USDA Natural Resources
Conservation Service

Ecological site XA232X01Y223
Boreal Scrub Loamy Frozen Terrace Depressions

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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 shrubby ecological site occurs in the transitional area between the forested tread of a terrace and the graminoid-dominant communities associated with closed, terrace depressions (ecological site XA232X01Y222). This site typically occurs between the outer third and lip of these closed depressions. These depressions are considered closed because they are disassociated from a flood regime and have limited if any groundwater through flow or groundwater recharge. The presumed hydrological inputs for this ecological site are primarily an annual active layer and/or permafrost thaw, snowmelt runoff, and precipitation. Since much of the previously mentioned inputs are tied to local climate (e.g., precipitation), the extent and size of the waterbodies and plant communities in these closed depressions appear to be highly dynamic.

The reference plant community for this ecological site is characterized as an open tall scrubland (Viereck et al. 1992). The shrubs are primarily an assortment of willow (Salix spp.). Commonly observed species include white spruce (Picea glauca), tealeaf willow (Salix pulchra), false mountain willow (Salix pseudomonticola), littletree willow (Salix arbusculoides), grayleaf willow (Salix glauca), water sedge (Carex aquatilis), bluejoint (Calamagrostis canadensis), and arctic raspberry (Rubus arcticus). The soil surface is covered primarily with herbaceous litter and bryophytes, leaving minimal if any exposed soil.

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).
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).
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).
XA232X01Y221	**Boreal Forest Loamy Terraces** This ecological site is associated with moderately well to well drained soils on the tread 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).
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).
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).

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 with 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).
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.

Similar sites

XA232X01Y206	**Boreal Scrub Loamy Frozen Flood Plain Depressions** XA232X01Y206 supports a similar shrub-dominant reference state and plant communities. XA232X01Y206 occurs in depressions of flood plains, is associated with a flood regime, and is associated with soils that do not have sodic parent materials. These differences in landform position, disturbance regime, and soil type result in similar, but unique, plant community phases for each ecological site.

Figure 1. Closed depressions in the Yukon Flats Lowlands MLRA. The outer third, or lip, of these depressions commonly supports willow communities, while the other part of the depressions supports a mixture of various graminoid-dominant communities.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix*
Herbaceous	(1) *Calamagrostis stricta* (2) *Hordeum jubatum*

Legacy ID

R232XY223AK

Physiographic features

This ecological site and its associated plant communities commonly occur on 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. 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. 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 (e.g. Pitka 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.

