Flooding frequency ranges from rare to none. The reference plant community is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of mature white spruce (Picea glauca).
XA232X01Y224	**Boreal Woodland Sandy Terrace Rises** This ecological site is associated with vegetated dunes on treads of stream terraces in the lowlands region of the Yukon Flats Lowlands MLRA. The reference plant community is characterized as a needleleaf woodland (10 to 25 percent cover; Viereck et al. 1992) composed primarily of mature white spruce (Picea glauca).
XA232X01Y222	**Boreal Graminoid Loamy Terrace Depressions** This ecological site is associated with closed depressions of stream terraces that support a reference state with multiple graminoid-dominant community phases. These depressions are considered closed because they are not associated with a flood regime and have limited, if any, groundwater flow or recharge. The presumed hydrological inputs for this ecological site are primarily thaw of the annual active soil layer and/or permafrost, snowmelt runoff, and precipitation. This hydrologic regime results in the development of sodic soil properties.
XA232X01Y262	**Boreal Woodland Gravelly Terraces** This ecological site is associated with wet soils on the tread of gravelly stream terraces in the lowlands region of the Yukon Flats Lowlands MLRA. Gravelly horizons range from very shallow to shallow depths (0 to 20 inches) and soils lack permafrost at depth. The pH of soil horizons commonly range from neutral to moderately alkaline, which leads to diverse species assemblages. The reference plant community phase is characterized as a needleleaf woodland (10 to 25 percent cover; Viereck et al. 1992) composed primarily of black spruce (Picea mariana) and white spruce (Picea glauca).
XA232X01Y201	**Boreal Woodland Peat Frozen Terraces** This ecological site occurs in organic rich bogs in the lowlands and marginal uplands regions of the Yukon Flats Lowlands MLRA. The cumulative thickness of organic material often exceeds 50 inches in the soil profile. Reference state soils are poorly drained and organic material is considered ultra to extremely acidic. The soils associated with the reference plant community generally has permafrost at moderate depth (20 to 40 inches). This ecological site has an alternative state related to thermokarst.
XA232X01Y205	**Boreal Grass Loamy Flood Plain Depressions** This ecological site is associated with depressions on flood plains in the Yukon Flats Lowlands MLRA. The reference state plant communities are associated with soils that both pond and flood. Ponding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). Flooding occurs occasionally for brief durations of time. The reference plant community is characterized as open tall scrub (Viereck et al. 1992) and is primarily composed of willow (Salix spp.).

XA232X01Y206	**Boreal Scrub Loamy Frozen Flood Plain Depressions** This ecological site is associated with depressions on flood plains in the Yukon Flats Lowlands MLRA. The reference state plant communities are associated with soils that both pond and flood. Ponding occurs frequently (greater than 50 times in 100 years) for long durations of time (between 7 and 30 days). Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). The reference plant community is characterized as mesic graminoid herbaceous (Viereck et al. 1992) and is primarily composed of bluejoint (Calamagrostis canadensis).
XA232X01Y209	**Boreal Tussock Loamy Frozen Terraces** This ecological site occurs on stream terraces in the lowlands region of the Yukon Flats Lowlands MLRA. Soils commonly have permafrost at moderate depth (20 to 40 inches) and pond frequently for very long durations. The reference plant community is characterized as open low mixed shrub-sedge tussock bog (Viereck et al. 1992).
XA232X01Y200	**Boreal Scrub Loamy Flood Plain Low** This ecological site is associated with the low flood plain of major tributaries in the Yukon Flats Lowlands MLRA. Flooding occurs frequently (greater than 50 times in 100 years) for long durations of time (between 7 and 30 days). The reference plant community is characterized as closed tall scrub (greater than 75 percent shrub cover; Viereck et al. 1992) primarily composed of a mixture of willow (Salix spp.) and alder (Alder spp.).
XA232X01Y212	**Boreal Sedge Peat Terrace Depressions** This ecological site is associated with drainageways on stream terraces in the lowlands region of the Yukon Flats Lowlands MLRA. Associated drainageways are very poorly drained and have a water table that remains above the soil surface for the entire growing season. The reference plant community phase is characterized as subarctic lowland sedge wet meadow (Viereck et al. 1992) and is composed primarily of water sedge (Carex aquatilis).
XA232X01Y204	**Boreal Forest Loamy Flood Plain High** This ecological site occurs on the high flood plain of major tributaries in the Yukon Flats Lowlands MLRA. Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). The reference plant community is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of mature white spruce (Picea glauca).
XA232X01Y218	**Boreal Woodland Loamy Frozen Terraces** This ecological site is associated with wet soils on the tread of stream terraces in Yukon Flats Lowlands MLRA. Soils generally have permafrost at moderate depth (20 to 40 inches) and pond occasionally for long durations of time. The reference plant community is characterized as a needleleaf woodland (10 to 25 percent cover; Viereck et al. 1992) composed of black spruce (Picea mariana) and white spruce (Picea glauca).
XA232X01Y223	**Boreal Scrub Loamy Frozen Terrace Depressions** This shrubby ecological site occurs in the transitional area between the forested tread of a stream terrace and the graminoid-dominant communities associated with closed, terrace depressions (ecological site R232XY222AK). This site typically occurs between the outer third and lip of these closed depressions. The reference plant community for ecological site is characterized as an open tall scrubland (Viereck et al. 1992) and those shrubs are primarily an assortment of willow (Salix spp.).

Similar sites

XA232X01Y204	**Boreal Forest Loamy Flood Plain High** XA232X01Y204 is on flood plains and has plant community phases related to a flood regime. As compared to XA232X01Y221, white spruce trees associated with site XA232X01Y204 tend to grow larger and have a higher site index value.
XA232X02Y210	**Boreal Forest Loamy Frozen Plains Warm** XA232X02Y210 is associated with dry soils on slopes in the marginal uplands LRU. As compared to XA232X01Y221, white spruce trees associated with site XA232X02Y210 tend to grow larger and have a higher site index value.
XA232X01Y219	**Boreal Forest Loamy Terraces Moist** XA232X01Y219 is in similar landform positions as XA232X01Y221 (tread of stream terraces), but site XA232X01Y219 is associated with wetter soils. As compared to XA232X01Y221 , white spruce trees associated with XA232X01Y219 tend to be smaller and have a lower site index value.

Table 1. Dominant plant species

Tree	(1) *Picea glauca*
Shrub	(1) *Geocaulon lividum* (2) *Calamagrostis purpurascens*
Herbaceous	(1) *Hylocomium splendens* (2) *Ptilidium ciliare*

Legacy ID

F232XY221AK

Physiographic features

This ecological site and its associated plant communities are throughout the Yukon Flats Lowlands MLRA. Given the large spatial extent, the site is associated with a wide array of soil components. The differences in site characteristics among soils of different ages (young and old) and on different landforms are discussed in this section. All of the soil components, however, support similar kinds and amounts of vegetation.

