USDA Natural Resources Conservation Service

Ecological site XA232X01Y280
Boreal Scrub Loamy Flood Plain Wet

Last updated: 5/18/2020
Accessed: 05/13/2025

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 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 the flood plain and adjacent terraces of minor, low-gradient tributaries in the Yukon Flats Lowlands MLRA. The reference plant community is associated with soils that both pond and flood. Ponding occurs frequently (greater than 50 times in 100 years) for long durations of time (between 7 and 30 days). Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). The reference state supports three plant communities, which represent riparian primary succession along these minor tributaries.

The reference plant community phase is characterized as closed tall scrub (greater than 75 percent shrub cover; Viereck et al. 1992) primarily composed of a mixture of willow (Salix spp.). Commonly observed species include tealeaf willow (Salix pulchra), littletree willow (Salix arbusculoides), Bebb willow (Salix bebbiana), sweetgale (Myrica gale), bluejoint (Calamagrostis canadensis), water sedge (Carex aquatilis), and field horsetail (Equisetum arvense).

Associated sites

XA232X01Y205	**Boreal Grass Loamy Flood Plain Depressions** This ecological site is associated with depressions on flood plains in the Yukon Flats Lowlands MLRA. The reference state plant communities are associated with soils that both pond and flood. Ponding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). Flooding occurs occasionally for brief durations of time. The reference plant community is characterized as open tall scrub (Viereck et al. 1992) and is primarily composed of willow (Salix spp.).
XA232X01Y206	**Boreal Scrub Loamy Frozen Flood Plain Depressions** This ecological site is associated with depressions on flood plains in the Yukon Flats Lowlands MLRA. The reference state plant communities are associated with soils that both pond and flood. Ponding occurs frequently (greater than 50 times in 100 years) for long durations of time (between 7 and 30 days). Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). The reference plant community is characterized as mesic graminoid herbaceous (Viereck et al. 1992) and is primarily composed of bluejoint (Calamagrostis canadensis).
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).
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.
XA232X01Y223	**Boreal Scrub Loamy Frozen Terrace Depressions** This shrubby ecological site occurs in the transitional area between the forested tread of a stream terrace and the graminoid-dominant communities associated with closed, terrace depressions (ecological site R232XY222AK). This site typically occurs between the outer third and lip of these closed depressions. The reference plant community for ecological site is characterized as an open tall scrubland (Viereck et al. 1992) and those shrubs are primarily an assortment of willow (Salix spp.).

Similar sites

XA232X01Y205	**Boreal Grass Loamy Flood Plain Depressions** Ecological site XA232X01Y205 supports a bluejoint dominant reference plant community similar to community 1.2 of this ecological site. With that said, XA232X01Y205 occurs in flood plain depressions. These ecological sites were kept as unique concepts based on differences in landform position, soils, associated ecological sites, and disturbance regimes.

XA232X01Y200	**Boreal Scrub Loamy Flood Plain Low** XA232X01Y200 is associated with the low flood plain of major tributaries. When compared to XA232X01Y280, associated soils do not pond and are comparatively drier.
XA232X01Y206	**Boreal Scrub Loamy Frozen Flood Plain Depressions** XA232X01Y206 occurs on the edge of flood plain depressions. This ecological site is commonly associated with permafrost.
XA232X01Y223	**Boreal Scrub Loamy Frozen Terrace Depressions** XA232X01Y223 occurs on the edge of terrace depressions. This ecological sites is commonly associated with permafrost.

Figure 1. The reference plant community for XA232X01Y205 is similar to community 1.2 for ecological site XA232X01Y280. Both are bluejoint dominant communities.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Salix* (2) *Myrica gale*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Carex aquatilis*

Legacy ID

R232XY280AK

Physiographic features

This ecological site and its associated plant communities occur adjacent to minor, low-gradient tributaries throughout the Yukon Flats Lowlands MLRA. Within the lowlands portion of this MLRA, low-gradient tributaries are common; prime examples being the Grass River (66.470 N, 144.400 W; WGS84) and The Forks (66.150 N, 149.200 W; WGS84; see figures below). Because plant communities and soils adjacent to these minor tributaries were unique when compared to major tributaries (e.g. XA232X01Y200), a unique ecological site was developed.

