USDA Natural Resources Conservation Service

Ecological site XA232X02Y227
Boreal Forest Loamy Frozen Plains Cold

Last updated: 5/18/2020
Accessed: 05/11/2025

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 regions—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 uplands LRU.

Classification relationships

Yukon Flats Lowlands MLRA.

Ecological site concept

This ecological site occurs in the marginal uplands region of the Yukon Flats Lowlands MLRA. The marginal uplands are characterized by broad and extensive plains. This ecological site occurs on colder slopes of these plains. Associated soils have very deep loess deposition and range from poorly to somewhat poorly drained. The reference state supports multiple community phases related to a fire regime.

The reference plant community phase is characterized as an open needleleaf forest (25 to 60 percent cover; Viereck et al. 1992) primarily composed of black spruce (Picea mariana). Commonly observed understory species include bog Labrador tea (*Ledum groenlandicum*), marsh Labrador tea (Ledum palustre ssp. decumbens), lingonberry (Vaccinium vitis-idaea), prickly rose (Rosa acicularis), black crowberry (Empetrum nigrum), Bigelow's sedge (Carex bigelowii), dwarf scouringrush (Equisetum scirpoides), splendid feathermoss (Hylocomium splendens), and a mixture of reindeer lichen (Cladina spp.).

Associated sites

XA232X02Y203	**Boreal Scrub Loamy Frozen Drainages** This ecological site occurs in the marginal uplands region of the Yukon Flats Lowlands MLRA. This ecological site occurs in drainageways on these plains. Associated soils flood occasionally (5 to 50 times in 100 years) for long durations of time (between 7 and 30 days). Soils range from poorly to very poorly drained. The reference plant community is characterized as closed tall scrub (Viereck et al. 1992). Black spruce commonly occurs but cover is generally low.
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.
XA232X02Y210	**Boreal Forest Loamy Frozen Plains Warm** This ecological site occurs in the marginal uplands region of the Yukon Flats Lowlands MLRA. The marginal uplands are characterized by broad and extensive plains. This ecological site occurs on warm slopes of these plains. Associated soils have very deep loess deposition and are well drained. The reference plant community phase is characterized as an open needleleaf forest (25 to 60 percent cover; Viereck et al. 1992) primarily composed of mature white spruce (Picea glauca).
XA232X02Y211	**Boreal Loamy Escarpments** This ecological site is associated with steep and erosive escarpments in the marginal uplands region of the Yukon Flats Lowlands MLRA. During field work, these escarpments were not sampled and this ecological site is currently a provisional concept.
XA232X02Y217	**Boreal Woodland Loamy Frozen Plain Wet** This ecological site occurs where water accumulates on the slopes (i.e. lower third of slopes and swales) of the marginal uplands region of the Yukon Flats Lowlands MLRA. The marginal uplands are characterized by broad and extensive plains. Associated soils have very deep loess deposition, are prone to ponding, and are poorly drained. The reference plant community is characterized as needleleaf woodland (10 to 25 percent cover; Viereck et al. 1992) primarily composed of black spruce (Picea mariana).

Similar sites

XA232X01Y262	**Boreal Woodland Gravelly Terraces** This ecological site has similar reference state plant communities but occurs on gravelly stream terraces in the Lowlands LRU in the Yukon Flats Lowlands MLRA.
XA232X01Y218	**Boreal Woodland Loamy Frozen Terraces** This ecological site has similar reference state plant communities but occurs on stream terraces in the Lowlands LRU in the Yukon Flats Lowlands MLRA.
XA232X02Y217	**Boreal Woodland Loamy Frozen Plain Wet** XA232X02Y217 supports black spruce woodlands in wetter landform positions adjacent to this ecological site.

Table 1. Dominant plant species

Tree	(1) *Picea mariana*
Shrub	(1) *Ledum* (2) *Vaccinium vitis-idaea*
Herbaceous	(1) *Hylocomium splendens*

Legacy ID

F232XY227AK

Physiographic features

This ecological site and its associated plant communities occur on rises of plains in the marginal uplands region of the Yukon Flats Lowlands MLRA. The marginal uplands are characterized by broad and extensive plains. Due to weathering, these plains are often highly dissected and often resemble hill complexes. In areas where plains are highly dissected, slopes can be steep. This ecological site is associated with areas within the marginal uplands that have very deep accumulations of loess (greater than 60 inches).