This ecological site and its associated communities commonly occur on young and old terraces. The Yukon Flats Lowlands MLRA is composed of broad and numerous terrace levels. Individual terrace levels commonly span several miles in all directions, but one level to the next can be separated by less than 25 feet in elevation. These terrace levels can be broadly segregated by age. Young terraces are generally proximal to active stream channels and have a recent or current association with a flood regime (rare flooding, 1 to 5 times in 100 years). While capped with organic material, soils on young terraces are primarily composed of alluvium (Gwichin soils). Flight or satellite reconnaissance of young terraces results in observance of readily identifiable stream landforms, which in the Yukon Flats Lowlands MLRA commonly include meander scrolls, abandoned channels, and oxbow lakes (see photo below). Old terraces are generally distal from active stream channels and are disconnected from a flood regime. Soils on old terraces are generally composed of eolian deposits and/or loess underlain by alluvium (Tlozhavun and Choonjik soils). The depositional surface material commonly is thick enough to mask stream landforms like abandoned linear channels. From the air, the depressions appear to be circular to amorphous in shape.

Soils associated with rivers that are currently or have previously been glacially fed have different characteristics than those associated with nonglacial rivers. For instance, glacial rivers that flow out of the southern foothills of the Brooks Range created large gravelly terraces north of the Yukon River (e.g. Sheenjek River). The soils on these terraces tend to have a sandy and gravelly substrata (e.g., Choonjik, gravelly substratum). These coarsely textured soils are unfavorable for permafrost aggradation in the profile. Nonglacial rivers that flow out of the Yukon-Tanana Plateau (e.g., Birch Creek) formed numerous terrace levels south of the Yukon River. The soils on these terrace levels have a loamy substrata that is generally favorable for permafrost aggradation (Choonjik, Gwichin, and Tlozhavun soils).

During the soil survey, many unique soil types were identified because of the differences in the age of the terraces and in the landforms. Each soil type originally had a correspondingly unique ecological site. After more fieldwork and data analysis, it was determined that these wide-ranging soils all appear to support plant communities that respond similarly to fire and have similar kinds and amounts of vegetation in the reference state. For example, the site index for white spruce was similar for all of the correlated soil components, with or without a sandy and gravelly substratum. As a result, the soil components were all correlated into one ecological site.

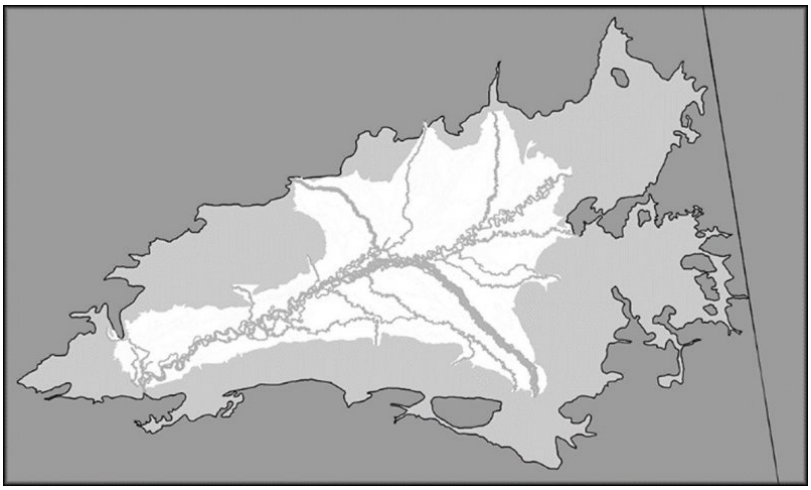


Figure 1. Lowlands (white) and marginal uplands (light gray) LRU of the Yukon Flats Lowlands MLRA.

Figure 2. Aerial image of a meander scroll adjacent to the Yukon River, which is a landform associated with younger terrace surfaces. Well drained soils on this meander scroll that rarely flood support plant communities associated with ecological site F232XY221AK.

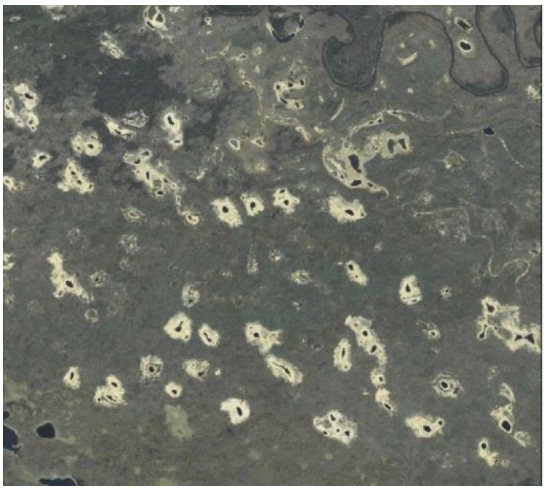


Figure 3. An older stream terrace between the Yukon River and Beaver Creek in the Yukon Flats Lowlands MLRA. Notice the closed depressions that appear to be circular to amorphous in shape.

Table 2. Representative physiographic features

Geomorphic position, terraces	(1) Tread
Landforms	(1) Alluvial plain > Stream terrace (2) Alluvial plain > Stream terrace
Flooding frequency	None to rare

Ponding frequency	None
Elevation	91–305 m
Slope	0–3%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Short, warm summers and long, very cold winters characterize the subarctic continental climate of the area. The surrounding hills and mountains of this MLRA partially isolate it from weather systems affecting other interior lowlands. As a result, temperatures are generally warmer in summer and colder in winter than is characteristic in other areas of comparable latitude. The average annual temperature ranges from about 20 to 25 degrees F (-7 to -4 degrees C). The freeze-free period averages 70 to 120 days. The temperature usually remains above freezing from early June through late August. The average annual precipitation ranges from about 6 inches (150 millimeters) in the central basin to 15 inches (380 millimeters) along the boundary with the surrounding highlands. The maximum precipitation occurs in late summer, mainly as a result of thunderstorms. The average annual snowfall is about 45 to 55 inches (115 to 140 centimeters) (USDA, NRCS 2006).

All of the tabular data below was calculated from the PRISM dataset (1971-2000) and is specific to the Lowlands LRU in the Yukon Flats Lowlands MLRA.

