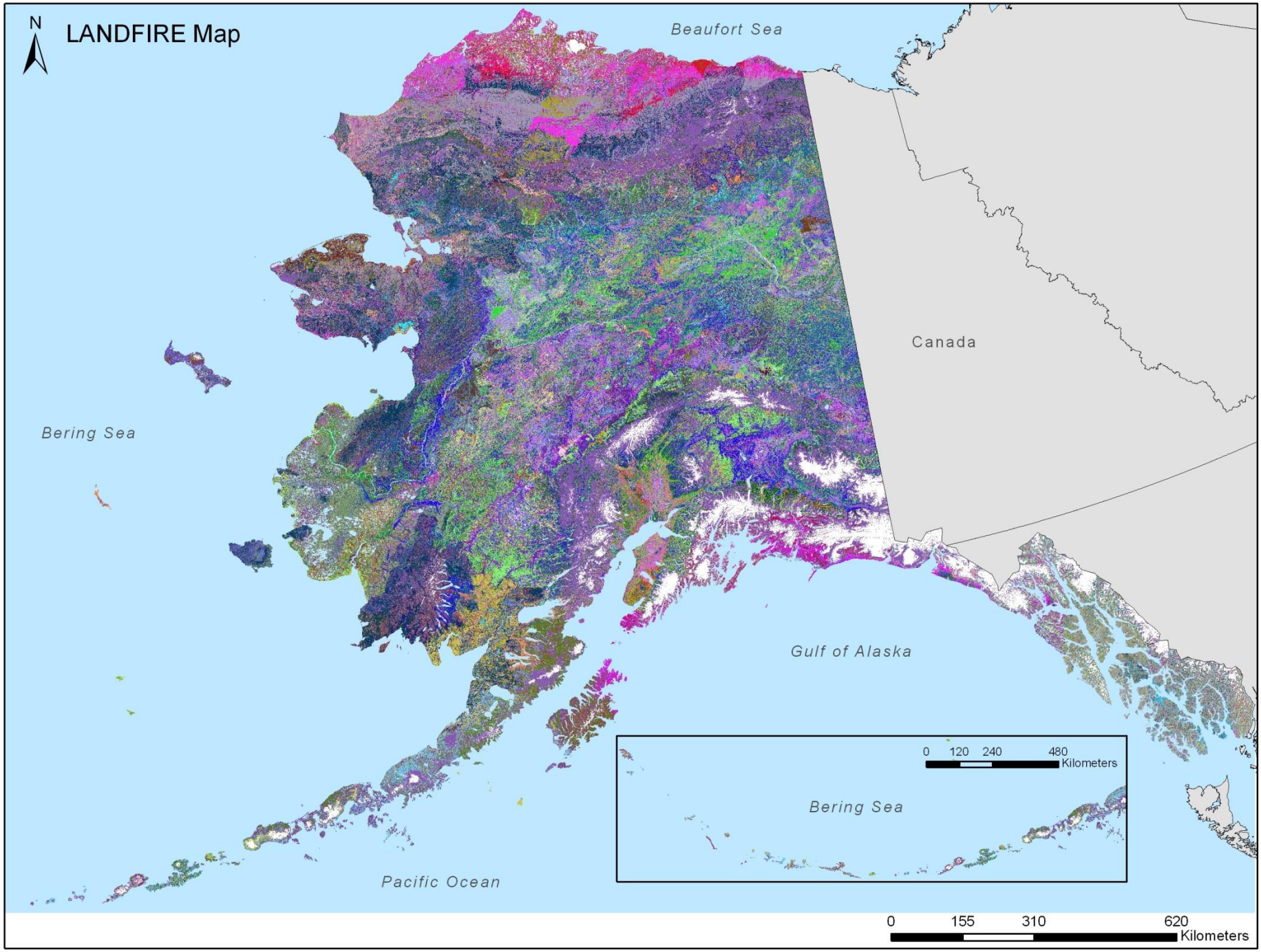

# LANDFIRE MAP, LEGEND, AND ECOLOGICAL SYSTEMS DESCRIPTIONS

# FOR ALASKA

**Existing Vegetation Type**

The Existing Vegetation Type (EVT) layer represents the species composition currently present at a given site. Vegetation map units are primarily derived from NatureServe's Ecological Systems classification, which is a nationally consistent set of mid-scale ecological units. Additional units are derived from NLCD, National Vegetation Classification Standard (NVCS) Alliances, and LANDFIRE specific types.

