USDA Natural Resources Conservation Service

# Ecological site XA232X01Y229
# Boreal Scrub Loamy Terrace Swales

Last updated: 5/18/2020
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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 swales on stream terraces in the Yukon Flats Lowlands MLRA. Associated soils are considered very poorly drained. The reference state supports two plant communities related to a fire regime.

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). Other commonly observed species include shrubby cinquefoil (Dasiphora fruticosa), an assortment of sedges (Carex spp.), reedgrass (Calamagrostis spp.), and field horsetail (Equisetum arvense). The vegetative strata that characterize the reference plant community are medium shrubs (between 3 and 10 feet in height) and medium graminoids (between 4 and 24 inches in height).

## Associated sites

| | |
|---|---|
| XA232X01Y221 | **Boreal Forest Loamy Terraces**<br>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). |

| | |
|---|---|
| XA232X01Y222 | **Boreal Graminoid Loamy Terrace Depressions**<br>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. |
| XA232X01Y223 | **Boreal Scrub Loamy Frozen Terrace Depressions**<br>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.). |
| XA232X01Y262 | **Boreal Woodland Gravelly Terraces**<br>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**<br>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**<br>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). |
| XA232X01Y201 | **Boreal Woodland Peat Frozen Terraces**<br>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. |

| | |
|---|---|
| XA232X01Y218 | **Boreal Woodland Loamy Frozen Terraces**<br>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**<br>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). |

## Similar sites

| | |
|---|---|
| XA232X01Y206 | **Boreal Scrub Loamy Frozen Flood Plain Depressions**<br>XA232X01Y206 occurs in depressions of floodplains and associated soils are also wet. Floodplain indicator species are much more common (e.g. redosier dogwood [Cornus sericea]) and sedges and shrub birch are less common and abundant. |
| XA232X01Y209 | **Boreal Tussock Loamy Frozen Terraces**<br>XA232X01Y209 occurs on the tread of stream terraces and associated soils are also wet. Tussocks are more common and abundant (tussocks formed by Bigelow's sedge [Carex bigelowii] and tussock cottongrass [Eriophorum vaginatum]). |
| XA232X01Y223 | **Boreal Scrub Loamy Frozen Terrace Depressions**<br>XA232X01Y223 occurs in closed terrace depressions and associated soils are also wet. Sedges and shrub birch are less common and abundant. |

**Figure 1. Photograph of a subaqueous drainageway adjacent to the Sheenjek River. Plant communities associated with swales commonly occur**

**on the edge of drainageways in the Yukon Flats Lowlands MLRA (XA232X01Y212).**

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Betula glandulosa*<br>(2) *Salix* |
| Herbaceous | (1) *Carex*<br>(2) *Calamagrostis* |

## Legacy ID

R232XY229AK

## Physiographic features

Drainageways (XA232X01Y212) and swales are both depressional features common on stream terraces in the Yukon Flats Lowlands MLRA. Unlike drainageways, swales lack clearly defined channels. While both landforms are depressional features, swales and drainageways have different plant communities. Drainageways are sedge dominant, while swales are shrub birch and willow dominant. In the Yukon Flats Lowlands, swales appear to commonly funnel overland and subsurface water into drainageways. In addition, swale plant communities commonly occur on the edge of drainageways.

This ecological site has two associated soil components that occur in different regions of the Yukon Flats Lowlands MLRA. Soils associated with rivers that are currently or have previously been glacially fed have different characteristics than those associated with nonglacial rivers in this MLRA. For instance, glacial rivers that flow out of the southern foothills of the Brooks Range (e.g., Sheenjek River) have created large gravelly stream terraces north of the Yukon River. The soils on these terraces tend to have a sandy and gravelly substrata (Typic Cryaquents soils). These coarse textured soils are unfavorable for permafrost aggradation in the profile. Nonglacial rivers that flow out of the Yukon-Tanana Plateau (e.g., Beaver Creek) have 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 (Yanert Soils).

During initial work on the soil survey, each soil type originally had a correspondingly unique ecological site. After more fieldwork and data analysis, it was determined that these wide-ranging soils each appear to support plant communities that respond similarly to fire and have similar kinds and amounts of vegetation in the reference state. As a result, the soil components were all correlated into one ecological site.