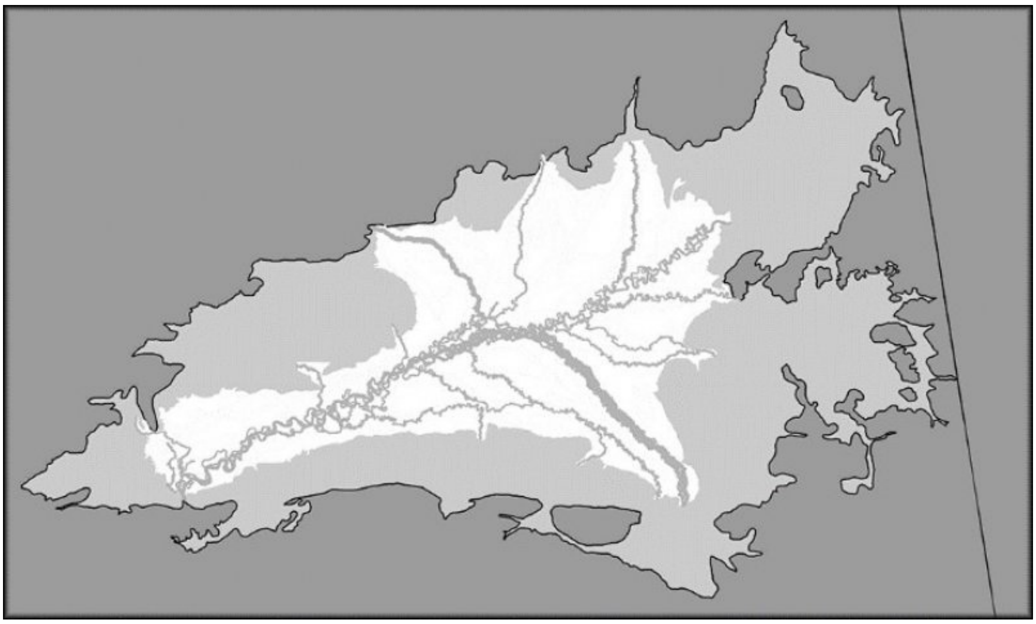


Figure 2. Lowlands (white) and marginal uplands (light grey) regions of the Yukon Flats Lowlands MLRA.

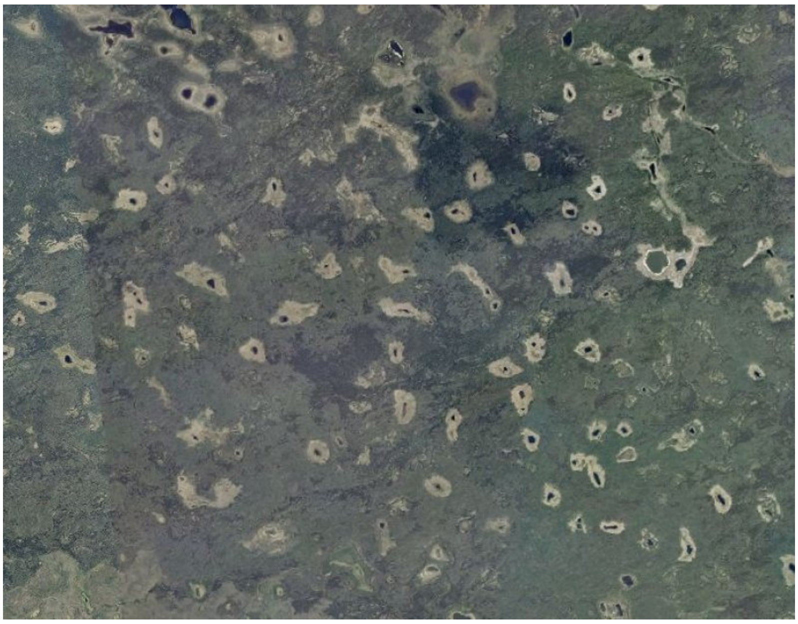


Figure 3. Satellite image of a stream terrace with circular to amorphous shaped depressions. The image is of a terrace adjacent to the Yukon River and Birch Creek in the Yukon Flats Lowlands MLRA.

Table 2. Representative physiographic features

Geomorphic position, terraces	(1) Tread
Landforms	(1) Alluvial plain > Stream terrace > Closed depression
Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	Occasional
Elevation	99–251 m
Slope	Not specified
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

