Ecological Site Description ID:	R236XY127AK—Western Alaska Maritime Graminoid Peat Slopes

Ecological Dynamics of the Site:

This western Alaska maritime ecological site is located in depressions of upland plains and hills. These areas are typically found at elevations between sea level and 720 feet with slopes of 0 to 6 percent. Slope aspect does not appear to influence the plant community dynamics of this site as it is found on all aspects.

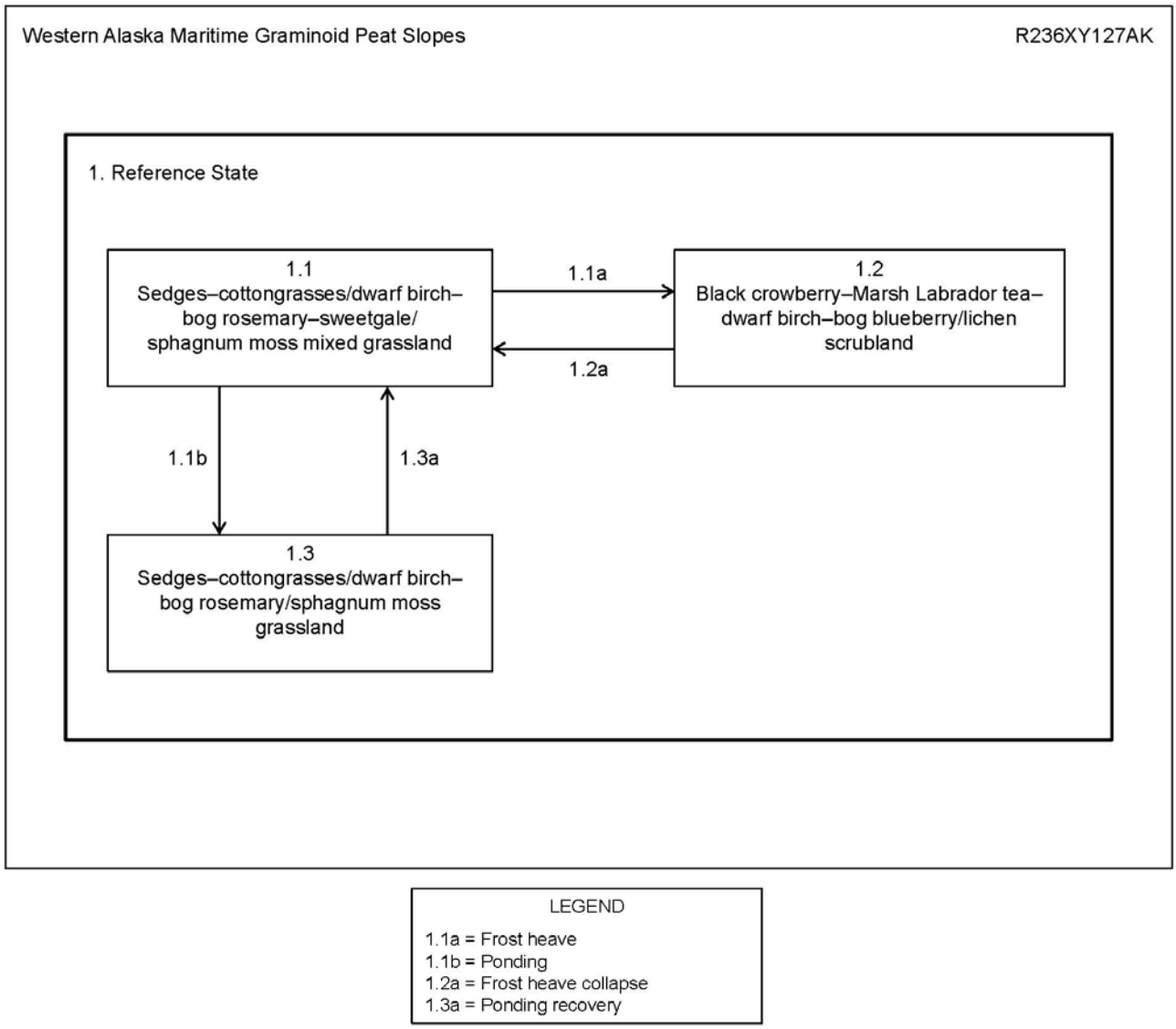
This ecological site is correlated to Mosquitopoint, Pellernarquq, and Wearyriver soils. Soil characteristics that are likely to influence plant community dynamics include a cryic soil temperature regime, an aquic moisture regime moderate soil permeability to a depth of 10 inches, and a moderately to extremely acidic (pH 5.8 to 4.2) surface layer. These soils are very poorly drained with negligible to medium runoff potential. Organic material content is commonly 75 to 95 percent in the surface layer. Annual precipitation is commonly between 24 and 36 inches, and the annual frost-free period ranges from 85 to 140 days. Parent material varies; it can consist of grassy organic material, mossy organic material over organic material over coarse-silty loess, or mossy organic material over coarse-loamy slope alluvium over coarse-loamy glaciolacustrine deposits.