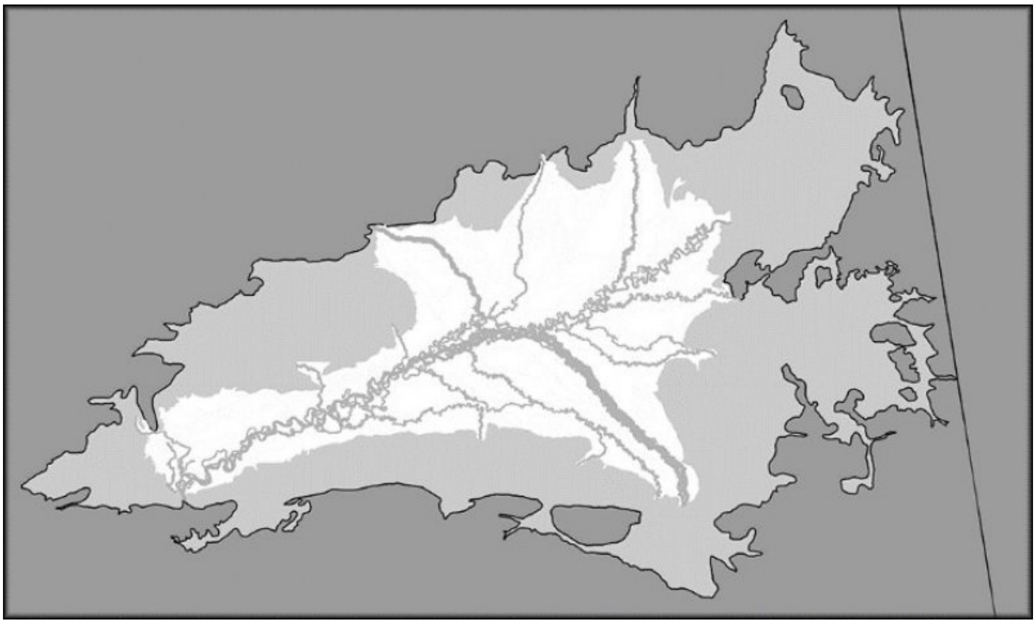


**Figure 2. Lowlands region (white) and marginal uplands region (light gray) of the Yukon Flats Lowlands MLRA.**

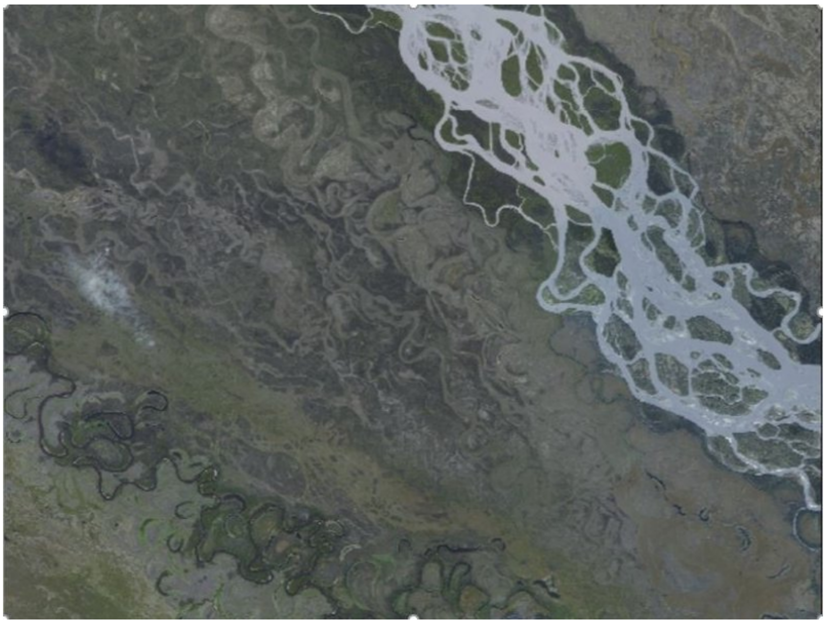


**Figure 3. Aerial image showing a complex of drainageways and swales adjacent to Birch Creek and the Yukon River in the Yukon Flats Lowlands MLRA.**

**Table 2. Representative physiographic features**

| | |
|---|---|
| Geomorphic position, terraces | (1) Tread |
| Landforms | (1) Alluvial plain > Stream terrace > Swale<br>(2) Alluvial plain > Stream terrace > Swale |
| Flooding frequency | Rare to none |
| Ponding duration | Very long (more than 30 days) |
| Ponding frequency | Frequent |
| 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 |