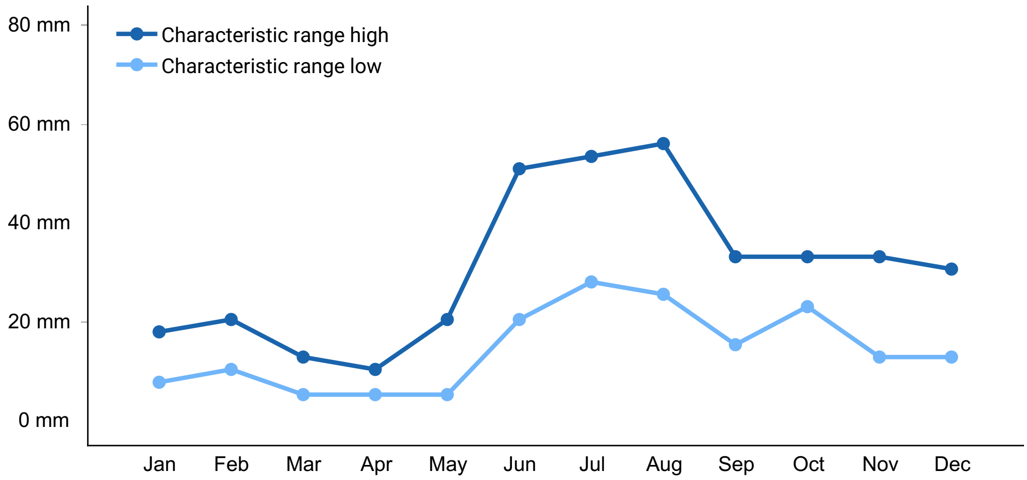


Figure 4. Monthly precipitation range

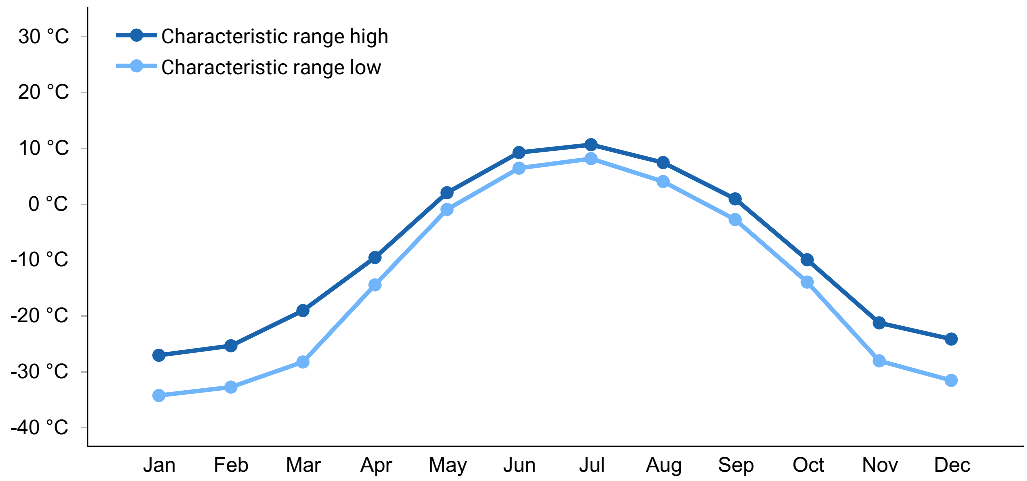


Figure 5. Monthly minimum temperature range

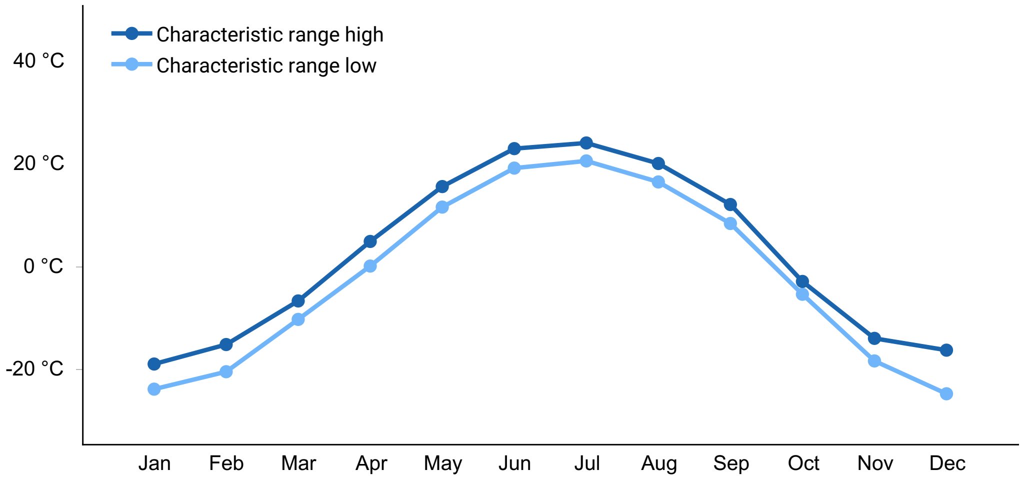


Figure 6. Monthly maximum temperature range

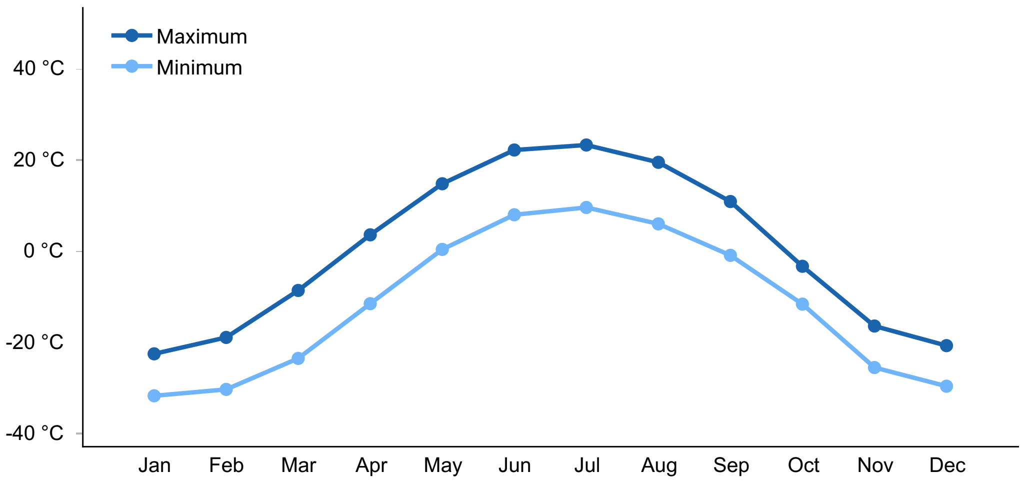


Figure 7. Monthly average minimum and maximum temperature

Influencing water features

During the early portion of the growing season (May and June), a perched water table is over seasonal frost in the soil profile resulting in wet soils at very shallow depth (less than 10 inches). During this period, soils occasionally pond for brief durations of time. As the seasonal frost melts, the water drains from these soils. During long portions of the growing season, a water table commonly occurs at shallow to moderate depths (between 10 and 40 inches). Due to the depth and persistence of this water table, wetland indicator plants are commonly observed in the reference state. Ponding duration and the typical depth to the water table was determined through field observations.

Field work indicates that certain sampled communities within the reference state pond more frequently or pond for longer durations of time then other communities. As ponding frequency or duration increases, graminoid cover increases and willow cover decreases. Given this observation, a more frequently ponded community was incorporated into the reference state.

Figure 8. Aerial photograph of several depressions in the Yukon Flats Lowlands MLRA that have significant willow mortality. The mortality is thought to be a result of a rapid increase in the size of the waterbody in the depressions.

Soil features

Correlated soil components for the Yukon Flats Area, Alaska soil survey (AK685): Pitka.

Community 1.2 is associated with wetter soils with comparatively longer ponding durations. A specific soil component has not currently been developed for plant community 1.2.

Figure 9. Typical soil profile associated with Pitka soil component

Figure 10. Typical soil profile associated with Pitka soil component

Table 4. Representative soil features

Parent material	(1) Organic material (2) Alluvium (3) Lacustrine deposits
Family particle size	(1) Coarse-silty
Drainage class	Poorly drained
Soil depth	203 cm