Four ecological sites were observed on slopes of these loess covered plains. This ecological site is associated with rises on colder slopes (e.g. north facing and moderately steep slopes). Ecological site XA232X02Y210 is associated with rises on warmer slopes (e.g. south facing or steep slopes). Ecological site XA232X02Y217 occurs in positions where water accumulates on the slopes (e.g. lower third of slopes or in swales). Ecological site XA232X02Y211 is associated with steep and erosive escarpments on slopes. These differences in site characteristics lead to dramatically different assemblages of vegetation and resulted in unique ecological site concepts.

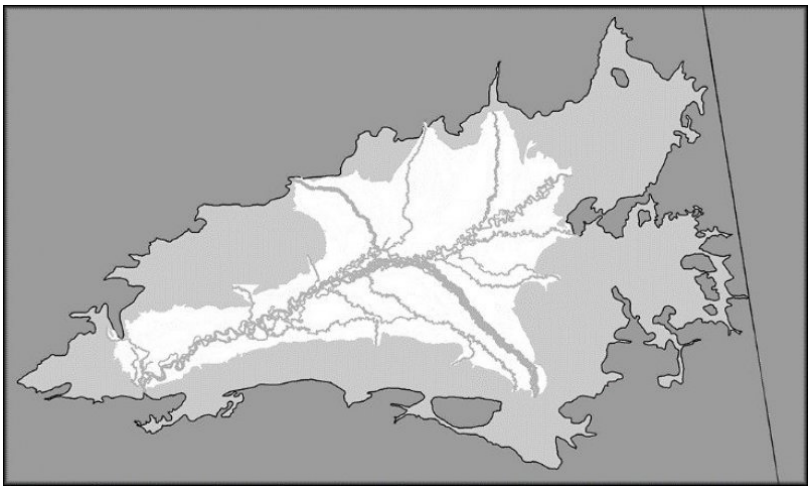


Figure 1. Lowlands (white) and marginal uplands (light gray) LRU in the Yukon Flats Lowlands MLRA.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Rise
Hillslope profile	(1) Footslope (2) Toeslope (3) Backslope
Landforms	(1) Plains > Hillslope (2) Plains > Plain
Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	300–1,350 ft

Slope	3–35%
Water table depth	10–20 in
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).

The tabular data in this report is specific to the marginal uplands LRU in the Yukon Flats Lowlands MLRA. All tabular data was calculated from the PRISM dataset (1971-2000).

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)	9-22 in
Frost-free period (average)	75 days
Freeze-free period (average)	
Precipitation total (average)	11 in

