Ecological site R236XY155AK
Boreal Scrub Loamy Flood Plains, Wet

Last updated: 2/13/2024
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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.

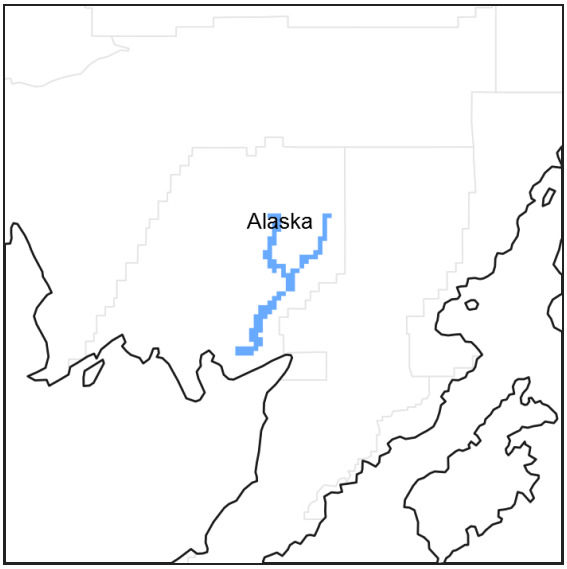


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 236X–Bristol Bay-Northern Alaska Peninsula Lowlands

MLRA 236 is in the western region of Alaska. It covers approximately 19,575 square miles and extends inland from Bristol Bay. It is defined by an expanse of nearly level to rolling lowlands, uplands, and low to moderate hills bordered by long footslopes of mountains. The climate near the coast is dominantly maritime, but the weather systems of Interior Alaska may have a strong influence on inland areas. The entire MLRA was covered by glacial ice during the early to middle Pleistocene. MLRA 236 is dominantly sparsely populated, undeveloped wildland. The communities of Dillingham and King Salmon and other villages are in the MLRA.

Ecological site concept

Information about the ecological site concept is in the "Ecological Dynamics" section.

This report provides baseline inventory data for the vegetation in this ecological site. Future 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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Alnus viridis subsp. sinuata* (2) *Salix alaxensis*
Herbaceous	(1) *Calamagrostis canadensis* (2) *Comarum palustre*

Physiographic features

Information about the physiographic features is in the "Ecological Dynamics" section.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Elevation	0–580 ft
Slope	0–1%
Aspect	Aspect is not a significant factor

Climatic features

Influencing water features

Information about the water features is in the "Ecological Dynamics" section.

Soil features

Information about the soil features is in the "Ecological Dynamics" section. More in-depth soils information is in the soil survey reports.

Ecological dynamics

This boreal ecological site is in channels of mid flood plains of the Nushagak River. Elevation ranges from sea level to 580 feet above sea level, and slopes are 0 to 1 percent. Slope aspect does influence the plant community dynamics of this site.

This ecological site is correlated to D36-Boreal scrub silty flood plains, wet. This soil has a cryic temperature regime and an aquic moisture regime. The saturated hydraulic conductivity is moderately low to a depth of 40 inches. The upper mineral horizon is very strongly acid or strongly acid (pH 4.8 to 5.3), and it has an organic matter content of 50 to 100 percent. The soil is poorly drained. The annual precipitation is 24 to 37 inches, and the annual frost-free period is 85 to 140 days. The parent material consists of herbaceous organic material over coarse-silty alluvium.

The reference community phase is typified by tall scrubland consisting of alder and willow and an understory of diverse forbs and bluejoint grass (*Calamagrostis canadensis*). All of the ecological sites on boreal mid flood plains in the MLRA are subject to flooding, but this site is also subject to frequent, long periods of ponding. Differences in soil moisture and disturbance regimes create distinct reference states and community phases, making the use of unique ecological sites necessary.