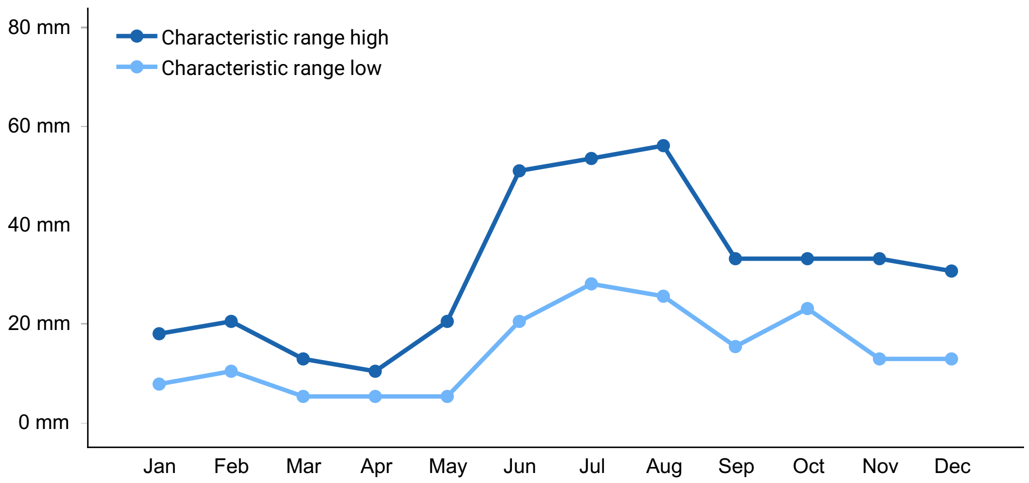



**Figure 4. Monthly precipitation range**

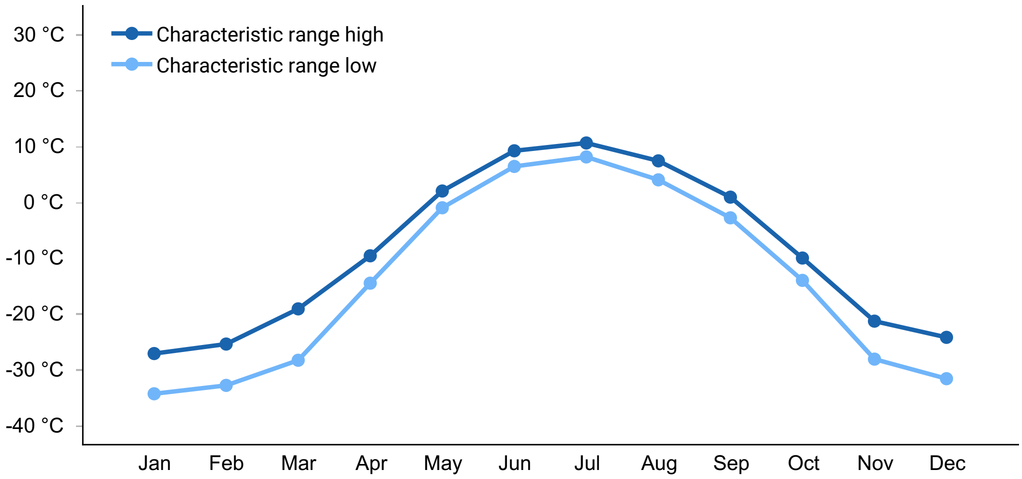



**Figure 5. Monthly minimum temperature range**

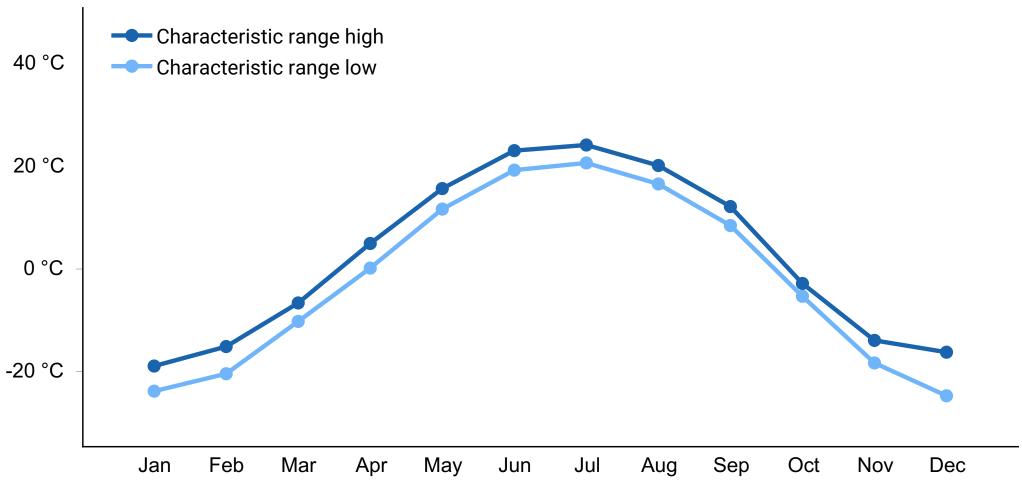



**Figure 6. Monthly maximum temperature range**

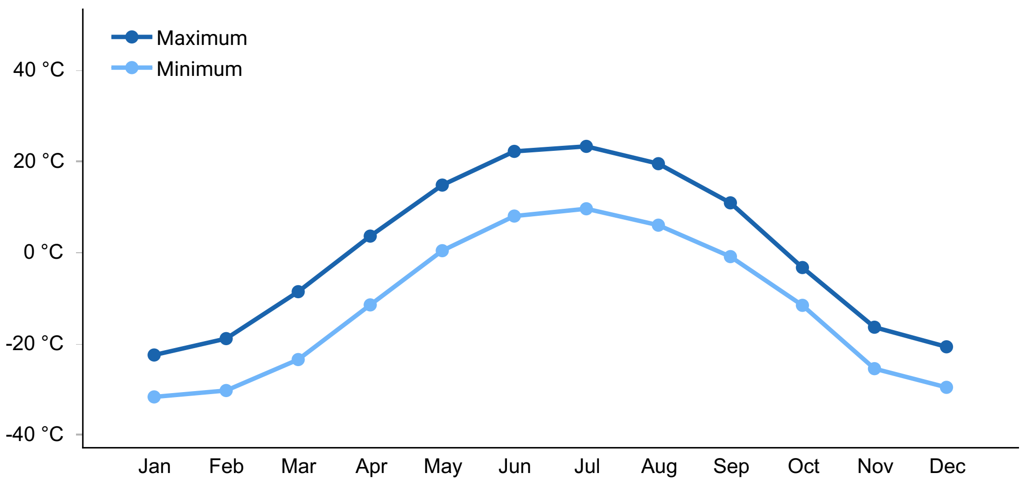



**Figure 7. Monthly average minimum and maximum temperature**

## Influencing water features

Associated soils have a water table that remains at very shallow to shallow depth throughout the growing season (0 to 20 inches). During the growing season, ponding of water over the soil surface occurs frequently and for very long durations of time. 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 for the Yukon Flats Area, Alaska soil survey (AK685): Typic Cryaquents, silty; Yanert.


**Figure 8. Typical soil profile associated with Yanert soil component.**

**Figure 9. A typical Yanert soil component has permafrost at depth while the Typic Cryaquents soil component does not.**

**Table 4. Representative soil features**

| | |
|---|---|
| Parent material | (1) Organic material<br>(2) Alluvium |
| Family particle size | (1) Coarse-silty<br>(2) Coarse-silty over sandy or sandy-skeletal |
| Drainage class | Very poorly 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 plant succession and alter dynamic soil properties (e.g., presence or depth of permafrost). For this ecological site to progress from the early fire stage to the reference plant community, data suggest that 20 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 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 very 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 removed. Organic matter continues to insulate these cold soils, and in areas that have permafrost before a fire event, permafrost remains in the soil profile. For soils associated with permafrost (Yanert soils), fire was thought to increase active layer depth causing the permafrost to occur deeper in the soil profile and improve drainage. 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).

Because the dominant vegetation (willow, shrub birch, and sedges) grows quickly and commonly regenerate 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 using fire history perimeter data (AICC 2016), a site sampled in 2010 and one sampled in 2011 are believed to have burned as recently as 1986 and 1990. Over that 20-year period, the vegetation appeared to have fully recovered. For this ecological site, field data suggest that full recovery of dynamic soil properties and vegetation typically takes between 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).

Flooding

This ecological site is associated with swales on stream terraces that are thought to rarely flood. 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 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 ecological site likely has limited energy, depositing alluvium on the soil surface but causing minimal alterations to overall composition of the plant community.