Ecological dynamics

Closed terrace depressions have two associated ecological sites (XA232X01Y222 and XA232X01Y223; figure 7). Ecological site XA232X01Y222 has graminoid-dominant plant communities, and ecological site XA232X01Y223 has willow-dominant plant communities. The lowest part of the terrace depressions generally has a body of stagnant water. Bare mineral soils with sparse patches of various obligate wetland species are common in these areas (e.g., *Hippuris vulgaris*). Multiple graminoid-dominant community phases are adjacent to these bodies of water. These plant communities appear to be controlled largely by ponding and the persistence of a seasonal high water table. The soils in these areas commonly have sodic parent materials (For definitions, see Ogle and John 2010). The shrub-dominant plant communities associated with ecological site XA232X01Y223 generally are on the outer third or lip of the closed depressions (figure 7). The soils associated with shrubby willow communities tend to be drier than those associated with graminoid-dominant communities, generally lack sodic parent materials, and commonly have permafrost. The spatial dominance of each ecological site is presumed to be dynamic within these closed depressions and might be controlled by regional climatic variables.

Climatic Influences

This shrubby ecological site is thought to expand into closed depressions during warm and dry climatic periods, and the expansion can lead to permafrost aggradation (Briggs et al. 2014). Since many of the hydrologic inputs are tied to the local climate (e.g., precipitation), changes in climatic variables have a large impact on the associated water table and plant communities in these closed depressions. Large net evaporative losses from many years of low snowfall, warm annual temperatures, and low relative humidity have reduced the water table of closed depressions in the Yukon Flats Lowlands MLRA (Anderson et al. 2013). These warm and dry conditions are likely leading to tree and shrub colonization and community expansion. The opposite likely occurs during many consecutive years of colder and wetter conditions (see figure 8). Extended periods of warmer and drier conditions in the Yukon Flats Lowlands MLRA may be due in part to large-scale climatic regimes, such as the Pacific decadal oscillation. For more information, refer to the publications by Hartmann and Weller (2005) and Anderson et al. (2013).

Fire

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).

When a fire sweeps through areas associated with this ecological site, field data indicate that the majority of the aboveground willow and tree biomass is destroyed. The data also suggest that the fire consumes significant proportions of the organic mat, exposing bare mineral soil. Loss of the insulating layer results in a loss of permafrost in the soil profile. The postfire community is a mix of species that regenerate in place (subterranean root crowns for willow and rhizomes for graminoids) and/or from wind-dispersed seeds or spores that colonize the exposed mineral soil. A fire event in this ecological site will cause a successional transition to community 1.3.

Because the dominant vegetation (willow and graminoids) grows quickly and commonly regenerates after a fire event, minimal time is needed for postfire recovery back to the reference plant community (as compared to adjacent forested ecological sites). For an example from fire history perimeter data (AICC 2016), a site sampled in 2010 and one sampled in 2012 are believed to have burned as recently as 1988 and 1990. Over that 20-year period, the vegetation appeared to have fully recovered but permafrost was still undetected. Seven sites sampled from 2011 through 2014 are thought to have burned in 1969; five of the sites had permafrost. For this ecological site, field data suggest that full recovery of dynamic soil properties and vegetation typically takes 20 to 40 years. In comparison, it typically takes 100 to 150 years for a white spruce stand in Interior Alaska to mature (Chapin et al. 2006).

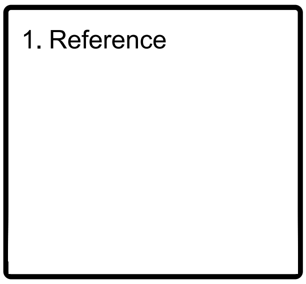
For this ecological site, the relationship between drainage class and fire-permafrost dynamics is complex and not fully understood. Field observations indicate that the depth to and presence of permafrost is impacted by fire. When areas associated with the reference plant community 1.1 are burned, loss of permafrost appears to improve drainage. The relationship among fire, permafrost, and drainage class for community 1.2, however, is poorly understood. Burned areas of community 1.2 may become wetter or drier. Future data collection could help to determine this relationship, which may lead to the creation of a unique wet, early-fire plant community.