The reference community phase is typified by grassland consisting of hydrophilic graminoids interspersed with low shrubs and sphagnum mosses (*Sphagnum spp.*). When compared to the other ecological site found in depressions of upland hills and plains within the survey area, R236XY109AK (Western Alaska Maritime Graminoid Peat Drainages) is not subject to frost heave and collapse, leading to different community phases and pathways. Furthermore, R236XY109AK corresponds with soils and landscapes mapped at the Order 3 level of intensity (1:63,360 scale), and this ecological site (R236XY127AK) is associated with soils mapped at the Order 2 level (1:24,000 scale). The mapping scale can result in differences in how landscapes and landforms are defined and described in terms of soils, plants, and land uses, sometimes making it necessary to describe the soils and ecological sites differently. Differences in disturbance regimes, soils, mapping scales, reference states, and community phases make the use of the two distinct ecological sites necessary.

Two disturbance regimes are recognized for this ecological site. Frost heave and collapse is considered a natural disturbance that is typically unmanaged. Frost heave in the reference community phase can create elevated areas that dry out. This can lead to a community consisting of fewer hydrophilic species and more low shrubs and lichens. Ponding is also considered a natural event that is typically unmanaged. Frequent, commonly very long periods of ponding occur from April through October. The available background information suggests that ponding commonly inhibits access of oxygen to susceptible plants (Hook and Crawford, 1978; Jackson *et al.*, 1991). Hypoxic or anoxic conditions are a major abiotic stress that helps to determine the presence or absence of vascular plants (Vartapetian and Jackson, 1996). The period of ponding that affects plants varies, as temporal tolerance of plants to oxygen deprivation differs among species and may range from many hours to several weeks (Vartapetian and Jackson, 1996). Flooding has not been noted on this landform, so the effects of ponding typically depend on yearly and monthly variations in rainfall, snowmelt, and seepage.

Slight browsing by moose is also possible on this ecological site, but it does not appear to affect the ecological processes significantly enough to alter the plant communities.

State and Transition Diagram:



State ID Number:	1	State Name:	Reference State
State Narrative:	The reference state supports three community phases, grouped by structure and dominance of the vegetation (e.g., graminoids, shrubs, forbs, mosses, and lichens) and their ecological function and stability. The reference community phase is represented by grassland consisting of hydrophilic graminoids and low shrubs and sphagnum mosses (*Sphagnum spp.*). The presence of the plant communities is temporally and spatially dictated by the influences of frost heave and ponding. No alternative states have been observed. This report provides baseline vegetation inventory data for 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.		