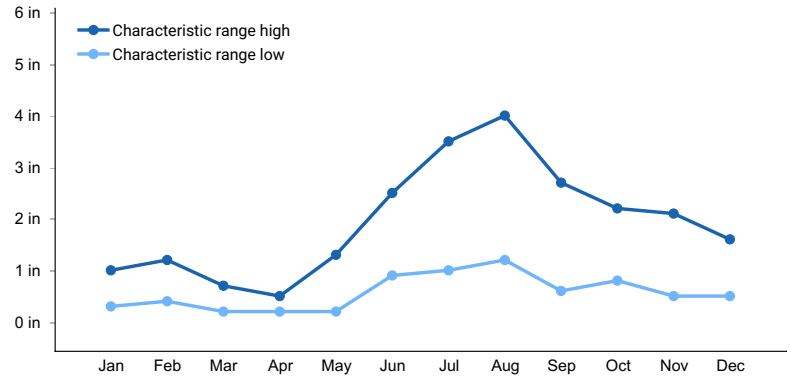


Figure 2. Monthly precipitation range

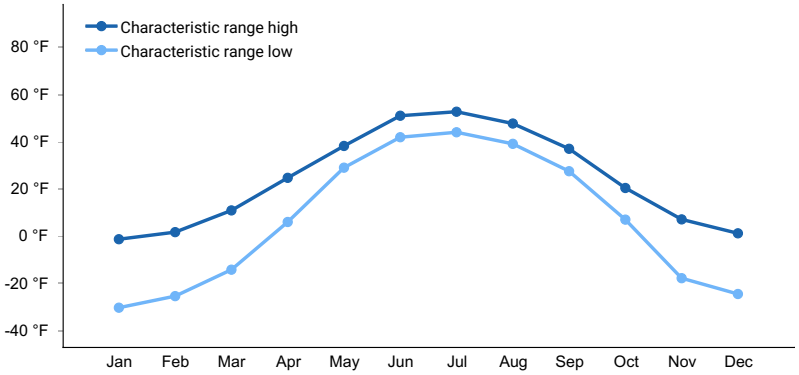


Figure 3. Monthly minimum temperature range

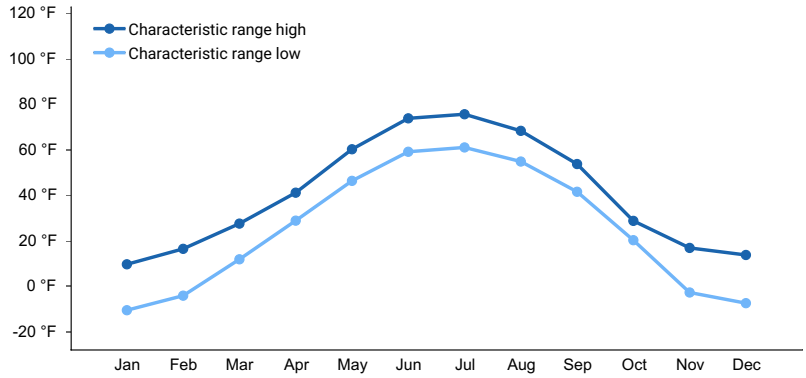


Figure 4. Monthly maximum temperature range

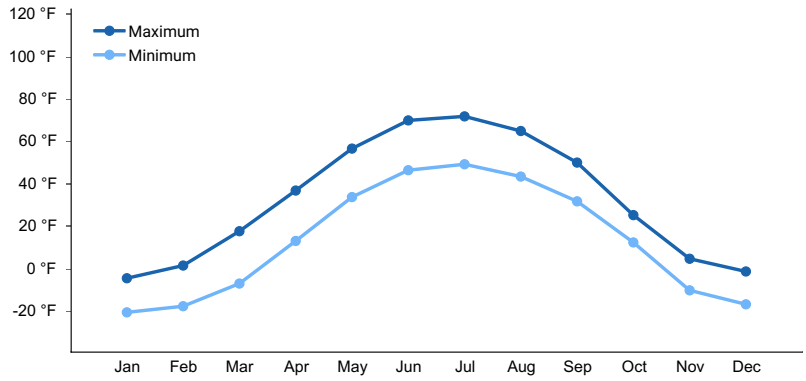


Figure 5. Monthly average minimum and maximum temperature

Influencing water features

During the early growing season, a perched water table is over the seasonal frost in the soil profile resulting in wet soils at very shallow depth (less than 10 inches). During this time frame, ponding can occur occasionally (5 to 50 times in 100 years) for brief periods of time (between 2 and 7 days). As the seasonal frost melts, the water drains from these soils. During long portions of the growing season, a water table is commonly at shallow depths (10 to 20 inches) in the soil profile. Ponding duration and the typical depth to the water table was determined through field observations.

Due to the depth and persistence of this water table, wetland indicator plants are commonly observed in the reference state.

Soil features

Correlated soil components from AK684: D32-Boreal taiga silty eolian slopes, frozen
Correlated soil components from AK685: Typic Histoturbels

Figure 6. Typical soil profile associated with the Typic Histoturbel soil component.

Figure 7. Permafrost and cryoturbation in this typical soil profile.

Table 4. Representative soil features

Parent material	(1) Organic material (2) Loess
Family particle size	(1) Coarse-silty
Drainage class	Poorly drained to somewhat poorly drained

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 plant succession and alter dynamic soil properties (e.g., presence or thickness of permafrost). For this ecological site to progress from the early fire stage to the reference plant community phase, data suggest that 70 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 the Yukon Flats Lowlands MLRA, fire is considered to be a natural and common event that typically goes 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 perimeters of the fires totaled about 4.1 million acres (AICC 2016). Fire-related disturbances are highly patchy and can leave large undisturbed areas within the burn perimeters. Ten fires were attributed to human activities (affecting a total of 2,864 acres), but the majority of the fires 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 this area 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. From field observations and because the associated soils are cooler and poorly drained, the typical fire scenario for this ecological site is considered to result in a low-severity burn.

While a low-severity fire can consume the bulk of above ground vegetation, minimal proportions of the organic mat are typically removed. Organic matter continues to insulate these cold soils and permafrost remains in the soil profile. While field observations support that each community phase is associated with permafrost, fire was thought to increase active layer depth causing the permafrost to occur deeper in the soil profile.