Other Observations

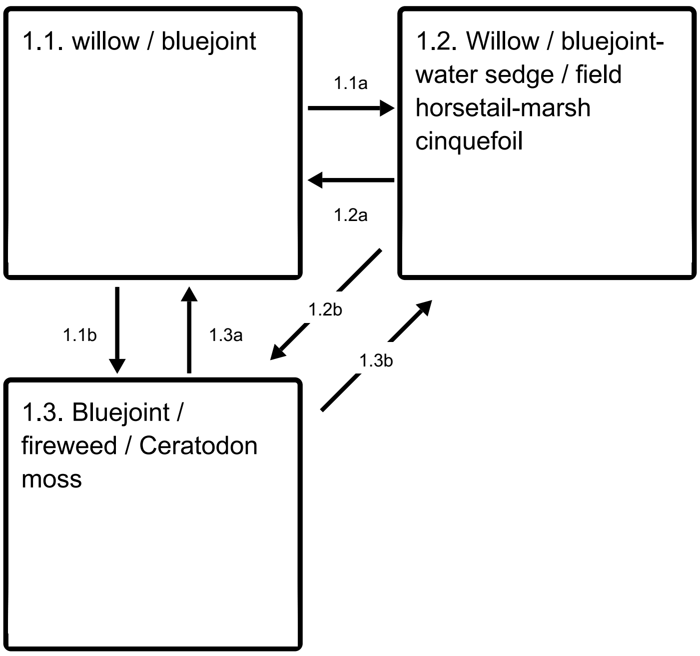
While moose browse on willow was observed in each plant community, the severity of the browse is considered slight. Much of the willow was not browsed, and the majority that was browsed did not exhibit broomed architecture.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference

Figure 11. Lakes on stream terraces in the Yukon Flats Lowlands MLRA. This ecological site occurs on the edges of closed terrace depressions in this MLRA.

The reference state has three plant communities, which 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 ponding and 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 names are from the USDA PLANTS database. All community in the report are characterized using the Alaska Vegetation Classification (Viereck et al. 1992).

Community 1.1
willow / bluejoint

Figure 12. Typical plant community associated with community 1.1.

Community Phase 1.1 Canopy Cover Table

Vegetation data is aggregated from all sample plots for this community phase. The data is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. 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	83	2 (0-5)
S	willow	*Salix spp.*	SALIX	100	50 (20-70)
S	manzanita	*Arctostaphylos spp.*	ARCTO3	50	1 (0-5)
G	reedgrass	*Calamagrostis spp.*	CALAM	78	15 (0-80)
G	sedge	*Carex spp.*	CAREX	67	25 (0-70)
F	arctic blackberry	*Rubus arcticus*	RUAR	61	2 (0-15)
F	yarrow	*Achillea spp.*	ACHIL	56	1 (0-5)
F	arctic sweet coltsfoot	*Petasites frigidus*	PEFR5	44	2 (0-35)
F	horsetail	*Equisetum spp.*	EQUIS	44	2 (0-10)

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, 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 13. Canopy cover table for community 1.1.

The reference plant community is characterized as an open tall scrubland (Viereck et al.

1992). The shrubs are primarily an assortment of willow. Commonly observed species include white spruce, tealeaf willow, false mountain willow, littletree willow, grayleaf willow, water sedge, bluejoint, and arctic raspberry. The soil surface is covered primarily with herbaceous litter and bryophytes, with minimal if any exposed soil. Tree cover is limited, and the trees are primarily in the regenerative stratum (less than 15 feet in height). The vegetative strata that characterize this community are medium shrubs (3 to 10 feet in height), medium graminoids (4 to 24 inches in height), and bryophytes.