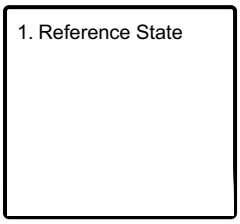
Ponding is the major documented disturbance regime for this ecological site; it is considered natural and typically is unmanaged. This disturbance regime results in two distinct community phases. Although this site is subject to occasional, long periods of flooding, the ponding affects the progression of vegetation in the community phases. The site is subject to frequent, long periods of ponding in April through October because of the depressed topography, minimal slope, and poorly drained soils. A water table is near the surface during peak snowmelt in May and June. The available background information suggests that ponding commonly inhibits oxygen to susceptible plants (Hook and Crawford, 1978; Jackson et al., 1991). The hypoxic or anoxic condition is a major abiotic stress

that may determine the presence or absence of vascular plants (Vartapetian and Jackson, 1996). The period of ponding that affects plants varies. Temporal tolerance of plants to oxygen deprivation differs among species and may range from many hours to several weeks (Vartapetian and Jackson, 1996). The effects of ponding typically depend on the periods of flooding and the yearly and monthly deviations in rainfall, snowmelt, and seepage.

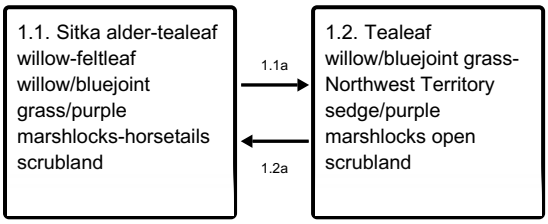
Moderate or severe browsing by moose on willows has been observed in both community phases. Browsing appears to cause patchiness in the stands of willow and alder, which may partially explain the variation in the willow cover in the reference community phase. Browsing appears to be ubiquitous, but it does not create a significant change in the structure and function of the communities.

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1a - Ponding.

1.2a - Ponding recovery.

State 1
Reference State

The reference state supports two community phases, which are grouped by the structure and dominance of the vegetation (e.g. shrubs, graminoids, and forbs) and by their ecological function and stability. The presence of these communities is dictated temporally by ponding. The reference community phase is characterized by scrubland that has graminoids and forbs throughout. No alternate states have been observed.

Community 1.1
Sitka alder-tealeaf willow-feltleaf willow/bluejoint grass/purple marshlocks-horsetails scrubland

Figure 2. Typical area of community 1.1.

Community Phase Canopy Cover

(Vegetation data in the table are provided as constancy (percent) and average canopy cover (percent) of the most dominant and ecologically relevant species for this community phase.)

Plant group	Common name	Scientific name	USDA plant code	Constancy (percent)	Average canopy cover (percent)
S	Sitka spruce	*Alnus viridis* ssp. *sinuata*	ALVIS	100	40
S	Arctic raspberry	*Rubus arcticus*	RUAR	100	10
S	Feltleaf willow	*Salix alaxensis*	SAAL	67	35
S	Tealeaf willow	*Salix pulchra*	SAPU15	67	15
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	70
F	Purple marshlocks	*Comarum palustre*	COPA28	100	25
F	Northern bedstraw	*Galium boreale*	GABO2	100	3
F	Tall Jacob's-ladder	*Polemonium acutiflorum*	POAC	100	3
F	Fewflower meadow-rue	*Thalictrum sparsiflorum*	THSP	100	Trace

Figure 3. Constancy and canopy cover of plants in community 1.1.

The reference community phase is characterized by scrubland that has bluejoint grass (*Calamagrostis canadensis*) and forbs throughout the understory and in open spaces. Typically, this community consists of a mixed scrubland of Sitka alder (*Alnus viridis* ssp. sinuata), tealeaf willow (*Salix pulchra*), and feltleaf willow (*Salix alaxensis*) and an understory of bluejoint grass (*Calamagrostis canadensis*), purple marshlocks (*Comarum palustre*), northern bedstraw (*Galium boreale*), and violets (Viola spp.). Other species may include arctic raspberry (*Rubus arcticus*), tall Jacob's-ladder (*Polemonium acutiflorum*), fewflower meadow-rue (*Thalictrum sparsiflorum*), and various sedges (Carex spp.). Rare, individual, medium or regenerating Kenai birch (*Betula papyrifera* var. kenaica) trees are present, but the natural disturbance regime prevents development of woodland or forestland. Mosses are common in the ground cover (about 40 percent total mean cover), dominantly sphagnum mosses (Sphagnum spp.) and rhizomnium mosses (Rhizomnium spp.). Other ground cover commonly includes herbaceous litter (about 60 percent cover) and woody litter (about 3 percent). About 1 percent of the surface is covered with water. Note: The vegetation and soils for this community were sampled at three locations. Due to the limited data available, personal field observations were used to aid in describing the plant community.