In areas prone to low-severity fire events, the pre-fire vegetative community generally reestablishes quickly and

there is minimal long-term alteration to community composition (Johnstone et al. 2010; Bernhardt et al. 2011). When minimal proportions of the organic mat are consumed, many species regenerate asexually using below ground root tissues. Species known to regenerate after low-severity fire events include various graminoids (e.g. Carex spp. and Eriophorum spp.), forbs (e.g. Equisetum sp.), and shrubs (e.g. *Ledum groenlandicum*, *Vaccinium uliginosum*, Salix sp.) (Johnstone et al. 2010). Black spruce is the Interior Alaska tree species best adapted to a low-severity fire regime. Black spruce have semi-serotenous cones and a low-severity fire often results in a flush of black spruce seedlings at the burned location.

Field data suggest that when the forested community phase burns, the fire event will cause a transition to the pioneering stage of fire succession. This stage (community 1.4) 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 seeds or spores (e.g., resin birch [*Betula neoalaskana*] and Polytrichum moss [Polytrichum spp.]). 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 1.3). In the absence of fire, tree seedlings continue to colonize and grow in recently burned areas until they become dominant in the overstory. The later stages of succession have an overstory that is a mix of immature broadleaf and needleleaf trees (not sampled in the field) or is primarily a mixed age needleleaf stand (community 1.1).

Other Observations

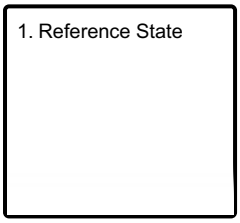
While field work indicates low-severity fires are most common, high-severity fires can and likely do occur in areas associated with this ecological site. A high-severity fire would likely cause permafrost to drop out of the soil profile and result in unique and currently unknown plant community phases within the reference state. Due to a lack of data, high-severity fire events are currently considered atypical in areas that support this ecological site.

Animal use (browsing and grazing) of this ecological site primarily consists of moose browse on willow and tree regeneration during the earlier stages of fire succession.

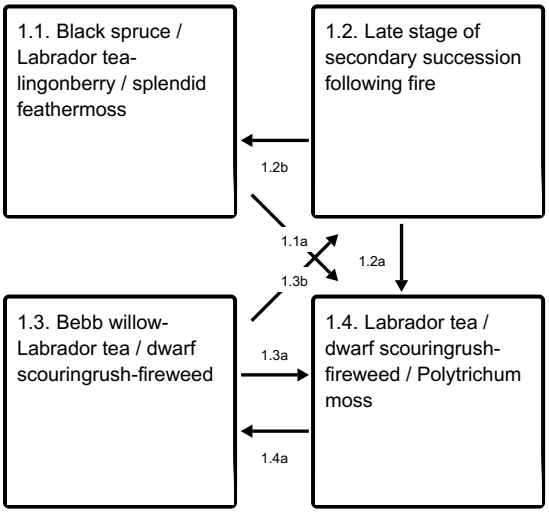
No alternative states for this ecological site were documented.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1