Dominant plant species

- white spruce (*Picea glauca*), tree
- tealeaf willow (*Salix pulchra*), shrub
- false mountain willow (*Salix pseudomonticola*), shrub
- littletree willow (*Salix arbusculoides*), shrub
- grayleaf willow (*Salix glauca*), shrub
- red fruit bearberry (*Arctostaphylos rubra*), shrub
- water sedge (*Carex aquatilis*), grass
- sedge (*Carex*), grass
- slimstem reedgrass (*Calamagrostis stricta*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- arctic raspberry (*Rubus arcticus*), other herbaceous
- common yarrow (*Achillea millefolium*), other herbaceous
- Siberian yarrow (*Achillea sibirica*), other herbaceous
- arctic sweet coltsfoot (*Petasites frigidus*), other herbaceous
- horsetail (*Equisetum*), other herbaceous

Community 1.2
Willow / bluejoint-water sedge / field horsetail-marsh cinquefoil

Figure 14. Typical plant community associated with community 1.2.

Community Phase 1.2 Canopy Cover Table

Vegetation data is aggregated from all sample plots for this community phase. The data is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. 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	67	0.1 (0-1)
S	willow	*Salix spp.*	SALIX	100	35 (20-60)
G	sedge	*Carex spp.*	CAREX	83	25 (0-60)
G	reedgrass	*Calamagrostis spp.*	CALAM	67	20 (0.1-60)
G	Arctic rush	*Juncus arcticus*	JUAR2	33	5 (0-25)
F	field horsetail	*Equisetum arvense*	EQAR	67	5 (0-25)
F	marsh cinquefoil	*Comarum palustre*	COPA28	67	3 (0-15)
F	arctic sweet coltsfoot	*Petasites frigidus*	PEFR5	50	3 (0-5)
F	arctic blackberry	*Rubus arcticus*	RUAR	50	3 (0-15)
F	marsh skullcap	*Scutellaria galericulata*	SCGA	50	2 (0-10)
F	threepetal bedstraw	*Galium trifidum*	GATR2	50	0.1 (0-2)

This dataset includes data from six 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, 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 15. Canopy cover table for community 1.2.

This community has comparatively wetter soils than the reference community. The plant community is characterized as an open tall scrubland (Viereck et al. 1992). The shrubs are primarily an assortment of willow). Commonly observed species include tealeaf willow, false mountain willow, littletree willow, bluejoint, water sedge, arctic rush (*Juncus arcticus*), field horsetail (*Equisetum arvense*), purple marshlocks (*Comarum palustre*), arctic raspberry, and arctic sweet coltsfoot (*Petasites frigidus*). The soil surface is covered primarily with herbaceous litter and bryophytes, leaving minimal if any exposed soil. The vegetative strata that characterize this community are medium shrubs (3 to 10 feet in height), tall graminoids (4 to 24 inches in height), and medium forbs (4 to 24 inches in height).

Dominant plant species

- white spruce (*Picea glauca*), tree
- tealeaf willow (*Salix pulchra*), shrub
- false mountain willow (*Salix pseudomonticola*), shrub
- littletree willow (*Salix arbusculoides*), shrub

- red fruit bearberry (*Arctostaphylos rubra*), shrub
- water sedge (*Carex aquatilis*), grass
- sedge (*Carex*), grass
- slimstem reedgrass (*Calamagrostis stricta*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- arctic rush (*Juncus arcticus*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- purple marshlocks (*Comarum palustre*), other herbaceous
- arctic sweet coltsfoot (*Petasites frigidus*), other herbaceous
- arctic raspberry (*Rubus arcticus*), other herbaceous
- marsh skullcap (*Scutellaria galericulata*), other herbaceous
- threepetal bedstraw (*Galium trifidum*), other herbaceous

Community 1.3
Bluejoint / fireweed / Ceratodon moss

Figure 16. Typical plant community associated with community 1.3.

