16610

Alaskan Pacific-Aleutian Fen and Wet Meadow

BpS Model/Description Version: Nov. 2024

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| --- | --- | --- | --- |
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Vegetation Type

Herbaceous Wetland

Map Zones

73, 74, 75, 76, 77, 78, 80

Geographic Range

This Biophysical Setting (BpS) occurs from the eastern Aleutian Islands, Alaska Peninsula, Cook Inlet, and Kodiak Island through southeast AK.

Biophysical Site Description

Fens in Pacific Alaska and the Aleutians are typically found in low to mid elevation hydrologic discharge zones along bases of slopes. They are characterized by high, slow-moving water tables fed by groundwater, with water often expressed at the surface as small channels. Water tables fluctuate seasonally and are strongly influenced by precipitation events (Boggs et al. 2019). Fens differ from bogs in that they are fed by and receive nutrients from surface water, groundwater, and rainfall while bogs receive water and nutrients only from precipitation (Aerts et al. 1999).

Wet meadows in Pacific Alaska and the Aleutians are less influenced by the local surface and groundwater regime and thus develop in any topography where water collects during the growing season. This includes shallow depressions, seepage channels, infilled ponds, and late-melting snowbeds, along stream, lake, and pond margins, and on convex slopes, valley toeslopes, and terraces. The organic layer ranges from thick (sometimes >40 cm) to relatively thin and may be composed mainly of sedge peat or other, more decomposed organic material. The organic layer can occur over mineral soil or may be floating or submerged.

Vegetation Description

The unique hydrogeochemistry of fens, and to a lesser extent, wet meadows, fosters high species diversity and unique plant associations that are distinct from the peatland associations. In the alpine, fens and wet meadows are small-patch ecotypes, often occurring as mosaics of headwater fens, marshes, and riparian zones. The fen/wet meadow system is typically dominated by sedges (i.e. species in the Cyperacea family: *Carex, Juncus, Eriophorum, Tricophorum, Luzula*), but may be co-dominated by forbs. Vegetation has >25% herbaceous species cover and <25% shrub cover. Throughout the range of this system, fens and wet meadows consistently feature *Carex aquatilis* var. *dives* (syn*. Carex sitchensis)* (McClellan et al. 2003), although a variety of other sedges and forbs may be present, including *Dodecatheon pulchellum, Parnassia fimbriata, Eriophorum russeolum, Menyanthes trifoliata* (in pockets of standing water), *Carex saxatilis,* and *Comarum palustre*. The sloped fens of Prince William Sound and the outer Kenai Peninsula are consistently dominated by *Trichophorum cespitosum* and *Nephrophyllidium crista-galli.*

Other common genera and species include *Eriophorum angustifolium, Eriophorum scheuchzeri, Carex anthoxanthea*, and *Juncus mertensianus*. Less common but still possible species include *Saxifraga hirculus, Geum pentapetalum, Carex nigricans, Carex pluriflora, Carex anthoxanthea, Leptarrhena pyrolifolia, Ranunculus eschscholtzii, Ranunculus flammula, Saxifraga rivularis, Caltha palustris, Claytonia sibirica, Rubus chamaemorus, Juncus alpinoarticulatus ssp. nodulosus, Juncus triglumis*, and *Drosera* spp. *Calamagrostis canadensis* and *Calamagrostis stricta spp. inexpansa* are generalist species that may occur in this environment but do not indicate this specific system.

The only characteristic shrub is *Salix planifolia*. Ericaceous shrubs, which thrive in nutrient poor wetlands, are not common. *Sphagnum*, when present, may include *Sphagnum squarrosum* and *Sphagnum riparium* (Shephard 1995, Boggs 2000).

Mixed sedge and forb meadows include *Carex saxatilis, Sanguisorba canadensis, Swertia perennis*, and *Platanthera dilatata*. Forb-dominated sites include *Equisetum fluviatile,* and *Comarum palustre (= Potentilla palustris)*. Common alpine meadow species include *Salix reticulata, Salix stolonifera, Viola* spp., *Lupinus nootkatensis, Mimulus guttatus, Mimulus lewisii, Petasites frigidus var. frigidus, Sanguisorba canadensis*, *Leptarrhena pyrolifolia, Saxifraga ferruginea,* and *Saxifraga punctata* (Robuck 1989). *Valeriana sitchensis, Castilleja parviflora, Ranunculus* spp., and *Caltha* spp. often occur along streambanks.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CAAQD | *Carex aquatilis var. dives* | Sitka sedge |
| DOPU | *Dodecatheon pulchellum* | Darkthroat shootingstar |
| PAFI3 | *Parnassia fimbriata* | Fringed grass of parnassus |
| ERRU2 | *Eriophorum russeolum* | Red cottongrass |
| METR3 | *Menyanthes trifoliata* | Buckbean |
| COPA28 | *Comarum palustre* | Purple marshlocks |
| CASA10 | *Carex saxatilis* | Rock sedge |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Hydrologic dynamics govern this system. Under appropriate hydrologic conditions this system will remain stable for long periods of time, but changes in water level or frequency and duration of flooding may cause a transition to another BpS. Substantial flooding or an increase in water level may lead to the development of a Freshwater Emergent Marsh system. Under drying conditions, a Wet Low Shrub community may develop.

Succession in fens is a slow process in which a minerotrophic fen association develops into an ombrotrophic bog with surface vegetation raised above the influence of the groundwater (Zobel 1988). In general, the fen to bog transition occurs in two steps: (1) the acidification of the fen by *Sphagnum* species and (2) peat accumulation and isolation from the influence of water inflow from the surrounding mineral soil. *Sphagnum* species adapted to ombrotrophy initiate feedback processes (acidification and peat accumulation) favoring *Sphagnum* over vascular plants and other mosses (van Breemen 1995, Granath et al. 2010).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement |  |  |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires |  |  |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Small patch

Adjacency or Identification Concerns

This type does not include poor fens—which are included with the bog types.

Issues or Problems

Native Uncharacteristic Conditions

Comments

In 2021 NatureServe merged Alaskan Pacific Maritime Fen and Wet Meadow (BpS 1661), Alaskan Pacific Maritime Alpine Wet Meadow (BpS 1673), and Aleutian Wet Meadow and Herbaceous Peatland – Complex (BpS 1723) into one Ecological System: Alaskan Pacific-Aleutian Fen and Wet Meadow. Pat Comer and Kori Blankenship merged the BpS descriptions for 1661 (created by David D'Amore and reviewed by Tom DeMeo), 1673 (created by Tina Boucher, Rick Turner and Tom DeMeo), and 1723 (created by Randy Swaty and Keith Boggs and reviewed by Jeff Williams) to reflect the new Ecological System concept. All BpS were represented by models with one seral state.

For LANDFIRE National BpS 1661, 1673, and 1723 were developed based on input from experts who attend the LANDFIRE Juneau Modeling Meeting (Feb. 08) and the draft Ecological Systems descriptions (NatureServe 2008a, NatureServe 2008b).

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | A | A | A | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 100 Mid Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| CAAQD | *Carex aquatilis* var. *dives* | Sitka sedge | Upper |
| DOPU | *Dodecatheon pulchellum* | Darkthroat shootingstar | Upper |
| PAFI3 | *Parnassia fimbriata* | Fringed grass of parnassus | Upper |
| CASA10 | *Carex saxatilis* | Rock sedge | Upper |

Description

This class represents the stable fen and wet meadow community. This class persists indefinitely under appropriate hydrological conditions.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Mid1:ALL | 0 | Mid1:ALL | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |

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