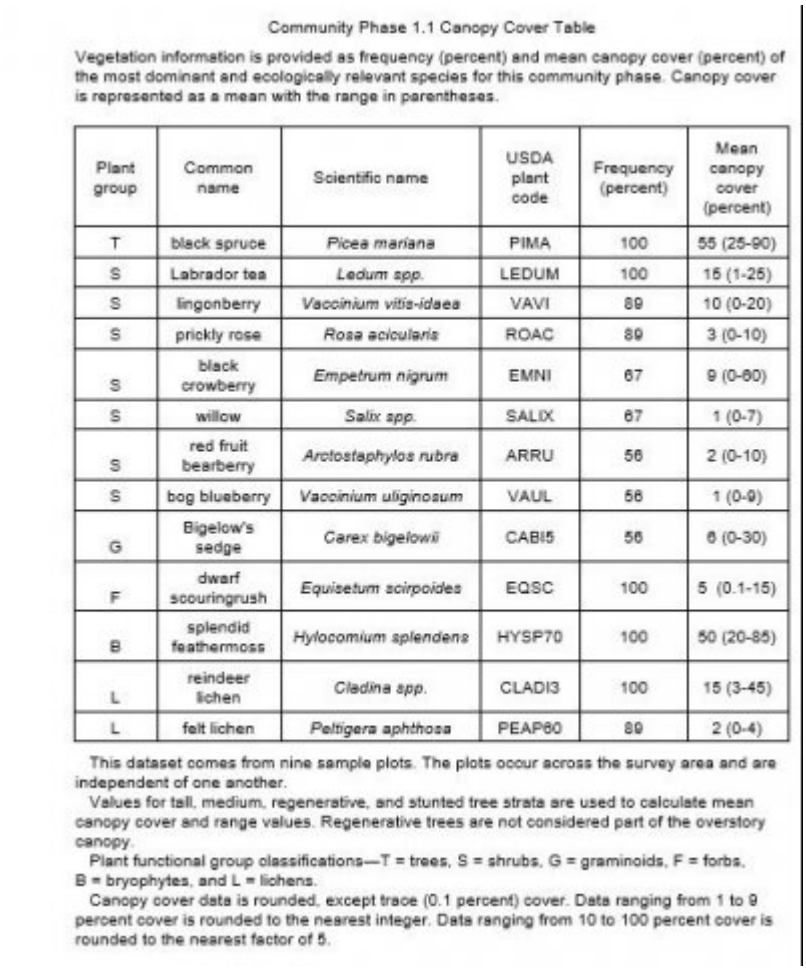
Reference State

Figure 8. Aerial image of the marginal uplands in the Yukon Flats Lowlands MLRA. This ecological site occurs on cold and frozen slopes in this MLRA.

The reference state has three associated community phases. The phases 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 phases in this report are characterized using the Alaska Vegetation Classification (Viereck et al. 1992).

Community 1.1
Black spruce / Labrador tea-lingonberry / splendid feathermoss

Figure 9. 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	black spruce	*Picea mariana*	PIMA	100	55 (25-90)
S	Labrador tea	*Ledum spp.*	LEDUM	100	15 (1-25)
S	lingonberry	*Vaccinium vitis-idaea*	VAVI	89	10 (0-20)
S	prickly rose	*Rosa acicularis*	ROAC	89	3 (0-10)
S	black crowberry	*Empetrum nigrum*	EMNI	67	9 (0-60)
S	willow	*Salix spp.*	SALIX	67	1 (0-7)
S	red fruit bearberry	*Arctostaphylos rubra*	ARRU	56	2 (0-10)
S	bog blueberry	*Vaccinium uliginosum*	VAUL	56	1 (0-9)
G	Bigelow's sedge	*Carex bigelowii*	CABI5	56	6 (0-30)
F	dwarf scouringrush	*Equisetum scirpoides*	EQSC	100	5 (0.1-15)
B	splendid feathermoss	*Hylocomium splendens*	HYSP70	100	50 (20-85)
L	reindeer lichen	*Cladina spp.*	CLADI3	100	15 (3-45)
L	felt lichen	*Peltigera aphthosa*	PEAP60	89	2 (0-4)

This dataset comes from nine 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.

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 10. Canopy cover table for community 1.1.

Reference plant community 1.1 is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of black spruce (fig. 3). Tree age was highly variable, which may be due to patchy low-intensity fire events. Tree cover primarily occurs in the medium tree stratum (between 15 and 40 feet in height) but stunted and regenerative trees are common (less than 15 feet in height). Occasional live deciduous trees, primarily resin birch, are in the tree canopy, but most have been replaced by spruce. The soil surface is covered primarily with bryophytes and lichen. Commonly observed understory species include bog Labrador tea, marsh Labrador tea, lingonberry, prickly rose, black crowberry, Bigelow's sedge, dwarf scouringrush, splendid feathermoss, and a mixture of reindeer lichen (most common species being C. rangiferina and C. stellaris). The understory vegetative strata that characterize this community are bryophytes, dwarf shrubs (less than 8 inches in height), foliose and fruticose lichens, and low shrubs (between 8 and 36 inches in height). Black spruce were sampled for diameter at breast height (dbh), height, and age at dbh (21 trees total). The basal area of the stand was determined for each sample plot. The mean dbh of black spruce is 3.2 inches (ranging from 1.5 to 6.0), the mean height is 21 feet (ranging from 6 to 43 feet), and the mean age is 78 years (ranging from 24 to 171 years). The mean basal area of the stands is 54.