Community Phase 1.3 Canopy Cover Table

Vegetation data is aggregated from all sample plots for this community phase. The data is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and ecologically relevant species. 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	50	10 (0-20)
S	Bebb willow	*Salix bebbiana*	SABE2	50	1 (0-2)
S	shrub birch	*Betula glandulosa*	BEGL	50	1 (0-2)
G	bluejoint	*Calamagrostis canadensis*	CACA4	100	12 (3-20)
F	fireweed	*Chamerion angustifolium*	CHAN9	100	35 (5-60)
B	*Ceratodon* moss	*Ceratodon purpureus*	CEPU12	50	30 (0-30)

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, 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 17. Canopy cover table for community 1.3.

Community 1.3 occurs after a fire event. The plant community is characterized as mesic forb herbaceous (Viereck et al. 1992). It is composed primarily of fireweed (*Chamerion angustifolium*), bluejoint, and various weedy bryophytes. The soil surface is covered primarily with moss and herbaceous litter, but small pockets of bare soil are common. Colonizing willow and quaking aspen (*Populus tremuloides*) are common, but they have sparse distribution. The vegetative strata that characterize this community are moss, medium forbs (4 to 24 inches in height), and regenerative trees (less than 15 feet in height).

Dominant plant species

- quaking aspen (*Populus tremuloides*), tree
- willow (*Salix*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- fireweed (*Chamerion angustifolium*), other herbaceous
- ceratodon moss (*Ceratodon purpureus*), other herbaceous

Pathway 1.1a
Community 1.1 to 1.2

willow / bluejoint

Willow / bluejoint-water sedge / field horsetail-marsh cinquefoil

Ponding duration/frequency increases. If site conditions become wetter, the frequency and duration of ponding and length of time with a persistent water table during the growing season increase. These conditions favor community 1.2. It is known that certain depressions can become wetter or drier as a result of long-term climatic influences. For unknown and likely complex reasons, however, site conditions can become wetter rapidly in depressions across the Yukon Flats Lowlands MLRA (fig. 8).

Pathway 1.1b
Community 1.1 to 1.3

willow / bluejoint

Bluejoint / fireweed / Ceratodon moss

Fire

Pathway 1.2a
Community 1.2 to 1.1

Willow / bluejoint-water sedge / field horsetail-marsh cinquefoil

willow / bluejoint

Ponding duration/frequency decreases. If site conditions become drier, the frequency and duration of ponding and length of time with a persistent water table during the growing season decrease. These conditions favor community 1.1.

Pathway 1.2b

Community 1.2 to 1.3

Willow / bluejoint-water sedge / field horsetail-marsh cinquefoil

Bluejoint / fireweed / Ceratodon moss

Fire.

Pathway 1.3a
Community 1.3 to 1.1

Bluejoint / fireweed / Ceratodon moss

willow / bluejoint

Time without fire.

Pathway 1.3b
Community 1.3 to 1.2

Bluejoint / fireweed / Ceratodon moss

Willow / bluejoint-water sedge / field horsetail-marsh cinquefoil

Time without fire.

Additional community tables

Inventory data references

NASIS User Site ID / Modal Datasets
10BB00901 plant community 1.1
10BB01205 plant community 1.1
10BB01802 plant community 1.1
10BL00902 plant community 1.1
10BL01001 plant community 1.1

10BL01201 plant community 1.1
10BL01506 plant community 1.1
10DM02004 plant community 1.1
11BB05102 plant community 1.1
11BB05302 plant community 1.1
11BB05502 plant community 1.1
11SN02902 plant community 1.1
11SN03201 plant community 1.1
11SN03204 plant community 1.1
12NR01604 plant community 1.1
12SN00303 plant community 1.1
12SN00402 plant community 1.1
12SN00503 plant community 1.1
11BB05304 plant community 1.2
11BB06005 plant community 1.2
11BB06502 plant community 1.2
11TD09202 plant community 1.2
11TD09402 plant community 1.2
12NR03002 plant community 1.2
11BB06706 plant community 1.3
12TR00704 plant community 1.3

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Contributors

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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:**

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:**

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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:

---

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:**

17. **Perennial plant reproductive capability:**