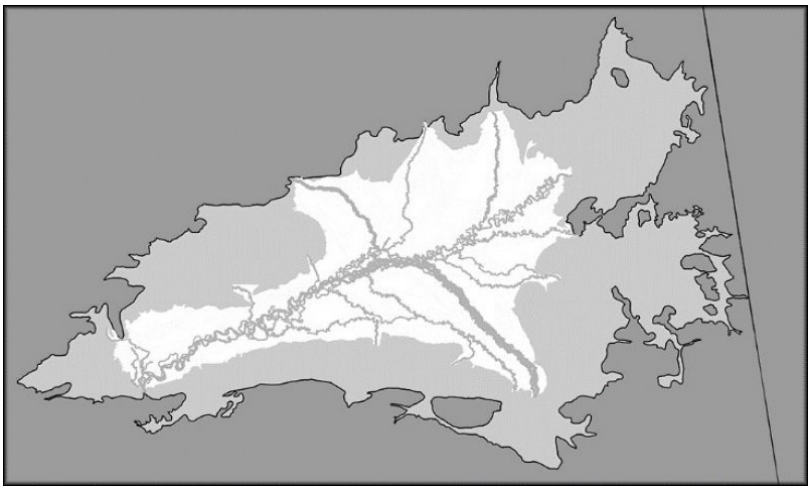


Figure 2. Lowlands (white) and marginal uplands (light gray) regions of the Yukon Flats Lowlands MLRA.

Figure 3. Satellite image of The Forks, which is composed on many minor, low-gradient streams. Graminoid dominant communities occur directly adjacent to the streams. As elevation above and distance from the stream increases, a willow dominant community occurs.

Figure 4. Aerial image of The Forks. This image shows the three communities that occur adjacent to minor,low-gradient streams in the Yukon Flats Lowlands MLRA.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain (2) Alluvial plain > Stream terrace
Flooding duration	Long (7 to 30 days) to brief (2 to 7 days)
Flooding frequency	Frequent to occasional

Ponding duration	Long (7 to 30 days)
Ponding frequency	Frequent to none
Elevation	91–305 m
Slope	0–3%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