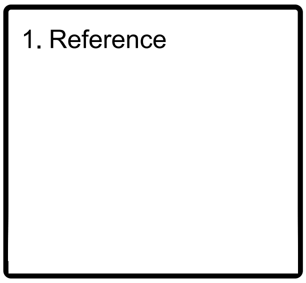
Other Observations

Moose browse on willow was commonly observed in each community and the severity of browse typically ranged from slight to moderate. A browse rating of slight indicates the majority of willow in the sample plot was not browsed. A browse rating of moderate indicates the majority of willow was browsed in the sample plot but vegetation does not exhibit broomed architecture.

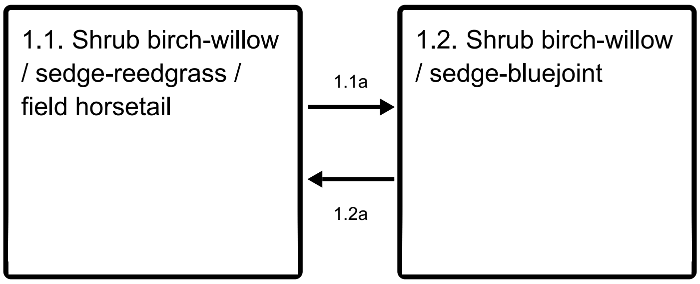
No alternative states for this ecological site were documented.

## State and transition model

**Ecosystem states**




**State 1 submodel, plant communities**




## State 1
## Reference

**Figure 10. Aerial image of a stream terrace in the Yukon Flats Lowlands MLRA. This ecological site is associated with swales on terraces in this MLRA.**

The reference state has two associated communities. Plant communities in the reference state appear to be largely controlled by the influences of 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 plant names are from the USDA PLANTS database. All plant communities in this report are characterized using the Alaska Vegetation Classification (Viereck et al. 1992).

## Community 1.1
## Shrub birch-willow / sedge-reedgrass / field horsetail

**Figure 11. 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 | 63 | 2 (0-10) |
| S | willow | *Salix spp.* | SALIX | 100 | 30 (1-60) |
| S | shrub birch | *Betula glandulosa* | BEGL | 97 | 25 (0-65) |
| S | shrubby cinquefoil | *Dasiphora fruticosa* | DAFR3 | 67 | 1 (0-6) |
| G | reedgrass | *Calamagrostis spp.* | CALAM | 73 | 8 (0-50) |
| G | sedge | *Carex spp.* | CAREX | 93 | 35 (0-90) |
| G | cottongrass | *Eriophorum spp.* | ERIOP | 43 | 3 (0-30) |
| F | field horsetail | *Equisetum arvense* | EQAR | 83 | 6 (0-40) |
| F | marsh cinquefoil | *Comarum palustre* | COPA28 | 43 | 1 (0-10) |
| F | arctic sweet coltsfoot | *Petasites frigidus* | PEFR5 | 33 | 1 (0-5) |

This dataset includes data from 30 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, 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 1.1.**

The reference plant community is characterized as open tall scrub (Viereck et al. 1992) and the dominant shrubs are scrub birch and willow. Commonly observed willow species include tealeaf willow (S. pulchra), grayleaf willow (S. glauca), and littletree willow (S. arbusculoides). White spruce (*Picea glauca*) tree seedlings were commonly observed but not abundant. Other commonly observed species include shrubby cinquefoil, an assortment of sedges (primarily *Carex aquatilis*), reedgrass (primarily *Calamagrostis canadensis* and *Calamagrostis stricta*.), and field horsetail. Tussocks (primarily formed by *Carex bigelowii* and *Eriophorum vaginatum*) are often present but not abundant. The soil surface is primarily covered with herbaceous litter, which is often covered with water. In certain sample locations, moss is abundant. The vegetative strata that characterize this community are medium shrubs (between 3 and 10 feet in height) and medium graminoids (between 4 and 24 inches in height).