Dominant plant species

- black spruce (*Picea mariana*), tree
- Labrador tea (*Ledum*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- prickly rose (*Rosa acicularis*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- willow (*Salix*), shrub
- red fruit bearberry (*Arctostaphylos rubra*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- Bigelow's sedge (*Carex bigelowii*), grass
- dwarf scouringrush (*Equisetum scirpoides*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- reindeer lichen (*Cladina*), other herbaceous
- felt lichen (*Peltigera aphthosa*), other herbaceous

Community 1.2
Late stage of secondary succession following fire

Plant community 1.2 was not sampled in the field. This ecological site is currently thought to have a mixed closed forest primarily composed of black spruce and resin birch.

Dominant plant species

- black spruce (*Picea mariana*), tree
- resin birch (*Betula neoalaskana*), tree
- lingonberry (*Vaccinium vitis-idaea*), shrub
- prickly rose (*Rosa acicularis*), shrub
- black crowberry (*Empetrum nigrum*), shrub
- Bigelow's sedge (*Carex bigelowii*), grass
- dwarf scouringrush (*Equisetum scirpoides*), other herbaceous
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- reindeer lichen (*Cladina*), other herbaceous

Community 1.3
Bebb willow-Labrador tea / dwarf scouringrush-fireweed

Figure 11. Typical plant community associated with community 1.3.

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	black spruce	*Picea mariana*	PIMA	100	15 (15)
T	resin birch	*Betula neoalaskana*	BENE4	100	8 (5-10)
S	willow	*Salix spp.*	SALIX	100	50 (25-70)
S	Siberian alder	*Alnus viridis ssp. fruticosa*	ALVIF	100	10 (10)
S	Labrador tea	*Ledum spp.*	LEDUM	100	7 (5-8)
S	lingonberry	*Vaccinium vitis-idaea*	VAVI	100	7 (6-7)
S	twinflower	*Linnaea borealis*	LIBO3	100	5 (4-5)
S	red fruit bearberry	*Arctostaphylos rubra*	ARRU	50	8 (0-15)
G	bluejoint	*Calamagrostis canadensis*	CACA4	50	8 (0-15)
F	horsetail	*Equisetum spp.*	EQUIS	100	30 (15-45)
F	fireweed	*Chamerion angustifolium*	CHAN9	100	6 (4-8)
B	Ceratodon moss	*Ceratodon purpureus*	CEPU12	100	9 (2-15)
B	Polytrichum moss	*Polytrichum spp.*	POLYT5	100	10 (2-15)

This dataset includes data from two 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 12. Canopy cover table for community 1.3.

Community 1.3 is in the early stage of fire-induced secondary succession for this ecological site. It is characterized as closed tall scrub. Seedlings of black spruce and resin birch (*Betula neoalaskana*) are common but do not yet dominate the overstory. Commonly observed species include Bebb willow (*Salix bebbiana*), Siberian alder (*Alnus viridis* ssp. fruticosa), Labrador tea (Ledum spp.), lingonberry, bluejoint (*Calamagrostis canadensis*), dwarf scouringrush, fireweed (*Chamerion angustifolium*), Ceratodon moss (*Ceratodon purpureus*), and Polytrichum moss (Polytrichum spp.). The vegetative strata that characterize this community are tall shrubs (greater and 10 feet in height), medium forbs (between 4 and 24 inches), regenerating trees (less than 15 feet), and weedy bryophytes.

Dominant plant species

- black spruce (*Picea mariana*), tree
- resin birch (*Betula neoalaskana*), tree
- Bebb willow (*Salix bebbiana*), shrub
- willow (*Salix*), shrub
- Siberian alder (*Alnus viridis ssp. fruticosa*), shrub
- Labrador tea (*Ledum*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- twinflower (*Linnaea borealis*), shrub
- red fruit bearberry (*Arctostaphylos rubra*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- dwarf scouringrush (*Equisetum scirpoides*), other herbaceous
- fireweed (*Chamerion angustifolium*), other herbaceous
- horsetail (*Equisetum*), other herbaceous
- polytrichum moss (*Polytrichum*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous

Community 1.4
Labrador tea / dwarf scouringrush-fireweed / Polytrichum moss

Figure 13. Typical plant community associated with community 1.4.