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

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

Table 3. Representative climatic features

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

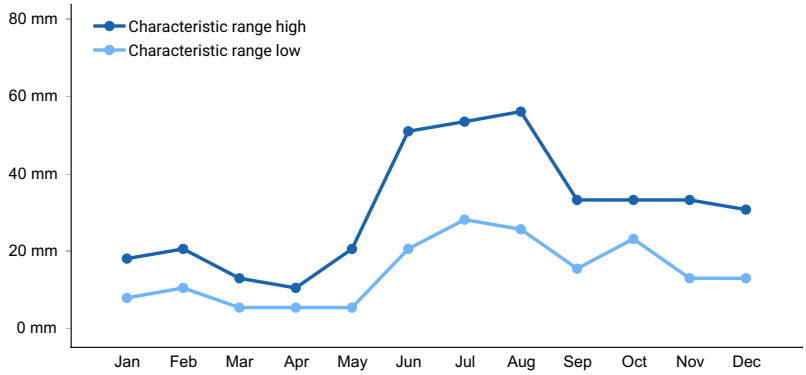


Figure 5. Monthly precipitation range

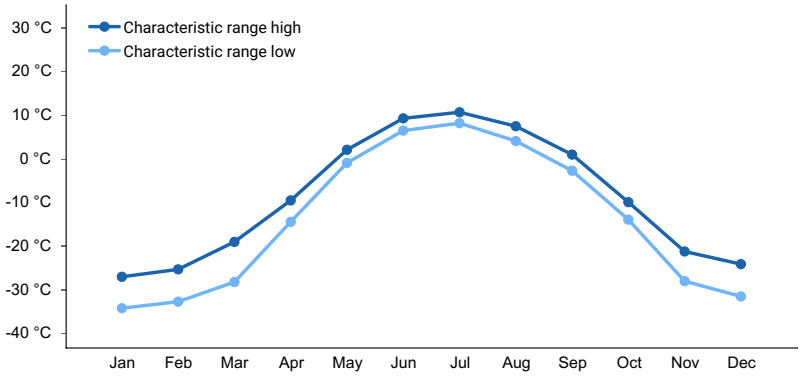


Figure 6. Monthly minimum temperature range

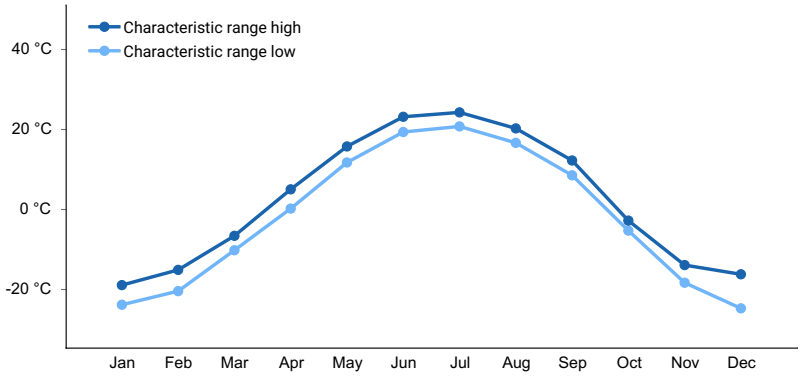


Figure 7. Monthly maximum temperature range

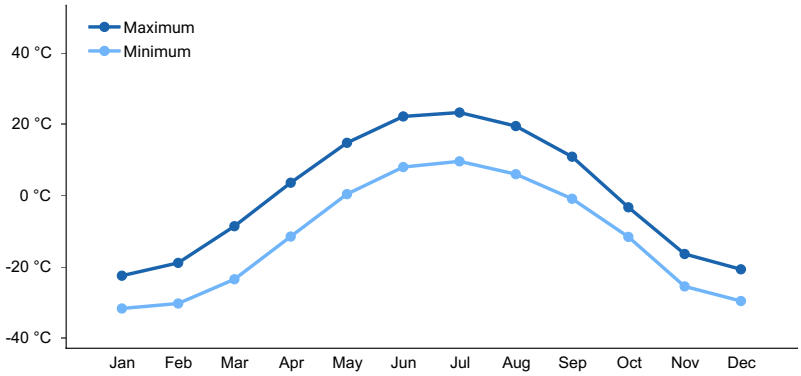


Figure 8. Monthly average minimum and maximum temperature

Influencing water features

During the spring and early growing season (May and June), a water table occurs at very shallow depth (less than 10 inches). For Fishnet soils, this occurs due to flooding. For Tanjoga soils, this occurs due to ponding. As the seasonal frost melts, the water drains from these soils. During long portions of the growing season (July through September), a water table commonly occurs at shallow depths for Tanjoga soils (between 10 and 20 inches) and at moderate depths for Fishnet soils (between 20 to 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.

Soil features

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

One soil component was developed for the graminoid dominant communities on the flood plain of these tributaries (Fishnet) and one for the willow dominant communities on the adjacent flooded terraces (Tanjoga). These two soil

components represent the catena of soil that occurs directly adjacent to these minor, low-gradient tributaries.

Tanjoga is thought to flood and pond with soils that are considered very poorly drained. Fishnet is thought to flood and has soils that are considered poorly drained.

Figure 9. Typical soil profile associated with Tanjoga soil component.

Figure 10. Typical soil profile associated with Fishnet soil component.

Table 4. Representative soil features

Parent material	(1) Organic material (2) Alluvium
Family particle size	(1) Coarse-loamy
Drainage class	Very poorly drained to poorly drained
Soil depth	203 cm

Ecological dynamics

Flooding

Tanjoga soils are thought to flood occasionally (5 to 50 times in 100 years) for brief periods of time (between 2 and 7 days), while Fishnet soils are thought to flood frequently (greater than 50 times in 100 years) for long periods of time (between 7 and 30 days). Flooding is thought to occur during the months of May and June.