Table 3. Representative climatic features

Frost-free period (characteristic range)	45-97 days
Freeze-free period (characteristic range)	70-120 days
Precipitation total (characteristic range)	203-330 mm
Frost-free period (average)	75 days
Freeze-free period (average)	
Precipitation total (average)	254 mm

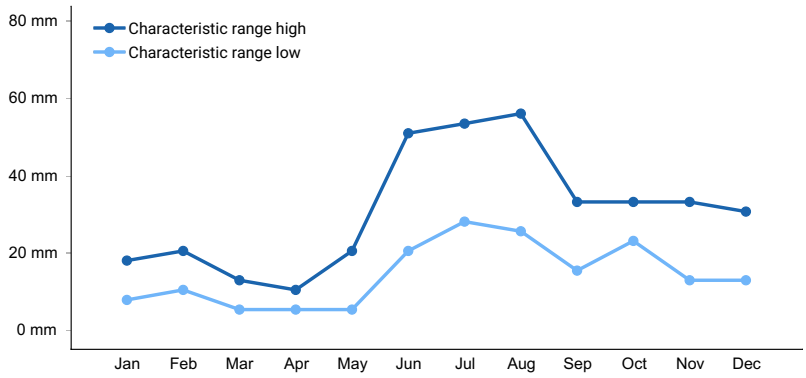


Figure 4. Monthly precipitation range

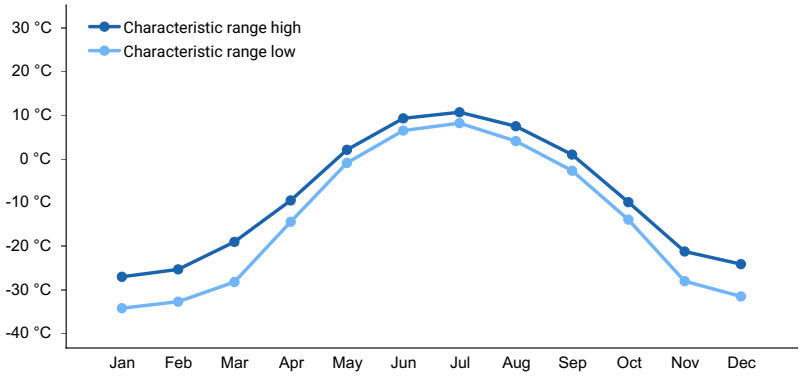


Figure 5. Monthly minimum temperature range

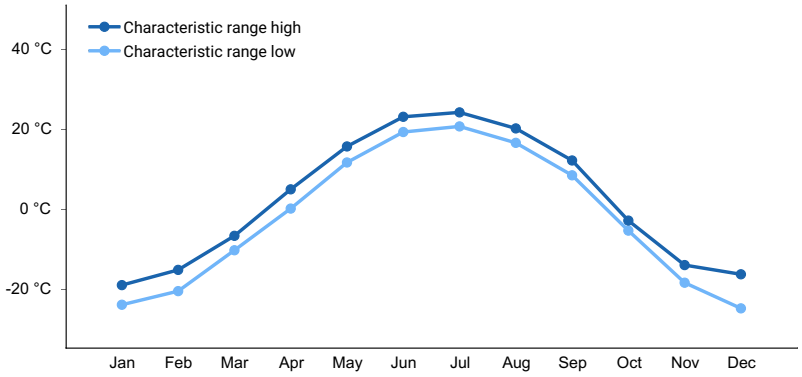


Figure 6. Monthly maximum temperature range

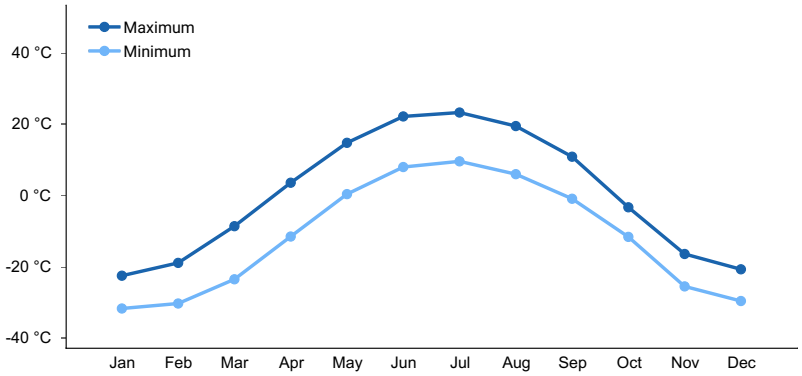


Figure 7. Monthly average minimum and maximum temperature

Influencing water features

Soils associated with this ecological site are generally considered well drained and lack an observable water table for the entire growing season. However, the Gwichin soil component is an exception. Gwichin soils have a water table at moderate depth (between 20 and 40 inches) during the early growing season (May/June). After the early growing season, these soils drain and a water table no longer occurs in the soil profile. In this instance, the seasonal water table does not appear to impact white spruce productivity or increase the presence of wetland indicator species.

Soil features

Correlated soil components for the Yukon Flats Area, Alaska soil survey (AK685): Choonjik; Choonjik, gravelly substratum; Gwichin; Tlozhavun; Tlozhavun, moderately deep over gravel; Tlozhavun, shallow over gravel; Typic Cryorthents.

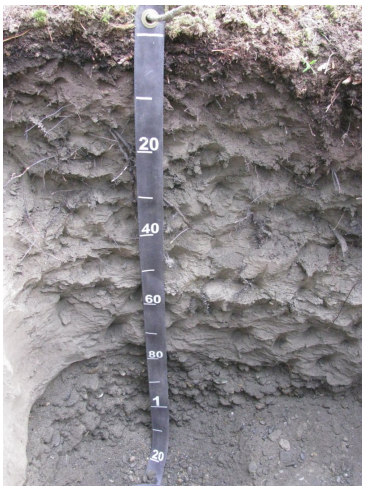


Figure 8. Typical soil profile associated with Tlozhavun, gravelly substratum soil components. Soils with gravelly substratum do not typically have permafrost in the soil profile.

Figure 9. Typical soil profile associated with Choonjik soil component. Soils lacking gravelly substratum can have permafrost at depth.

Table 4. Representative soil features

Parent material	(1) Organic material (2) Loess (3) Alluvium
Family particle size	(1) Coarse-silty over sandy or sandy-skeletal (2) Coarse-loamy (3) Coarse-silty
Drainage class	Moderately well drained to well drained
Soil depth	203 cm

Ecological dynamics

Fire

In the Yukon Flats Lowlands MLRA, fire is a common and natural event that has a significant control on the vegetation dynamics across the landscape. A typical fire event in areas associated with this ecological site will reset the plant succession and alter dynamic soil properties (e.g., presence or thickness of permafrost). For this ecological site to progress from the pioneering fire stage to the reference plant community phase, data suggest that 100 years or more must elapse without another fire event.

When comparing all MLRAs of Interior Alaska, land in the Yukon Flats Lowlands MLRA burns most frequently (Begét et al. 2006). Within this MLRA, fire is considered a natural and common event that typically is unmanaged. Fire suppression generally occurs adjacent to villages or on allotments with known structures, both of which have a

relatively limited acre footprint. From 2000 to 2015, 132 known fire events occurred on land in the Yukon Flats Lowlands MLRA and the burn perimeter of the fires totaled about 4.1 million acres (AICC 2016). Fire-related disturbances are highly patchy and can leave undisturbed areas within the burn perimeter. Ten of the fire events were attributed to human activities (affecting a total of 2,864 acres), but the majority were caused by lightning strikes (AICC 2016).