Community 1.2
Tealeaf willow/bluejoint grass-Northwest Territory sedge/purple marshlocks open scrubland

Figure 4. Typical area of community 1.2.

Community Phase Canopy Cover

(Vegetation data in the table are provided as constancy (percent) and average canopy cover (percent) of the most dominant and ecologically relevant species for this community phase.)

Plant group	Common name	Scientific name	USDA plant code	Constancy (percent)	Average canopy cover (percent)
S	Tealeaf willow	*Salix pulchra*	SAPU15	100	35
G	Bluejoint grass	*Calamagrostis canadensis*	CACA4	100	50
G	Northwest Territory sedge	*Carex utriculata*	CAUT	67	20
F	Purple marshlocks	*Comarum palustre*	COPA28	100	40
M	Sphagnum moss#	*Sphagnum spp.*	SPHAG2	67	20

Sphagnum mosses (*Sphagnum spp.*) are grouped by genera, not species.

Figure 5. Constancy and canopy cover of plants in community 1.2.

The early ponding community phase is characterized by open scrubland that has hydrophilic graminoids and forbs throughout the understory and in open areas. Typically, this community consists of clusters of tealeaf willow (*Salix pulchra*) with bluejoint grass (*Calamagrostis canadensis*), Northwest Territory sedge (*Carex utriculata*), and purple marshlocks (*Comarum palustre*) throughout. Other common species include alder (Alnus spp.), arctic raspberry (*Rubus arcticus*), field horsetail (*Equisetum arvense*), fireweed (*Chamerion angustifolium*), threepetal bedstraw (*Galium trifidum*), and Canadian burnet (*Sanguisorba canadensis*). Mosses generally are in the ground cover (about 20 percent total mean cover), including sphagnum mosses (Sphagnum spp.). The ground cover also includes herbaceous litter (about 75 percent cover) and woody litter (about 1 percent). About 5 percent of the surface is covered by water. About 1 percent is bare soil. Note: The vegetation and soils for this community were sampled at three locations. Due to the limited data available, personal field observations were used to aid in describing the plant community.

Pathway 1.1a
Community 1.1 to 1.2

Sitka alder-tealeaf willow-feltleaf willow/bluejoint grass/purple marshlocks-horsetails scrubland

Tealeaf willow/bluejoint grass-Northwest Territory sedge/purple marshlocks open scrubland

Ponding. This ecological site is subject to extended periods of ponding because of the minimal slopes and channeled topography. Ponding and saturation of the soils can create hypoxic and anoxic conditions that can stress or drown susceptible plants. The decreased competition for space and light can allow hydrophilic pioneer plants to colonize and the surviving graminoids to increase in abundance. The site is subject to frequent, long periods of ponding in April through October. It is hypothesized that much longer periods of ponding are needed to drown extant shrubs in the reference community phase and cause a community transition from the reference community phase to the early ponding phase (community 1.2).

Pathway 1.2a
Community 1.2 to 1.1

Tealeaf willow/bluejoint grass-Northwest Territory sedge/purple marshlocks open scrubland

Sitka alder-tealeaf willow-feltleaf willow/bluejoint grass/purple marshlocks-horsetails scrubland

Natural succession: Normal time and growth without disruptive ponding. As ponding subsides over time, facultative wet or obligate species will become less competitive and existing populations of species that are less water tolerant will increase. This commonly includes an increase in species that have greater longevity, such as shrubs. The canopy may increase the number of available niches and lead to an increase in the richness of shrubs, graminoids, and forbs. The period needed for this transition currently is unknown. It likely begins when active ponding ceases and is partially determined by the rates of propagule spread and growth of shrubs.

Additional community tables

Other references

Hook, D., and R.M.M. Crawford. 1978. Plant life in anaerobic environments. Ann Arbor Science Publishers, Ann Arbor, MI.

Jackson, M.B., D.D. Davies, and H. Lambers (editors). 1991. Plant life under oxygen deprivation: Ecology, physiology, and biochemistry. SPB Academic Publication, The Hague, Netherlands.

Vartapetian, B.B., and M.B. Jackson. 1996. Plant adaptations to anaerobic stress. Annals of Botany 79 (Supplement A): 3-20.

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Approval

Kirt Walstad, 2/13/2024

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	04/16/2024
Approved by	Kirt Walstad
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:**

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):**

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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:**