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	resin birch	*Betula neoalaskana*	BENE4	100	5 (2-8)
T	black spruce	*Picea mariana*	PIMA	50	2 (0-3)
S	Labrador tea	*Ledum spp.*	LEDUM	100	45 (10-80)
S	prickly rose	*Rosa acicularis*	ROAC	100	15 (2-25)
S	willow	*Salix spp.*	SALIX	100	10 (7-15)
S	bog blueberry	*Vaccinium uliginosum*	VAUL	100	9 (7-10)
S	lingonberry	*Vaccinium vitis-idaea*	VAVI	100	7 (3-10)
G	sedge	*Carex spp.*	CAREX	100	7 (5-8)
F	horsetail	*Equisetum spp.*	EQUIS	100	15 (8-20)
F	fireweed	*Chamerion angustifolium*	CHAN9	100	10 (7-15)
B	Polytrichum moss	*Polytrichum*	POLYT5	100	30 (5-50)
B	Ceratodon moss	*Ceratodon purpureus*	CEPU12	50	5 (0-10)
B	Marchantia polymorpha	*Marchantia polymorpha*	MAPO16	50	3 (0-6)

This dataset includes data from two 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 14. Canopy cover table for community 1.4.

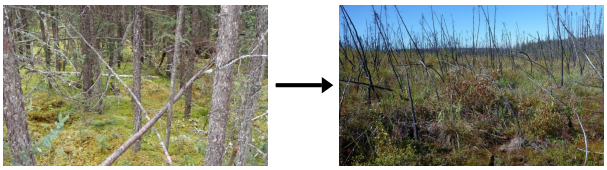
Community 1.4 is in the pioneering stage of fire-induced secondary succession for this ecological site. It is characterized as open low scrub. Seedlings of black spruce and resin birch commonly occur but have limited cover. Commonly observed species include Bebb willow, Labrador tea, prickly rose, lingonberry, dwarf scouringrush, fireweed, Ceratodon moss, Polytrichum moss, and Marchantia liverwort (*Marchantia polymorpha*). The vegetative strata that characterize this community are low shrubs (between 8 and 36 inches in height), weedy bryophytes, and medium shrubs (between 3 and 10 feet).

Dominant plant species

- resin birch (*Betula neoalaskana*), tree
- black spruce (*Picea mariana*), tree
- Labrador tea (*Ledum*), shrub
- prickly rose (*Rosa acicularis*), shrub
- Bebb willow (*Salix bebbiana*), shrub

- willow (*Salix*), shrub
- bog blueberry (*Vaccinium uliginosum*), shrub
- lingonberry (*Vaccinium vitis-idaea*), shrub
- sedge (*Carex*), grass
- dwarf scouringrush (*Equisetum scirpoides*), other herbaceous
- horsetail (*Equisetum*), other herbaceous
- fireweed (*Chamerion angustifolium*), other herbaceous
- polytrichum moss (*Polytrichum*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous
- (*Marchantia polymorpha*), other herbaceous

Pathway 1.1a
Community 1.1 to 1.4



Black spruce / Labrador tea-lingonberry / splendid feathermoss

Labrador tea / dwarf scouringrush-fireweed / Polytrichum moss

Fire.

Pathway 1.2b
Community 1.2 to 1.1

Time without fire.

Pathway 1.2a
Community 1.2 to 1.4

Fire.

Pathway 1.3b
Community 1.3 to 1.2

Pathway 1.3a
Community 1.3 to 1.4

Bebb willow-Labrador tea / dwarf scouringrush-fireweed

Labrador tea / dwarf scouringrush-fireweed / Polytrichum moss

Fire.

Pathway 1.4a
Community 1.4 to 1.3

Labrador tea / dwarf scouringrush-fireweed / Polytrichum moss

Bebb willow-Labrador tea / dwarf scouringrush-fireweed

Time without fire.

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
black spruce	PIMA	*Picea mariana*	Native	6–43	–	1.5–6	–

Inventory data references

NASIS User Site ID / Modal Datasets
08CS02602 F232XY227AK community 1.1
08CS02605 F232XY227AK community 1.1
08CS03601 F232XY227AK community 1.1
12SN00702 F232XY227AK community 1.1
2015AK290586 F232XY227AK community 1.1
2015AK290800 F232XY227AK community 1.1
2015AK290851 F232XY227AK community 1.1
2015AK290859 F232XY227AK community 1.1
2017AK290920 F232XY227AK community 1.1
08CS02505 F232XY227AK community 1.2
08TC01903 F232XY227AK community 1.2
08CS02502 F232XY227AK community 1.3
2015AK290603 F232XY227AK community 1.3

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Contributors

Blaine 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:**

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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:**

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17. **Perennial plant reproductive capability:**
