Ecological Site Description ID:	R236XY109AK—Western Alaska Maritime Graminoid Peat Drainages

Ecological Dynamics of the Site:

This western Alaska maritime ecological site is located in upland depressions and large (more than 10 meters across) lowland drainageways. These areas are typically found at elevations between sea level and 2,050 feet with slopes of 0 to 7 percent. Slope aspect does not appear to influence the plant community dynamics of this site as it is found on all aspects.

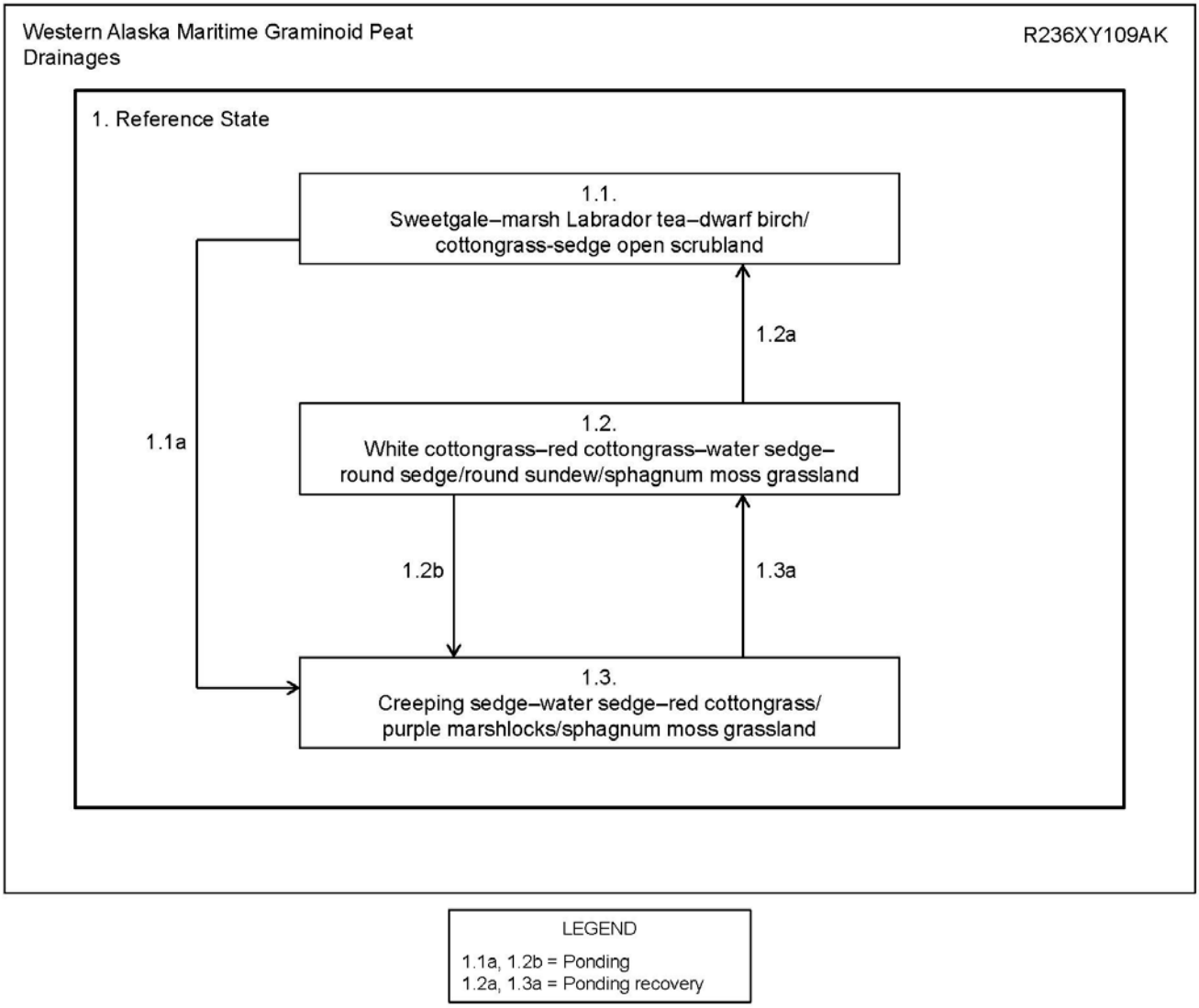
This ecological site is correlated to soil components D36-Western maritime scrub organic drainages and D36-Western maritime sedge organic depressions. Soil characteristics that are likely to influence plant community dynamics on this ecological site include a cryic soil temperature regime, an aquic moisture regime with very slow permeability between depths of 10 to 40 inches, and a moderately acidic to extremely acidic (pH 5.4 to 3.7) surface layer. Annual precipitation is normally between 21 and 57 inches, and the annual frost-free period ranges from 80 to 140 days. Parent material consists of mossy organic material over organic material over coarse-loamy slope alluvium or eolian deposits.