The fire regime within Interior Alaska follows two basic scenarios—low-severity burns and high-severity burns. It should be noted, however, that the fire regime in Interior Alaska is generally thought to be much more complex (Johnstone et al. 2008). Burn severity refers to the proportion of the vegetative canopy and organic material consumed in a fire event (Chapin et al. 2006). Fires in cool and moist habitat tend to result in low-severity burns, while fires in warm and dry habitat tend to result in high-severity burns. As a result of field observations and because the associated soils are warm and well drained, the typical fire scenario for this ecological site is considered to result in a high-severity burn.

Large portions of the organic mat are consumed during a high-severity fire event, commonly exposing pockets of mineral soil. The loss of this organic mat, which insulates the mineral soil, and the decrease in site albedo tends to cause overall soil temperatures to increase (Hinzman et al. 2006). In areas that have permafrost before a fire event, the increase in soil temperatures leads to a decrease in the depth to the permafrost or loss of permafrost in the soil profile (Hinzman et al. 2006). For this ecological site, permafrost was typically not observed in the soil profiles after recent fire events and a soil component was developed for this change in dynamic soil properties (Typic Cryorthents soils). For soils with loamy substratum, data from fieldwork indicate that permafrost aggradation in the soil profile typically does not occur until community phase 1.2 and that permafrost is commonly associated with community phase 1.1. Fire events also destroy a majority of the vascular and nonvascular biomass above ground.

Field data suggest that each of the forested communities will burn and that fire events will cause a transition to the pioneering stage of fire succession. This stage (community 1.5) is a mix of species that either regenerate in place (e.g., subterranean root crowns for willow and rhizomes for graminoids) and/or from wind-dispersed seed or spores that colonize exposed mineral soil (e.g., quaking aspen [*Populus tremuloides*] and Ceratodon moss [*Ceratodon purpureus*]). The pioneering stage of fire succession is primarily composed of tree seedlings, forbs, grasses, and weedy bryophytes. Willow (Salix spp.) and deciduous tree seedlings continue to colonize and grow on recently burned sites until they become dominant in the overstory, which marks the transition to the early stage of fire succession (community 1.4). In the absence of fire, tree species continue to become more dominant in the stand. The later stages of succession have an overstory that is dominantly deciduous trees (community 1.3), a mix of broadleaf and needleleaf trees (community 1.2), or needleleaf trees (community 1.1).

The time elapsed since the most recent fire event plays a large role in determining the community observed in the field. Using data from the burn perimeter (AICC 2016) and tree age, the pioneering fire stage is thought to persist for up to 10 years post fire and the early fire community persists about 10 to 30 years postfire. After approximately 30 years, an open forest with some combination of aspen and white spruce will persist until the next fire event. Field data suggest that broadleaf trees (primarily quaking aspen) are dominant in the canopy structure during the first 30 to 60 years post fire. During this timeframe, white spruce colonizes and matures in the understory. Eventually, white spruce gains dominance in the overstory and begins to replace the shade-intolerant broadleaf tree species. Late-fire community 1.2 has a mixture of immature and mature white spruce, while the reference community 1.1 has a stand composed primarily of mature white spruce. The average age of white spruce in the reference state is 105 years; therefore, it takes more than a century to progress from the pioneering stage to the reference community phase.

Given the high frequency of fire and its associated footprint, much of the land in the Yukon Flats Lowlands MLRA has burned too recently to support the reference plant community. GIS data and flight reconnaissance have made it apparent that large swaths of mature white spruce forests are uncommon throughout the MLRA. Mixed and open broadleaf forests have the greatest spatial representation in the Yukon Flats Lowlands MLRA.

Flooding

Historical flood markers in Fort Yukon and aerial observations conducted by U.S. Fish and Wildlife Service staff (personal communication) have shown that flooding occurs on the young terraces that support this ecological site.

While conducting fieldwork, little if any evidence of flood-related disturbance was observed. Thus, no flood-related community phases were developed for this ecological site. A flood event in areas associated with this site likely has

limited energy, depositing alluvium on the soil surface but causing minimal alterations to overall composition of the plant community.

Other Observations

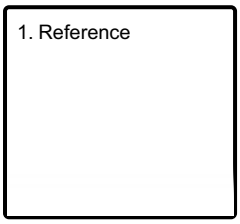
Future research and field studies may determine that the correlated soil components respond differently to anthropogenic disturbance or have varying degrees of agricultural value. In addition, more focused studies on the productivity of forested stands may indicate differences in timber quality among the correlated soil components. The present data, however, support the correlation of multiple soil components to this ecological site.

Animal use (browsing and grazing) of this ecological site primarily consists of slight moose browse on willow and tree regeneration. A browse severity rating of slight on willow and tree regeneration is defined as a majority of individuals having no signs of browsing.

No alternative states for this ecological site were documented.