The shift from graminoid to willow dominant vegetation is thought to represent riparian primary succession along these minor, low-gradient tributaries (fig. 4). Community 1.3 occurs directly adjacent to the stream, appearing to colonize exposed river wash. It is considered a pioneering flood sere and is primarily composed of water sedge. As elevation and distance from the stream increases, site conditions favor communities 1.1 and 1.2. Community 1.2 occurs on drier portions of the flood plain, is primarily composed of bluejoint, and is considered an early flood sere.

A natural levee separates community 1.2 and 1.1, which marks the transition to the adjacent terrace. The terrace supports the willow dominant reference community, which is believed to both flood and pond.

Other Observations

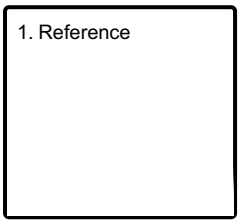
Flood plain and terrace plant communities are typically split into unique ecological sites. For this ecological site, the three associated community phases were put into one ecological site because they are thought to represent primary succession along these minor tributaries and the three communities occupy a limited spatial footprint.

Animal use (browsing and grazing) of this ecological site primarily consists of slight moose browse on willow, which was common in the reference community phase. A browse severity rating of slight on willow is defined as a majority of individuals having no signs of browsing.

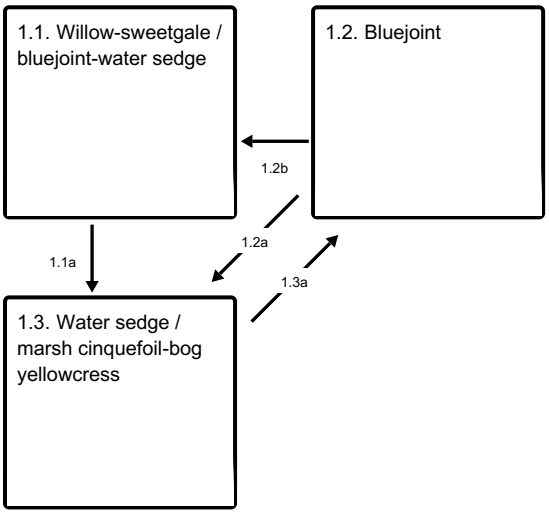
No alternative states for this ecological site were documented.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference

Figure 11. A small stream in the Yukon Flats Lowlands MLRA.

The reference state has three associated communities. These communities are grouped by the structure and dominance of the vegetation (e.g., coniferous trees, deciduous trees, shrubs, and forbs) and their ecological function and stability. Plant communities in the reference state appear to be largely controlled by the influences of flooding and ponding. As flooding becomes less frequent and lasts for shorter durations of time, willow gain dominance. 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 or state to another. The common and scientific plant names are from the USDA PLANTS database. All community in this report are characterized using the Alaska Vegetation Classification (Viereck et al. 1992).

Community 1.1
Willow-sweetgale / bluejoint-water sedge

Figure 12. Typical plant community associated with community 1.1.

Community Phase 1.1 Canopy Cover Table

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

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
T	white spruce	*Picea glauca*	PIGL	80	6 (0-25)
S	willow	*Salix spp.*	SALIX	100	70 (60-85)
S	sweetgale	*Myrica gale*	MYGA	40	9 (0-30)
S	Siberian alder	*Alnus viridis* ssp. *fruticosa*	ALVIF	40	2 (0-5)
G	bluejoint	*Calamagrostis canadensis*	CACA4	100	35 (10-60)
G	sedge	*Carex spp.*	CAREX	60	7(0-20)
F	field horsetail	*Equisetum arvense*	EQAR	80	3 (0-15)
F	sidebells wintergreen	*Orthilia secunda*	ORSE	60	1 (0-5)

This dataset comes from five 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 13. Canopy cover table for community 1.1.