The reference community phase for this ecological site is typified by open scrubland that includes dense, low and dwarf shrubs mixed with hydrophilic cottongrasses (*Eriophorum spp.*) and sedges (*Carex spp.*) and moss ground cover. Ecological site R236XY127AK (Western Alaska Maritime Mosaic Peat Slopes), also found in upland depressions, is subject to frost heave and collapse, leading to different reference state communities and transitional pathways than those for this site (R236XY109AK). The ecological site described herein corresponds to soils and landscape positions mapped at the Order 3 level of intensity (1:63,360 scale), whileR236XY127AK was mapped at the Order 2 level (1:24,000 scale). Mapping scale can result in differences in how landscapes and landforms are defined and described in terms of soils, plant communities, and land uses, sometimes making it necessary to describe the soils and ecological sites differently. Other ecological sites in the survey area, including R236XY107AK (Western Alaska Maritime Scrub Gravelly Drainages) and R236XY136AK (Western Alaska Maritime Scrub Loamy Drainages), are found in lowland drainageways that are generally wider and have slightly steeper slopes. These areas support distinct reference states and community phases and are subject to different disturbance regimes (no recorded disturbance regime for R236XY107AK; flooding for R236XY136AK), making unique ecological sites necessary.

Ponding is the major documented disturbance regime for this ecological site, and it is considered to be a natural and unmanaged disturbance that results in three distinct community phases. The depressions and wide drainageways have similar characteristics, including gradual slopes, very poorly drained drained soils, and a negligible to medium runoff class. This ecological site is subject to frequent, very long periods of ponding, which commonly occur from April through October. Ponding can occur to a depth of four inches a water table at or just below the soil surface is typically present year round. Available literature suggests that ponding can inhibit access of oxygen by 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). Because the temporal tolerance of plants to oxygen deprivation differs among species and may range from many hours to several weeks (Vartapetian and Jackson, 1996), the duration and frequency of ponding greatly affect the plant communities. The effects of ponding typically depend on yearly and monthly variations in rainfall, snowmelt, and seepage.

No grazing or browsing has been noted on this ecological site.

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, and forbs) and their ecological function and stability. The reference community phase is represented by open scrubland consisting of low and dwarf shrubs interspersed with areas of moisture-tolerant graminoids. The presence of the communities is temporally dictated by a ponding regime associated with these upland depressions and lowland drainageways. 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:	Sweetgale-marsh Labrador tea-dwarf birch/cottongrass-sedge open scrubland
Community Phase Narrative:			
The reference community phase is characterized by open scrubland that includes patchy, dense shrubs surrounded by moisture-tolerant graminoids. Annual plant production is visually estimated to occur dominantly in the graminoid plant group with shrubs and forbs making up the remainder. Typically, this community consists of myriad facultative to obligate shrub and graminoid species, including bog rosemary (*Andromeda polifolia*), sweetgale (*Myrica gale*), marsh Labrador tea (*Ledum palustre* ssp*. decumbens*), dwarf birch (*Betula nana*), water sedge (*Carex aquatilis*), and red cottongrass (*Eriophorum russeolum*). Various obligate species throughout the community, including roundleaf sundew (*Drosera rotundifolia*), creeping sedge (*Carex chordorrhiza*), manyflower sedge (*Carex polifolia*), and small cranberry (*Vaccinium oxycoccos*), indicate the ubiquitous presence of surface and subsurface water (NWI code PSS1). Mosses (total mean cover ~63 percent), dominantly various species of sphagnum mosses (*Sphagnum spp.*), commonly form a mat on the surface. Other ground cover may include lichens (~3 percent) and herbaceous litter (~51 percent). About 4 percent of the surface is covered with water.			