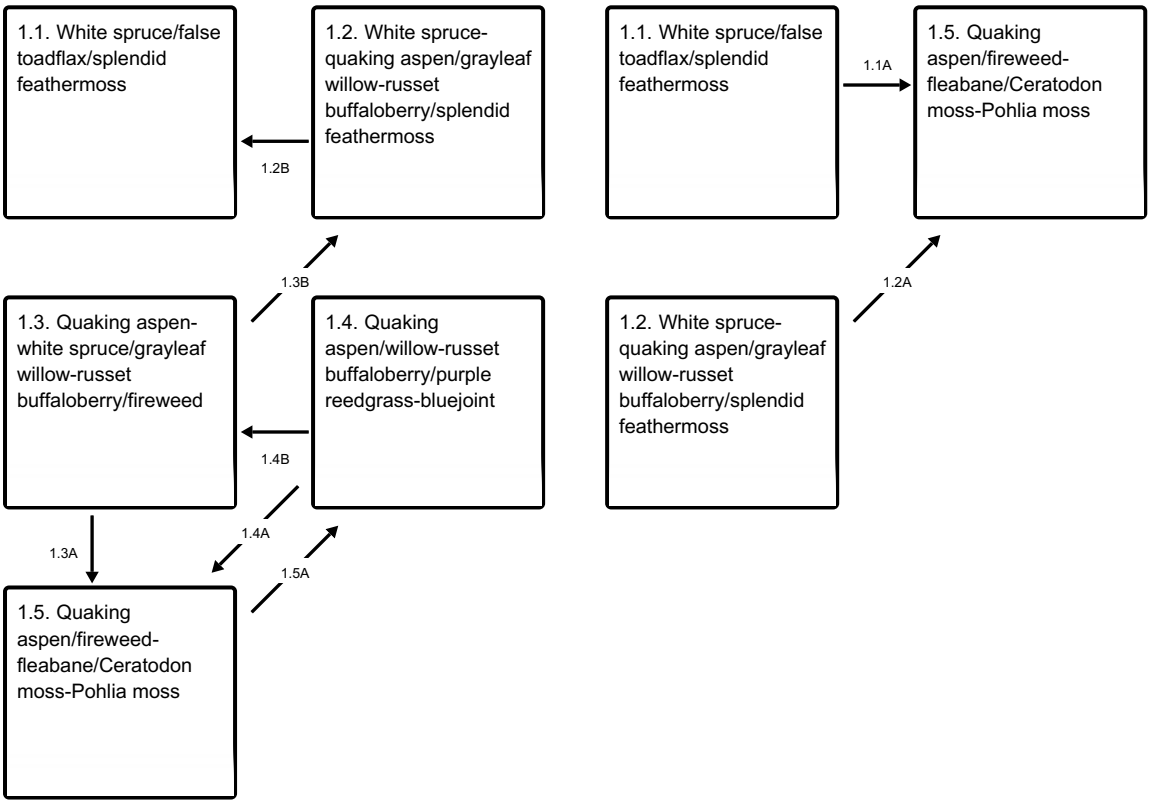
State and transition model

Ecosystem states



State 1 submodel, plant communities

Communities 1, 5 and 2 (additional pathways)



State 1
Reference

Figure 10. Aerial image of a stream terrace in the Yukon Flats Lowlands MLRA. This ecological site occurs on stream terraces in this MLRA.

The reference state has five associated communities. These communities are grouped by the structure and dominance of the vegetation (e.g., coniferous trees, deciduous trees, shrubs, and forbs) and their ecological function and stability. Plant communities in the reference state appear to be largely controlled by the influences of fire. This report provides baseline vegetation inventory data for the ecological site. More data collection is needed to provide further information about existing plant communities and the disturbance regimes that would result in transitions from one community to another. The common and scientific plant names are from the USDA PLANTS database. All community in this report are characterized using the Alaska Vegetation Classification (Viereck et al. 1992).

Community 1.1
White spruce/false toadflax/splendid feathermoss

Figure 11. Typical plant community associated with community 1.1.

Community Phase 1.1 Canopy Cover Table

Vegetation information is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species for this community phase. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
T	white spruce	*Picea glauca*	PIGL	100	45 (20-75)
S	russet buffaloberry	*Shepherdia canadensis*	SHCA	92	3 (0-15)
S	prickly rose	*Rosa acicularis*	ROAC	74	2 (0-20)
S	grayleaf willow	*Salix glauca*	SAGL	72	2 (0-7)
S	twinflower	*Linnaea borealis*	LIBO3	64	3 (0-35)
S	lingonberry	*Vaccinium vitis-idaea*	VAVI	33	4 (0-30)
G	purple reedgrass	*Calamagrostis purpurascens*	CAPU	62	3 (0-15)
F	false toadflax	*Geocaulon lividum*	GELI2	87	8 (0-55)
F	tall bluebells	*Mertensia paniculata*	MEPA	80	1 (0-10)
F	Jakutsk snowparsley	*Cnidium cnidiifolium*	CNCN	56	0.1 (0-1)
F	sidebells wintergreen	*Orthilia secunda*	ORSE	46	1 (0-25)
F	eastern pasqueflower	*Pulsatilla patens*	PUPA5	41	0.1 (0-4)
B	splendid feather moss	*Hylocomium splendens*	HYSP70	97	55 (0-90)
B	Ptilidium liverwort	*Ptilidium ciliare*	PTCI	41	5 (0-30)
L	greygreen reindeer lichen	*Cladina rangiferina*	CLRA60	64	2 (0-10)
L	felt lichen	*Peltigera aphthosa*	PEAP60	56	2 (0-30)
L	cup lichen	*Cladonia spp.*	CLADO3	54	1 (0-8)

This dataset comes from 39 sample plots. The plots occur across the survey area and are independent of one another.

Values for tall, medium, regenerative, and stunted tree strata are used to calculate mean canopy cover and range values. Regenerative trees are not considered part of the overstory canopy.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, and L = lichens.

Figure 12. Canopy cover table for community 1.1.

The reference plant community is characterized as an open needleleaf forest (25 to 60 percent cover; Viereck et al. 1992) composed primarily of mature white spruce. The majority of the white spruce trees are similar in size and age, and the tree cover is primarily in the tall tree stratum (greater than 40 feet in height). Gaps occur in the tree canopy, but they are limited in size and extent and are likely the result of occasional windthrow. Live deciduous trees, primarily quaking aspen, occasionally occur in the tree canopy, but most have been replaced by white spruce. The soil surface is primarily covered with bryophytes. Commonly observed understory species include grayleaf willow, russet buffaloberry, twinflower, purple reedgrass, false toadflax, splendid feathermoss, Ptilidium liverwort, and greygreen reindeer lichen. The understory vegetative strata that characterize this community are bryophytes, medium forbs (4 to 24 inches in height), and dwarf shrubs (less than 8 inches in height). White spruce trees were sampled for diameter at breast height (dbh), height, and age at dbh (150 trees, 6 without age data). The basal area of the stand and the site index were determined for each sample plot. The mean dbh is 8.6 inches (ranging from 2.2 to 19.7), the mean height is 55 feet (ranging from 19 to 96 feet), and the mean age is 105 years (ranging from 61 to 180 years). The mean basal area of the stands is 115 (ranging from 72 to 216), and mean site index is 54 (ranging from 37 to 73) (Farr 1967).

Dominant plant species

- white spruce (*Picea glauca*), tree
- russet buffaloberry (*Shepherdia canadensis*), shrub
- prickly rose (*Rosa acicularis*), shrub
- grayleaf willow (*Salix glauca*), shrub
- twinflower (*Linnaea borealis*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- purple reedgrass (*Calamagrostis purpurascens*), grass
- false toadflax (*Geocaulon lividum*), other herbaceous
- tall bluebells (*Mertensia paniculata*), other herbaceous
- Jakutsk snowparsley (*Cnidium cnidiifolium*), other herbaceous
- sidebells wintergreen (*Orthilia secunda*), other herbaceous
- eastern pasqueflower (*Pulsatilla patens*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous

- (*Ptilidium ciliare*), other herbaceous
- greygreen reindeer lichen (*Cladina rangiferina*), other herbaceous
- felt lichen (*Peltigera aphthosa*), other herbaceous
- cup lichen (*Cladonia*), other herbaceous

Community 1.2
White spruce-quaking aspen/grayleaf willow-russet buffaloberry/splendid feathermoss

Figure 13. Typical community associated with community 1.2.