The reference plant community is characterized as closed tall scrub primarily composed of a mixture of willow. White spruce (*Picea glauca*) is common but cover is low. Commonly observed species include tealeaf willow, littletree willow, Bebb willow, sweetgale, bluejoint, water sedge, and field horsetail. The vegetative strata that characterize this community are tall shrubs (greater than 10 feet in height) and tall graminoids (greater than 2 feet in height). The soil surface is primarily covered with herbaceous litter and bryophytes (species not recorded), which is commonly covered with ponded water (as much as 40 percent of plot).

Dominant plant species

- white spruce (*Picea glauca*), tree
- tealeaf willow (*Salix pulchra*), shrub
- littletree willow (*Salix arbusculoides*), shrub
- Bebb willow (*Salix bebbiana*), shrub
- sweetgale (*Myrica gale*), shrub
- Siberian alder (*Alnus viridis ssp. fruticosa*), shrub
- bluejoint (*Calamagrostis canadensis*), grass
- water sedge (*Carex aquatilis*), grass
- sedge (*Carex*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- sidebells wintergreen (*Orthilia secunda*), other herbaceous

Community 1.2
Bluejoint

Figure 14. Typical plant community associated with community 1.2.

Community Phase 1.2 Canopy Cover Table

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

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
G	bluejoint	*Calamagrostis canadensis*	CACA4	100	95 (90-100)
G	water sedge	*Carex aquatilis*	CAAQ	50	1 (0-2)
F	field horsetail	*Equisetum arvense*	EQAR	50	2 (0-3)
F	bog yellowcress	*Rorippa palustris*	ROPA2	50	0.1 (0-0.1)

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 15. Canopy cover table for community 1.2.

This early flooding community sere is characterized as mesic graminoid herbaceous and is primarily composed of bluejoint. Water sedge, field horsetail, and bog yellowcress (*Rorippa palustris*) occur but cover is low. The vegetative stratum that characterizes this community are tall graminoids (greater than 2 feet in height). The soil surface is primarily covered with herbaceous litter.

Dominant plant species

- bluejoint (*Calamagrostis canadensis*), grass
- water sedge (*Carex aquatilis*), grass
- field horsetail (*Equisetum arvense*), other herbaceous
- bog yellowcress (*Rorippa palustris*), other herbaceous

Community 1.3
Water sedge / marsh cinquefoil-bog yellowcress

Figure 16. Typical plant community associated with community 1.3.

Community Phase 1.3 Canopy Cover Table

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

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
S	willow	*Salix spp.*	SALIX	50	0.1 (0-0.1)
G	water sedge	*Carex aquatilis*	CAAQ	100	50 (30-65)
G	bluejoint	*Calamagrostis canadensis*	CACA4	100	4 (3-5)
F	marsh cinquefoil	*Comarum palustre*	COPA28	100	3 (0.1-5)
F	threepetal bedstraw	*Galium trifidum*	GATR2	100	0.1 (0.1)
F	bog yellowcress	*Rorippa palustris*	ROPA2	50	15 (0-25)
F	largeleaf avens	*Geum macrophyllum*	GEMA4	50	10 (0-20)
F	marsh fleabane	*Senecio congestus*	SECO2	50	2 (0-4)
F	Mackenzie's water hemlock	*Cicuta virosa*	CIVI5	50	1 (0-1)
F	Norwegian cinquefoil	*Potentilla norvegica*	PONO3	50	1 (0-1)

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 17. Canopy cover table for community 1.3.

This pioneer flooding community sere is characterized as wet graminoid herbaceous and is primarily composed of water sedge. This community sere occurs directly adjacent to the stream and appears to colonize river wash. Other commonly observed species include bluejoint, marsh cinquefoil (*Comarum palustre*), threepetal bedstraw (*Galium trifidum*), and bog yellowcress (*Rorippa palustris*). The vegetative stratum that characterizes this community are tall graminoids (greater than 2 feet in height) and medium forbs (between 4 and 24 inches in height). The soil surface is primarily covered with herbaceous litter, but small areas of exposed soil occur (as much as 10 percent of plot).