Phase 1.1			
Community Phase Number:	1.1	Community Phase Name:	Sedges-cottongrasses/dwarf birch-bog rosemary-sweetgale/sphagnum moss mixed grassland
Community Phase Narrative:			
The reference community phase is characterized by facultative to obligate wetland graminoids with low and dwarf shrubs interspersed throughout. Annual plant productivity is visually estimated to be highest among shrubs, though areas of dense graminoids may be more productive. Typically, this community consists of a wide variety of water-tolerant species, including water sedge (*Carex aquatilis*), manyflower sedge (*Carex pluriflora*), white cottongrass (*Eriophorum scheuchzeri*), dwarf birch (*Betula nana*), sweetgale (*Myrica gale*), bog rosemary (*Andromeda polifolia*), water horsetail (*Equisetum fluviatile*), and roundleaf sundew (*Drosera rotundifolia*). Myriad other facultative to obligate wetland species commonly are present, including small cranberry (*Vaccinium oxycoccos*), longawn sedge (*Carex macrochaeta*), creeping sedge (*Carex chordorrhiza*), Chamisso's cottongrass (*Eriophorum chamissonis*), and red cottongrass (*Eriophorum russeolum*). Sphagnum mosses (*Sphagnum spp.*) are nearly ubiquitous throughout and make up the vast majority of the total moss cover (total mean cover ~82 percent). Other ground cover commonly includes lichens (~5 percent) and herbaceous litter (~31 percent). About 3 percent of the surface is covered with water.			

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	Dwarf birch	*Betula nana*	BENA	97.4	7.9
S	Bog rosemary	*Andromeda polifolia*	ANPO	69.2	1.5
S	Sweetgale	*Myrica gale*	MYGA	35.9	26.4
G	Water sedge	*Carex aquatilis*	CAAQ	59.0	12.7
G	Manyflower sedge	*Carex pluriflora*	CAPL6	46.2	8.7
G	White cottongrass	*Eriophorum scheuchzeri*	ERSC2	33.3	6.6
F	Water horsetail	*Equisetum fluviatile*	EQFL	41.0	4.2
F	Roundleaf sundew	*Drosera rotundifolia*	DRRO	51.3	Trace
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2^	97.4	75.4

^ Sphagnum mosses are identified at the genus level.

Community Pathways

Pathway Number	Pathway Name & Description
1.1a	Frost heave. Upheaval of land from the surrounding areas can create drier areas that may lead to a shift in the vegetative community. Although many species are extant in community phase 1.1 and phase 1.2, marked differences in abundance between areas of frost heave and frost heave collapse make use of two separate communities necessary. The time required for this transition to occur depends on factors such as the time and height of frost heave and how quickly the upheaved area drains and dries.
1.1b	Ponding. It is likely that as ponding occurs, less water-tolerant plants will drown under hypoxic or anoxic conditions. This could cause a decrease in competition for light and space, allowing for colonization of less competitive, hydrophilic species. Ponding events *in situ* are frequent and very long. This combination of frequency and duration appears to be the disturbance pattern necessary to cause a transition from the reference community phase to the early ponding phase (1.3), though the timeframe has not been confirmed in the field.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	Black crowberry-marsh Labrador tea-dwarf birch-bog blueberry/lichen scrubland
Community Phase Narrative:			
This frost heave community phase is characterized by low and dwarf scrubland with various lichens throughout. Annual plant production is visually estimated to be primarily in the shrub group. Overall production is hypothesized to be slightly higher in this community than in the reference community phase, though comparisons between shrub and graminoid production are required to confirm this hypothesis. Typically, this community consists of marsh Labrador tea (*Ledum palustre* ssp. *decumbens*), dwarf birch (*Betula nana*), black crowberry (*Empetrum nigrum*), bog blueberry (*Vaccinium uliginosum*), cup lichens (*Cladonia spp.*), and reindeer lichens (*Cladina spp.*). Other species extant to this community are bog cranberry (*Vaccinium oxycoccos*), cloudberry (*Rubus chamaemorus*), water sedge (*Carex aquatilis*), other sedges (*Carex spp.*), and cottongrasses (*Eriophorum spp*.). Mosses (total mean cover ~55 percent) and lichens (~36 percent) are nearly ubiquitous throughout. Other ground cover commonly includes herbaceous litter (~21 percent). About 1 percent of the surface is covered with water.			