### Dominant plant species

- white spruce (*Picea glauca*), tree
- resin birch (*Betula glandulosa*), shrub

- tealeaf willow (*Salix pulchra*), shrub
- grayleaf willow (*Salix glauca*), shrub
- littletree willow (*Salix arbusculoides*), shrub
- shrubby cinquefoil (*Dasiphora fruticosa*), shrub
- water sedge (*Carex aquatilis*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- slimstem reedgrass (*Calamagrostis stricta*), grass
- Bigelow's sedge (*Carex bigelowii*), grass
- tussock cottongrass (*Eriophorum vaginatum*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- purple marshlocks (*Comarum palustre*), other herbaceous
- arctic sweet coltsfoot (*Petasites frigidus*), other herbaceous

## Community 1.2
## Shrub birch-willow / sedge-bluejoint

**Figure 13. 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 | quaking aspen | *Populus tremuloides* | POTR5 | 75 | 0.1 (0-1) |
| T | white spruce | *Picea glauca* | PIGL | 50 | 0.1 (0-0.1) |
| S | shrub birch | *Betula glandulosa* | BEGL | 100 | 30 (2-65) |
| S | willow | *Salix spp.* | SALIX | 100 | 15 (4-25) |
| G | bluejoint | *Calamagrostis canadensis* | CACA4 | 100 | 15 (2-45) |
| G | sedge | *Carex spp.* | CAREX | 100 | 15 (0.1-30) |
| F | field horsetail | *Equisetum arvense* | EQAR | 75 | 3 (0-10) |
| F | arctic sweet coltsfoot | *Petasites frigidus* | PEFR5 | 50 | 1 (0-2) |
| F | fleabane | *Erigeron spp.* | ERIGE2 | 50 | 0.1 (0-0.1) |

This dataset includes data from 4 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, 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 early stage of fire-induced secondary succession for this ecological site and is characterized as open low scrub (Viereck et al. 1992). The dominant shrubs are shrub birch and willow. Commonly observed willow species include tealeaf willow and littletree willow. Tree seedlings of white spruce and quaking aspen (*Populus tremuloides*) were commonly observed but not abundant. Other commonly observed species include an assortment of sedges (primarily *Carex aquatilis*), bluejoint (*C. canadensis*), and field horsetail. The soil surface is primarily covered with herbaceous litter, which is often covered with water. In certain sample locations, small patches of bare soil are present. The vegetative strata that characterize this community are medium shrubs (between 3 and 10 feet in height) and medium graminoids (between 4 and 24 inches in height).

### Dominant plant species

- quaking aspen (*Populus tremuloides*), tree
- white spruce (*Picea glauca*), tree
- resin birch (*Betula glandulosa*), shrub

- tealeaf willow (*Salix pulchra*), shrub
- littletree willow (*Salix arbusculoides*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- water sedge (*Carex aquatilis*), grass
- sedge (*Carex*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- arctic sweet coltsfoot (*Petasites frigidus*), other herbaceous
- fleabane (*Erigeron*), other herbaceous

### Pathway 1.1a
### Community 1.1 to 1.2

**Shrub birch-willow / sedge-reedgrass / field horsetail**

**Shrub birch-willow / sedge-bluejoint**

Fire.

### Pathway 1.2a
### Community 1.2 to 1.1

**Shrub birch-willow / sedge-bluejoint**

**Shrub birch-willow / sedge-reedgrass / field horsetail**

Time without fire.

## Additional community tables

## Inventory data references

NASIS User Site ID / Modal Datasets
10BB01701 plant community 1.1
10BB01703 plant community 1.1
10BB03902 plant community 1.1
10BL00704 plant community 1.1
10BL02001 plant community 1.1
10BL02006 plant community 1.1
10BL02007 plant community 1.1
10DM01903 plant community 1.1

11BB05405 plant community 1.1
11BB05901 plant community 1.1
11BB05905 plant community 1.1
11BB06801 plant community 1.1
11SN03002 plant community 1.1
11TD08703 plant community 1.1
11TD08902 plant community 1.1
12NR01501 plant community 1.1
12NR01601 plant community 1.1
12NR01801 plant community 1.1
12NR02503 plant community 1.1
12NR02801 plant community 1.1
12SN00902 plant community 1.1
12TR00601 plant community 1.1
12TR00901 plant community 1.1
13BA00901 plant community 1.1
13BA01002 plant community 1.1
13BA01304 plant community 1.1
13NR01403 plant community 1.1
14NR02504 plant community 1.1
2015AK290463 plant community 1.1
S2015AK290008 plant community 1.1
11TD09003 plant community 1.2
11TD09005 plant community 1.2
12NR01304 plant community 1.2
2015AK290458 plant community 1.2

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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:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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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):**

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:**

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