Community Phase Canopy Cover

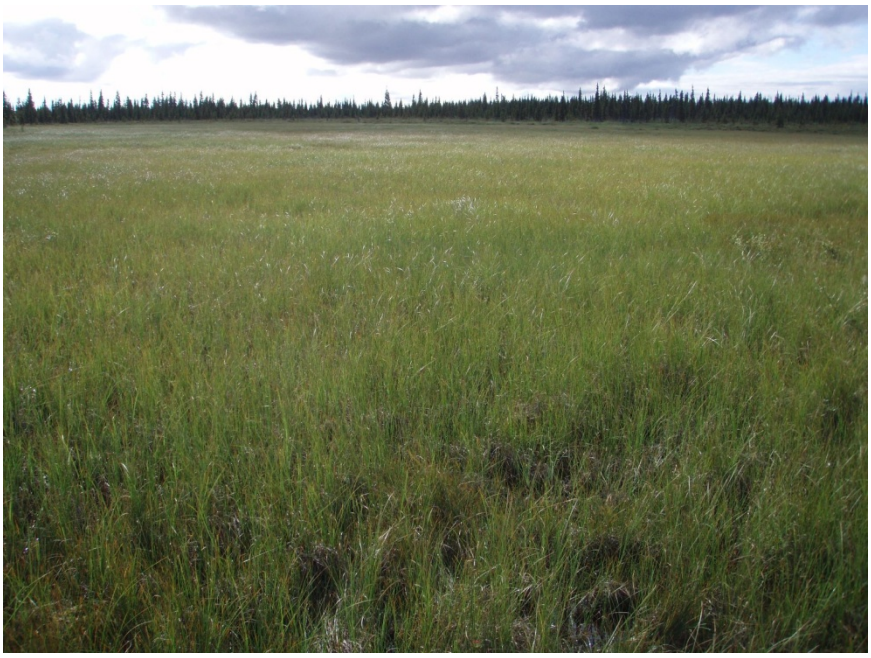
(Vegetation data in the table are provided as constancy (percent) and average canopy cover (percent) of the most dominant and ecologically relevant species for this community phase.)

Plant group	Common name	Scientific name	USDA plant code	Constancy (percent)	Average canopy cover (percent)
S	Bog rosemary	*Andromeda polifolia*	ANPO	74.2	2.4
S	Dwarf birch	*Betula nana*	BENA	93.6	9.2
S	Marsh Labrador tea	*Ledum palustre* ssp. *decumbens*	LEPAD	74.2	7.1
S	Sweetgale	*Myrica gale*	MYGA	41.9	27.3
S	Bog blueberry	*Vaccinium uliginosum*	VAUL	71.0	7.2
G	Water sedge	*Carex aquatilis*	CAAQ	67.7	18.5
G	Red cottongrass	*Eriophorum russeolum*	ERRU2	48.4	18.6
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2[#]	77.4	56.7

Sphagnum mosses are identified at the genus level.

Community Pathways

Pathway Number	Pathway Name & Description
1.1a	Ponding. It is likely that ponding of the reference community phase will create hypoxic or anoxic conditions that may kill extant shrubs that are less tolerant of wetness. Areas may then be colonized by hydrophilic (commonly wetland obligate) species. Along with the colonizing hydrophilic forbs and graminoids, some individual forbs, graminoids, and shrubs may persist after long-term ponding. Many of the plants in the reference community phase are facultative to obligate wetland species, which suggests that they may inherently survive periods of ponding. Ponding *in situ* is frequent and occurs for very long periods. This disturbance pattern appears to cause a community transition from the reference community phase to the early ponding phase (1.3), though the transitional timeframe has not been confirmed in the field.

Phase 1.2			
Community Phase Number:	1.2	Community Phase Name:	White cottongrass-red cottongrass-water sedge-round sedge/round sundew/sphagnum moss grassland
Community Phase Narrative:			
This is the late ponding community phase, characterized by grassland consisting of moisture-tolerant graminoids. Annual plant production is visually estimated to occur primarily among graminoids. Total production is hypothesized to be less than that of the reference community phase due to a lack of shrubs, though the loss in shrub production could be partially or fully negated by increased graminoid production. Typically, this community consists of myriad facultative to obligate graminoids, including white cottongrass (*Eriophorum scheuchzeri*), red cottongrass (*Eriophorum russeolum*), water sedge (*Carex aquatilis*), creeping sedge (*C. chordorrhiza*), and round sedge (*C. rotundata*). A variety of shrubs may be present, including dwarf birch (*Betula nana*), bog rosemary (*Andromeda polifolia*), and bog blueberry (*Vaccinium uliginosum*), but the abundance and coverage generally is low. Obligate forbs, such as purple marshlocks (*Comarum palustre*) and roundleaf sundew (*Drosera rotundifolia*), are also prevalent. Several wetland indicator species, such as tufted bulrush (*Trichophorum cespitosum*), small cranberry (*Vaccinium oxycoccos*), smallflower lousewort (*Pedicularis parviflora*), and buckbean (*Menyanthes trifoliate*), are also present, but they generally are not in high abundance. Mosses, dominantly sphagnum mosses (*Sphagnum spp.*), are prevalent on the surface (total mean cover ~81 percent). Other ground cover commonly includes herbaceous litter (~32 percent). About 8 percent of the area is covered with surface water, and about 1 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)
G	White cottongrass	*Eriophorum scheuchzeri*	ERSC2	42.2	12.0
G	Red cottongrass	*Eriophorum russeolum*	ERRU2	45.3	6.9
G	Water sedge	*Carex aquatilis*	CAAQ	85.9	10.3
G	Creeping sedge	*Carex chordorrhiza*	CACH5	18.6	16.9
G	Round sedge	*Carex rotundata*	CARO7	40.6	8.3
F	Round sundew	*Drosera rotundifolia*	DRRO	59.4	1.0
F	Purple marshlocks	*Comarum palustre*	COPA28	35.9	4.9
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2[#]	95.3	77.8