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	Black crowberry	*Empetrum nigrum*	EMNI	100.0	20.3
S	Marsh Labrador tea	*Ledum palustre* ssp. *decumbens*	LEPAD	100.0	13.1
S	Dwarf birch	*Betula nana*	BENA	100.0	8.5
S	Bog blueberry	*Vaccinium uliginosum*	VAUL	93.3	6.5
S	Bog rosemary	*Andromeda polifolia*	ANPO	80.0	2.2
G	Water sedge	*Carex aquatilis*	CAAQ	66.7	1.9
L	Reindeer lichens	*Cladina spp.*	CLADI3*	80.0	33.7
L	Cup lichens	*Cladonia spp.*	CALDO3#	53.3	17.0
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2^	93.3	44.4

* Cladina lichens are identified at the genus level.

Cladonia lichens are identified at the genus level.

^ Sphagnum mosses are identified at the genus level.

Community Pathways

Pathway Number	Pathway Name & Description
1.2a	Frost heave collapse. After frost heave collapse, moisture may remain in the soil and at the surface for a longer period of time, which can stress shrubs and lead to a decrease in their population. Lack of competition for space and light and ideal growth conditions allow facultative to obligate wetland graminoids to colonize and reproduce. The time period over which frost heave collapse will occur likely depends on various factors, including surface and soil temperatures and the precipitation rate.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Sedges-cottongrasses/dwarf birch-bog rosemary/ sphagnum moss grassland
Community Phase Narrative:			
This early ponding community phase is characterized hydrophilic grassland with some low and dwarf shrubs and an abundant mat of sphagnum moss (*Sphagnum spp.*). Annual plant production is visually estimated to occur primarily in the graminoid group. Total production is hypothesized to be less than in either of the other communities due to poorer growing conditions, though increases in graminoid production may make up for losses in shrub production. Typically, this community consists of water sedge (*Carex aquatilis*), red cottongrass (*Eriophorum russeolum*), round sedge (*Carex rotundata*), manyflower sedge (*Carex pluriflora*), purple marshlocks (*Comarum palustre*), roundleaf sundew (*Drosera rotundifolia*), dwarf birch (*Betula nana*), and bog rosemary (*Andromeda polifolia*). Other facultative to obligate wetland species that may be present include water horsetail (*Equisetum fluviatile*), small cranberry (*Vaccinium oxycoccos*), bog blueberry (*Vaccinium uliginosum*), and buckbean (*Menyanthes trifoliata*). The ground cover is dominantly sphagnum mosses (total mean cover ~85 percent). Other ground cover may include herbaceous litter (~24 percent). About 4 percent of the surface is covered with water. About 3 percent is bare soil.			

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	Dwarf birch	*Betula nana*	BENA	82.8	3.1
S	Bog rosemary	*Andromeda polifolia*	ANPO	75.9	1.5
S	Bog cranberry	*Vaccinium oxycoccos*	VAOX	62.1	1.1
G	Water sedge	*Carex aquatilis*	CAAQ	82.8	7.1
G	Round sedge	*Carex rotundata*	CARO7	44.8	6.5
G	Red cottongrass	*Eriophorum russeolum*	ERRU2	44.8	25.3
G	Manyflower sedge	*Carex pluriflora*	CAPL6	37.9	8.3
F	Roundleaf sundew	*Drosera rotundifolia*	DRRO	62.1	1.2
F	Purple marshlocks	*Comarum palustre*	COPA28	27.6	9.0
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2^	93.1	85.2

^ Sphagnum mosses are identified to the genus level.

Community Pathways

Pathway Number	Pathway Name & Description
1.3a	Natural succession: Normal time and growth without disruptive ponding. It is probable that as time passes, less water-tolerant species may be able to become established or expand their extant populations. New shrub species are likely to colonize, and existing shrub and graminoid populations will likely spread. The time needed for this to occur is unknown, but it likely depends at least partially on several factors, including the reproduction and growth rate of shrubs.

Bibliography

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

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