Community Phase 1.2 Canopy Cover Table

Vegetation information is provided as a frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species for this community phase. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
T	white spruce	*Picea glauca*	PIGL	100	35 (10-70)
T	quaking aspen	*Populus tremuloides*	POTR5	88	9 (0-50)
S	russet buffaloberry	*Shepherdia canadensis*	SHCA	96	7 (0-40)
S	prickly rose	*Rosa acicularis*	ROAC	76	2 (0-15)
S	grayleaf willow	*Salix glauca*	SAGL	69	4 (0-25)
S	kinnikinnick	*Arctostaphylos uva-ursi*	ARUV	51	5 (0-35)
G	purple reedgrass	*Calamagrostis purpurascens*	CAPU	51	4 (0-40)
F	false toadflax	*Geocaulon lividum*	GELI2	74	6 (0-40)
F	tall bluebells	*Mertensia paniculata*	MEPA	71	1 (0-7)
F	fireweed	*Chamerion angustifolium*	CHAN9	61	1 (0-7)
B	stairstep moss	*Hylocomium splendens*	HYSP70	90	25 (0-85)
L	felt lichen	*Peltigera spp.*	PELTI2	88	3 (0-30)
L	shield lichen	*Parmelia sulcata*	PASU63	71	0.1 (0-0.1)
L	deer moss	*Cladonia spp.*	CLADO3	61	1 (0-10)
L	Cetraria lichen	*Cetraria spp.*	CETRA2	53	0.1 (0-0.1)
L	reindeer lichen	*Cladina spp.*	CLADI3	43	1 (0-13)

This dataset includes data from 49 sample plots. The plots are distributed across the survey area and are independent of one another.

Values for tall, medium, regenerative, and stunted tree strata are used to calculate mean canopy cover and range values. Regenerative trees are not considered part of the overstory canopy.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, and L = lichens.

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

Figure 14. Canopy cover table for community 1.2.

Community 1.2 is in the late stage of fire-induced secondary succession for this ecological site. It is characterized as an open mixed forest (25 to 60 percent cover; Viereck et al. 1992). Deciduous trees are starting to be replaced by white spruce in the tree canopy. White spruce cover is generally split between immature medium-sized trees (15 to 40 feet in height) and mature tall trees (greater than 40 feet in height). The soil surface is primarily covered with herbaceous litter and bryophytes. Commonly observed understory species include grayleaf willow, russet buffaloberry, prickly rose, purple reedgrass, false toadflax, and splendid feathermoss. The understory vegetative

strata that characterize this community are bryophytes, medium forbs (4 to 24 inches in height), and dwarf shrubs (less than 8 inches in height). White spruce trees were sampled for diameter at breast height (dbh), height, and age at dbh (139 trees, 10 without age data). The basal area of the stand and the site index were determined for each sample plot. The mean dbh is 6.7 (ranging from 1.8 to 19.4), the mean height is 42 feet (ranging from 16 to 88 feet), and the mean age is 68 years (ranging from 36 to 132 years). The mean basal area of the stands is 84 (ranging from 30 to 198).

Dominant plant species

- white spruce (*Picea glauca*), tree
- quaking aspen (*Populus tremuloides*), tree
- russet buffaloberry (*Shepherdia canadensis*), shrub
- prickly rose (*Rosa acicularis*), shrub
- grayleaf willow (*Salix glauca*), shrub
- kinnikinnick (*Arctostaphylos uva-ursi*), shrub
- purple reedgrass (*Calamagrostis purpurascens*), grass
- false toadflax (*Geocaulon lividum*), other herbaceous
- tall bluebells (*Mertensia paniculata*), other herbaceous
- fireweed (*Chamerion angustifolium*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- felt lichen (*Peltigera*), other herbaceous
- shield lichen (*Parmelia sulcata*), other herbaceous
- cup lichen (*Cladonia*), other herbaceous
- cetraria lichen (*Cetraria*), other herbaceous
- reindeer lichen (*Cladina*), other herbaceous

Community 1.3
Quaking aspen-white spruce/grayleaf willow-russet buffaloberry/fireweed

Figure 15. Typical plant community associated with community 1.3.

Community Phase 1.3 Canopy Cover Table

Vegetation information is provided as a frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species for this community phase. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
T	quaking aspen	*Populus tremuloides*	POTR5	100	50 (10-75)
T	white spruce	*Picea glauca*	PIGL	86	6 (0-20)
S	russet buffaloberry	*Shepherdia canadensis*	SHCA	100	20 (1-50)
S	prickly rose	*Rosa acicularis*	ROAC	86	5 (0-20)
S	grayleaf willow	*Salix glauca*	SAGL	71	9 (0-40)
S	kinnikinnick	*Arctostaphylos uva-ursi*	ARUV	71	7 (0-60)
S	twinflower	*Linnaea borealis*	LIBO3	38	4 (0-35)
S	Bebb willow	*Salix bebbiana*	SABE2	33	2 (0-30)
G	purple reedgrass	*Calamagrostis purpurascens*	CAPU	57	4 (0-20)
F	fireweed	*Chamerion angustifolium*	CHAN9	91	3 (0-20)
F	eastern pasqueflower	*Pulsatilla patens*	PUPA5	52	1 (0-7)
F	northern bedstraw	*Galium boreale*	GABO2	48	1 (0-10)
F	tall bluebells	*Mertensia paniculata*	MEPA	48	1 (0-3)

This dataset includes data from 21 sample plots. The plots are distributed across the survey area and are independent of one another.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, and L = lichens.

Values for tall, medium, regenerative, and stunted tree strata are used to calculate mean canopy cover and range values. Regenerative trees are not considered part of the overstory canopy.

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

Figure 16. Canopy cover table for community 1.3.

Community phase 1.3 is in the middle stage of fire-induced secondary succession for this ecological site. It is characterized as an open broadleaf forest (25 to 60 percent cover; Viereck et al. 1992). Deciduous trees, primarily quaking aspen, are dominant in the tree canopy, and the majority of the tree cover is in the medium tree stratum (15 to 40 feet in height). Seedlings of white spruce commonly are throughout the understory. The forest floor is primarily covered with herbaceous litter. Commonly observed understory species include grayleaf willow, russet buffaloberry, prickly rose, kinnikinnick, purple reedgrass, and fireweed. The understory vegetative strata that characterize this community are low shrubs (8 to 36 inches in height), dwarf shrubs (less than 8 inches in height), and medium shrubs (3 to 10 feet in height). White spruce trees were sampled for diameter at breast height (dbh), height, and age at dbh (40 trees). The basal area of the stand and the site index were determined for each sample plot. The mean dbh is 4.5 (ranging from 1.3 to 12.6), the mean height is 27 feet (ranging from 8 to 69 feet), and the mean age is 35 years (ranging from 11 to 75 years). The mean basal area of the stands is 55 (ranging from 30 to 80).