Sphagnum mosses are identified at the genus level.

Community Pathways

Pathway Number	Pathway Name & Description
1.2a	Natural succession: Normal time and growth without disruptive ponding. It is probable that as time passes, extant low and dwarf shrubs may continue to colonize and spread. As a result, the forb community will likely decline due to competition for space and light. The time needed for this transition to occur is currently unknown. Since the reference community phase is comprised of many water-tolerant species, it is assumed that the transition period is limited by the spread and growth rate of shrubs.
1.2b	Ponding. It is likely that frequent, very long periods of ponding within this community may kill extant shrubs that are less tolerant of wetness. This can create space and decrease competition for light, commonly allowing fast-growing forb and graminoid pioneer species to colonize and spread. Many of the plants in the late ponding phase are facultative to obligate wetland species, which suggests that they may inherently survive periods of ponding. Ponding *in situ* occurs frequently for very long periods. This disturbance pattern appears to cause a community transition from the late ponding phase (1.2) to the early ponding phase (1.3), though the transitional timeframe has not been confirmed in the field.

Phase 1.3			
Community Phase Number:	1.3	Community Phase Name:	Creeping sedge-water sedge-red cottongrass/purple marshlocks/sphagnum moss grassland
Community Phase Narrative:			
This is the early ponding community phase, characterized by grassland that consists of graminoids and forbs. Annual plant production is visually estimated to occur primarily among graminoids, and total production is hypothesized to be less than that of the reference community phase due to an overall decrease in plant richness and abundance amid poorer growing conditions. Typically, this community consists of various facultative to obligate wetland graminoids, including water sedge (*Carex aquatilis*), creeping sedge (*Carex chordorrhiza*), red cottongrass (*Eriophorum russeolum*), and manyflower sedge (*Carex pluriflora*). It also supports various water-tolerant forbs, including but not limited to purple marshlocks (*Comarum palustre*), Mackenzie's water hemlock (*Cicuta virosa*), and buckbean (*Menyanthes trifoliate*). Shrubs are a very minor component of this community, and they generally consist of individuals that survived ponding of the reference community phase. Ground cover generally is comprised dominantly of mosses (total mean cover ~78 percent), commonly sphagnum mosses (*Sphagnum spp*.). Other ground cover commonly includes herbaceous litter (~29 percent). About 11 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	Small cranberry	*Vaccinium oxycoccos*	VAOX	63.6	Trace
G	Water sedge	*Carex aquatilis*	CAAQ	81.8	6.0
G	Creeping sedge	*Carex chordorrhiza*	CACH5	45.5	12.0
G	Red cottongrass	*Eriophorum russeolum*	ERRU2	72.7	7.5
F	Purple marshlocks	*Comarum palustre*	COPA28	54.6	11.0
F	Mackenzie's water hemlock	*Cicuta virosa*	CIVI5	27.3	Trace
M	Sphagnum moss	*Sphagnum spp.*	SPHAG2[#]	63.6	87.1

Sphagnum mosses are identified at 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 become established or expand their extant populations within this community. Shrub cover is likely to increase, though any negative effect on graminoid and forb richness and abundance may be tempered by the creation and exploitation of new niches. The time necessary for this to happen is unknown. This transition is unlikely to depend on the absence of moist soils, as many of the species in the late ponding community phase are facultative to obligate wetland species. It is assumed that the transition period is at least partially limited by the spread and growth rate of shrubs and graminoids.

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.

This report is interim and subject to change.