Dominant plant species

- willow (*Salix*), shrub
- water sedge (*Carex aquatilis*), grass
- bluejoint (*Calamagrostis canadensis*), grass
- purple marshlocks (*Comarum palustre*), other herbaceous
- threepetal bedstraw (*Galium trifidum*), other herbaceous
- bog yellowcress (*Rorippa palustris*), other herbaceous
- largeleaf avens (*Geum macrophyllum*), other herbaceous
- marsh fleabane (*Senecio congestus*), other herbaceous
- Mackenzie's water hemlock (*Cicuta virosa*), other herbaceous
- Norwegian cinquefoil (*Potentilla norvegica*), other herbaceous

Pathway 1.1a
Community 1.1 to 1.3

Willow-sweetgale / bluejoint-water sedge

Water sedge / marsh cinquefoil-bog yellowcress

More frequent and longer duration flood events. The reference state for this ecological site floods occasionally for brief periods of time. Areas that are thought to flood less frequently are represented by community 1.1 and areas that are thought to flood more frequently are represented by communities 1.2 and 1.3. When compared to community 1.1, the more frequently flooded plant communities have less willow cover.

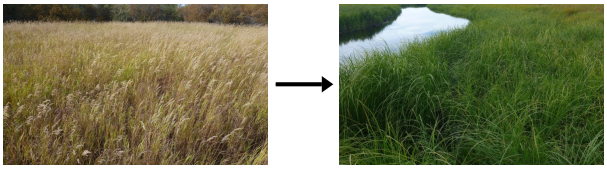
Pathway 1.2b
Community 1.2 to 1.1

Bluejoint

Willow-sweetgale / bluejoint-water sedge

Less frequent and shorter duration flood events. Areas that are thought to flood less frequently are represented by community 1.1 and areas that are thought to flood more frequently are represented by community 1.2. When compared to community 1.1, the more frequently flooded plant community has less willow cover.

Pathway 1.2a
Community 1.2 to 1.3

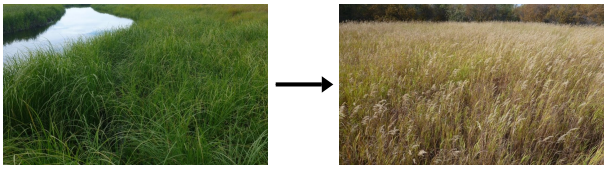


Bluejoint

Water sedge / marsh cinquefoil-bog yellowcress

More frequent and longer duration flood events. Areas that are thought to flood less frequently are represented by community 1.2 and areas that are thought to flood more frequently are represented by community 1.3. When compared to community 1.2, the more frequently flooded plant communities have less bluejoint and greater sedge cover.

Pathway 1.3a
Community 1.3 to 1.2



Water sedge / marsh cinquefoil-bog yellowcress

Bluejoint

Less frequent and shorter duration flood events. Areas that are thought to flood less frequently are represented by community 1.2 and areas that are thought to flood more frequently are represented by community 1.3. When compared to community 1.2, the more frequently flooded plant community has less bluejoint and more sedge cover.

Additional community tables

Inventory data references

NASIS User Site ID / Modal Datasets
11BB05001 plant community 1.1
11BB07105 plant community 1.1
2015AK290627 plant community 1.1
2015AK290629 plant community 1.1
2015AK290669 plant community 1.1

2015AK290628 plant community 1.2
2015AK290630 plant community 1.2
11BB07101 plant community 1.3
2015AK290626 plant community 1.3

Other references

PRISM Climate Group. 2006. Climate data of United States, 1971-2000. Oregon State University, Corvallis.

Schoeneberger, P.J., and D.A. Wysocki. 2012. Geomorphic description system. Version 4.2. U.S. Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and W.D. Broderson, editors. 2012. Field book for describing and sampling soils. Version 3.0. U.S. Department of Agriculture, Natural Resources Conservation Service.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18
.
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wezlick. 1992. The Alaska vegetation classification. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station General Technical Report PNW-GTR-286.

Williams, J.R. 1962. Geologic reconnaissance of the Yukon Flats District, Alaska. U.S. Department of the Interior, Geologic Survey Bulletin 1111-H.

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):**

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

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