Dominant plant species

- quaking aspen (*Populus tremuloides*), tree
- white spruce (*Picea glauca*), tree
- russet buffaloberry (*Shepherdia canadensis*), shrub
- prickly rose (*Rosa acicularis*), shrub
- grayleaf willow (*Salix glauca*), shrub
- kinnikinnick (*Arctostaphylos uva-ursi*), shrub
- twinflower (*Linnaea borealis*), shrub
- Bebb willow (*Salix bebbiana*), shrub
- purple reedgrass (*Calamagrostis purpurascens*), grass
- fireweed (*Chamerion angustifolium*), other herbaceous
- eastern pasqueflower (*Pulsatilla patens*), other herbaceous
- northern bedstraw (*Galium boreale*), other herbaceous
- tall bluebells (*Mertensia paniculata*), other herbaceous

Community 1.4

Quaking aspen/willow-russet buffaloberry/purple reedgrass-bluejoint

Figure 17. Typical community associated with community 1.4.

Community Phase 1.4 Canopy Cover Table

Vegetation information is provided as a frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species for this community phase. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
T	quaking aspen	*Populus tremuloides*	POTR5	100	15 (0.1-30)
T	white spruce	*Picea glauca*	PIGL	100	2 (0.1-5)
T	balsam poplar	*Populus balsamifera*	POBA2	40	3 (0-11)
S	russet buffaloberry	*Shepherdia canadensis*	SHCA	100	10 (1-20)
S	prickly rose	*Rosa acicularis*	ROAC	100	4 (0.1-10)
S	grayleaf willow	*Salix glauca*	SAGL	80	15 (0-40)
S	kinnikinnick	*Arctostaphylos uva-ursi*	ARUV	60	2 (0-5)
S	Bebb willow	*Salix bebbiana*	SABE2	40	15 (0-60)
S	littletree willow	*Salix arbusculoides*	SAAR3	40	3 (0-10)
G	purple reedgrass	*Calamagrostis purpurascens*	CAPU	40	15 (0-40)
G	bluejoint	*Calamagrostis canadensis*	CACA4	40	5 (0-15)
F	fireweed	*Chamerion angustifolium*	CHAN9	100	2 (0.1-10)
F	fleabane	*Erigeron sp.*	ERIGE2	80	1 (0-2)

This dataset includes data from five sample plots. The plots are distributed across the survey area and are independent of one another.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, and L = lichens.

Values for tall, medium, regenerative, and stunted tree strata are used to calculate mean canopy cover and range values. Regenerative trees are not considered part of the overstory canopy.

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

Figure 18. Canopy cover table for community 1.4.

Community 1.4 is in the early stage of fire-induced secondary succession for this ecological site. It is characterized as open tall scrubland (Viereck et al. 1992). The overstory canopy is primarily composed of willow and broadleaf tree species, commonly quaking aspen. Tree cover primarily is in the regenerative tree stratum (less than 15 feet in height). White spruce seedlings are common in the understory, but they are not abundant. The soil surface is primarily covered with herbaceous litter and woody debris. Commonly observed understory species include an assortment of willow (dominantly S. glauca and S. bebbiana), russet buffaloberry, prickly rose, kinnikinnick, purple reedgrass, bluejoint, fireweed, and horsetail. The understory vegetative strata that characterize this community are medium shrubs (3 to 10 feet in height), low shrubs (8 to 36 inches in height), and dwarf forbs (less than 4 inches in height).

Dominant plant species

- quaking aspen (*Populus tremuloides*), tree

- white spruce (*Picea glauca*), tree
- balsam poplar (*Populus balsamifera*), tree
- russet buffaloberry (*Shepherdia canadensis*), shrub
- prickly rose (*Rosa acicularis*), shrub
- grayleaf willow (*Salix glauca*), shrub
- kinnikinnick (*Arctostaphylos uva-ursi*), shrub
- Bebb willow (*Salix bebbiana*), shrub
- littletree willow (*Salix arbusculoides*), shrub
- purple reedgrass (*Calamagrostis purpurascens*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- fireweed (*Chamerion angustifolium*), other herbaceous
- fleabane (*Erigeron*), other herbaceous

Community 1.5
Quaking aspen/fireweed-fleabane/Ceratodon moss-Pohlia moss

Figure 19. Typical community associated with community 1.5.

Community Phase 1.5 Canopy Cover Table

Vegetation information is provided as a frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species for this community phase. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
T	quaking aspen	*Populus tremuloides*	POTR5	89	15 (0-70)
S	prickly rose	*Rosa acicularis*	ROAC	67	2 (0-10)
S	grayleaf willow	*Salix glauca*	SAGL	56	2 (0-10)
S	Bebb willow	*Salix bebbiana*	SABE2	56	2 (0-15)
S	russet buffaloberry	*Shepherdia canadensis*	SHCA	50	2 (0-10)
G	Pumpelly's brome	*Bromus inermis ssp. pumpellianus*	BRINP5	50	3 (0-20)
G	bluejoint	*Calamagrostis canadensis*	CACA4	50	3 (0-25)
G	purple reedgrass	*Calamagrostis purpurascens*	CAPU	33	3 (0-20)
F	fireweed	*Chamerion angustifolium*	CHAN9	100	35 (1-90)
F	fleabane	*Erigeron spp.*	ERIGE2	61	3 (0-45)
B	ceratodon moss	*Ceratodon purpureus*	CEPU12	50	15 (0-80)
B	*Pohlia* moss	*Pohlia nutans*	PONU70	17	7 (0-45)

This dataset includes data from 18 sample plots. The plots are distributed across the survey area and are independent of one another.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, and L = lichens.

Values for tall, medium, regenerative, and stunted tree strata are used to calculate mean canopy cover and range values. Regenerative trees are not considered part of the overstory canopy.

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

Figure 20. Canopy cover table for community 1.5.

Community 1.5 is in the pioneering stage of fire-induced secondary succession for this ecological site. It is characterized as a mesic forb herbaceous community (Viereck et al. 1992). Tree cover primarily is in the regenerative tree stratum (less than 15 feet in height). Deciduous tree seedlings, primarily quaking aspen, are common throughout the community. Although small areas of exposed bare soil are common, the soil surface is primarily covered with a mixture of weedy bryophyte species, woody debris, and herbaceous litter. Commonly observed species include an assortment of willow, russet buffaloberry, prickly rose, kinnikinnick, purple reedgrass, bluejoint, fireweed, and horsetail. Understory stratum with the most combined cover are medium forbs (4 to 24 inches in height), bryophytes, tall graminoids (greater than 24 inches in height), and medium shrubs (3 to 10 feet in height).

Dominant plant species

- quaking aspen (*Populus tremuloides*), tree
- prickly rose (*Rosa acicularis*), shrub
- grayleaf willow (*Salix glauca*), shrub
- Bebb willow (*Salix bebbiana*), shrub
- russet buffaloberry (*Shepherdia canadensis*), shrub
- Pumpelly's brome (*Bromus inermis ssp. pumpellianus var. pumpellianus*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- purple reedgrass (*Calamagrostis purpurascens*), grass
- fireweed (*Chamerion angustifolium*), other herbaceous
- fleabane (*Erigeron*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous
- pohlia moss (*Pohlia nutans*), other herbaceous

Table 5. Woody ground cover

Downed wood, fine-small (<0.40" diameter; 1-hour fuels)	–
Downed wood, fine-medium (0.40-0.99" diameter; 10-hour fuels)	–

Downed wood, fine-large (1.00-2.99" diameter; 100-hour fuels)	–
Downed wood, coarse-small (3.00-8.99" diameter; 1,000-hour fuels)	–
Downed wood, coarse-large (>9.00" diameter; 10,000-hour fuels)	–
Tree snags** (hard***)	–
Tree snags** (soft***)	2-60%
Tree snag count** (hard***)	
Tree snag count** (hard***)	

*** Decomposition Classes: N - no or little integration with the soil surface; I - partial to nearly full integration with the soil surface.**

**** >10.16cm diameter at 1.3716m above ground and >1.8288m height--if less diameter OR height use applicable down wood type; for pinyon and juniper, use 0.3048m above ground.**

***** Hard - tree is dead with most or all of bark intact; Soft - most of bark has sloughed off.**

Pathway 1.1A
Community 1.1 to 1.5

White spruce/false toadflax/splendid feathermoss

Quaking aspen/fireweed-fleabane/Ceratodon moss-Pohlia moss

Fire.

Pathway 1.2B
Community 1.2 to 1.1

White spruce-quaking aspen/grayleaf willow-russet buffaloberry/splendid feathermoss

White spruce/false toadflax/splendid feathermoss

Time without fire.

Pathway 1.2A
Community 1.2 to 1.5

White spruce-quaking aspen/grayleaf willow-russet buffaloberry/splendid feathermoss

Quaking aspen/fireweed-fleabane/Ceratodon moss-Pohlia moss

Fire.

Pathway 1.3B
Community 1.3 to 1.2

Quaking aspen-white spruce/grayleaf willow-russet buffaloberry/fireweed

White spruce-quaking aspen/grayleaf willow-russet buffaloberry/splendid feathermoss

Pathway 1.3A
Community 1.3 to 1.5

Quaking aspen-white spruce/grayleaf willow-russet buffaloberry/fireweed

Quaking aspen/fireweed-fleabane/Ceratodon moss-Pohlia moss

Fire.

Pathway 1.4B
Community 1.4 to 1.3

Quaking aspen/willow-russet buffaloberry/purple reedgrass-bluejoint

Quaking aspen-white spruce/grayleaf willow-russet buffaloberry/fireweed

Time without fire.

Pathway 1.4A
Community 1.4 to 1.5

Quaking aspen/willow-russet buffaloberry/purple reedgrass-bluejoint

Quaking aspen/fireweed-fleabane/Ceratodon moss-Pohlia moss

Fire.

Pathway 1.5A
Community 1.5 to 1.4

Quaking aspen/fireweed-fleabane/Ceratodon moss-Pohlia moss

Quaking aspen/willow-russet buffaloberry/purple reedgrass-bluejoint

Time without fire.

Additional community tables

Table 6. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
white spruce	PIGL	*Picea glauca*	Native	5.8–29.3	20–75	5.6–50	–

Table 7. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)

Table 8. Community 1.2 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
white spruce	PIGL	*Picea glauca*	Native	4.9–26.8	10–70	4.6–49.3	–
quaking aspen	POTR5	*Populus tremuloides*	Native	–	–	–	–

Table 9. Community 1.3 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
quaking aspen	POTR5	*Populus tremuloides*	Native	–	10–75	–	–
white spruce	PIGL	*Picea glauca*	Native	2.4–21	0–20	3.3–32	–

Table 10. Community 1.4 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
quaking aspen	POTR5	*Populus tremuloides*	Native	0.3–4.6	0.1–30	–	–
balsam poplar	POBA2	*Populus balsamifera*	Native	0.3–4.6	0–11	–	–
white spruce	PIGL	*Picea glauca*	Native	0.3–4.6	0.1–5	–	–

Table 11. Community 1.5 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
quaking aspen	POTR5	*Populus tremuloides*	Native	0.3–4.6	0–70	–	–

Table 12. 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*	37	73	–	–	–	–	–	

Inventory data references

NASIS User Site ID / Modal Datasets
10BL00903 F232XY221AK community 1.1
10BL01403 F232XY221AK community 1.1
10BL02004 F232XY221AK community 1.1
11BB05305 F232XY221AK community 1.1
11BB06202 F232XY221AK community 1.1
11BB06705 F232XY221AK community 1.1
11BB07301 F232XY221AK community 1.1
11TD09201 F232XY221AK community 1.1
12NR00403 F232XY221AK community 1.1
12NR00603 F232XY221AK community 1.1
12NR02003 F232XY221AK community 1.1
12NR02602 F232XY221AK community 1.1
12NR02802 F232XY221AK community 1.1
12SN00203 F232XY221AK community 1.1
12SN01202 F232XY221AK community 1.1
12TR00603 F232XY221AK community 1.1
12TR00803 F232XY221AK community 1.1
13BA00902 F232XY221AK community 1.1
13BA01501 F232XY221AK community 1.1
13BA01702 F232XY221AK community 1.1
13NR01405 F232XY221AK community 1.1
13NR01501 F232XY221AK community 1.1
13NR02103 F232XY221AK community 1.1
14AK2903031 F232XY221AK community 1.1
14DM00303 F232XY221AK community 1.1
14NR02101 F232XY221AK community 1.1
14NR02501 F232XY221AK community 1.1
14NR02701 F232XY221AK community 1.1
14NR02904 F232XY221AK community 1.1
2015AK290461 F232XY221AK community 1.1
2015AK290621 F232XY221AK community 1.1
2015AK290624 F232XY221AK community 1.1
2015AK290667 F232XY221AK community 1.1
2015AK290989 F232XY221AK community 1.1
2015AK290997 F232XY221AK community 1.1
S2012AK290002 F232XY221AK community 1.1
S2013AK290001 F232XY221AK community 1.1
S2014AK290001 F232XY221AK community 1.1
S2014AK290002 F232XY221AK community 1.1
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10BB01101 F232XY221AK community 1.2
10BB01203 F232XY221AK community 1.2
10BB01302 F232XY221AK community 1.2
10BB01303 F232XY221AK community 1.2
10BB01603 F232XY221AK community 1.2
10BB01903 F232XY221AK community 1.2
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14NR02503 F232XY221AK community 1.5

Type locality

Location 1: Yukon-Koyukuk County, AK	
Latitude	66° 27′ 49″
Longitude	-145° 40′ 41″

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Contributors

Blaine T. Spellman

Approval

Michael Margo, 5/18/2020

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	05/11/2020
Approved by	Michael Margo
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:**

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

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

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

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

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

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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:**