EVTs are mapped using decision tree models, field data, Landsat imagery, elevation, and biophysical gradient data. Decision tree models are developed separately for each of the three lifeforms -tree, shrub, and herbaceous and are then used to generate lifeform specific EVT layers.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LANDFIRE Map
Beaufort Sea
Canada
Bering Sea
Gulf of Alaska
Pacific Ocean
0 120 240 480
Kilometers
Bering Sea
0 155 310 620
Kilometers

# LANDFIRE Map Legend

- Recently Burned Forest and Woodland - Low Severity
- Agriculture-Cultivated Crops and Irrigated Agriculture
- Agriculture-Pasture/Hay
- Alaska Arctic Acidic Dryas Dwarf-Shrubland
- Alaska Arctic Acidic Dwarf-Shrub Lichen Tundra
- Alaska Arctic Acidic Sparse Tundra
- Alaska Arctic Active Inland Dune
- Alaska Arctic Bedrock and Talus
- Alaska Arctic Coastal Brackish Meadow
- Alaska Arctic Coastal Sedge-Dwarf-Shrubland
- Alaska Arctic Dwarf-Shrub-Sphagnum Peatland
- Alaska Arctic Dwarf-Shrubland
- Alaska Arctic Floodplain
- Alaska Arctic Freshwater Aquatic Bed
- Alaska Arctic Large River Floodplain
- Alaska Arctic Lichen Tundra
- Alaska Arctic Marine Beach and Beach Meadow
- Alaska Arctic Mesic Alder Shrubland
- Alaska Arctic Mesic Herbaceous Meadow
- Alaska Arctic Mesic Sedge-Dryas Tundra
- Alaska Arctic Mesic Sedge-Willow Tundra
- Alaska Arctic Mesic-Wet Willow Shrubland
- Alaska Arctic Non-Acidic Dryas Dwarf-Shrubland
- Alaska Arctic Non-Acidic Dwarf-Shrub Lichen Tundra
- Alaska Arctic Non-Acidic Sparse Tundra
- Alaska Arctic Pendantgrass Freshwater Marsh
- Alaska Arctic Permafrost Plateau Dwarf-Shrub Lichen Tundra
- Alaska Arctic Polygonal Ground Mesic Shrub Tundra
- Alaska Arctic Polygonal Ground Shrub-Tussock Tundra
- Alaska Arctic Polygonal Ground Tussock Tundra
- Alaska Arctic Polygonal Ground Wet Sedge Tundra
- Alaska Arctic Scrub Birch-Ericaceous Shrubland
- Alaska Arctic Sedge Freshwater Marsh
- Alaska Arctic Shrub-Tussock Tundra
- Alaska Arctic Tidal Flat
- Alaska Arctic Tidal Marsh
- Alaska Arctic Tussock Tundra
- Alaska Arctic Tussock-Lichen Tundra
- Alaska Arctic Wet Sedge Meadow
- Alaska Arctic Wet Sedge-Sphagnum Peatland
- Alaska Sub-boreal and Maritime Alpine Mesic Herbaceous Meadow
- Alaska Sub-boreal Avalanche Slope Shrubland
- Alaska Sub-boreal Mesic Subalpine Alder Shrubland
- Alaska Sub-boreal Mountain Hemlock-White Spruce Forest
- Alaska Sub-boreal White Spruce-Hardwood Forest
- Alaska Sub-boreal White-Lutz Spruce Forest and Woodland
- Alaskan Pacific Maritime Alpine Dwarf-Shrubland
- Alaskan Pacific Maritime Alpine Floodplain
- Alaskan Pacific Maritime Alpine Sparse Shrub and Fell-field
- Alaskan Pacific Maritime Alpine Wet Meadow
- Alaskan Pacific Maritime Avalanche Slope Shrubland
- Alaskan Pacific Maritime Coastal Meadow and Slough-Levee
- Alaskan Pacific Maritime Dwarf-shrub-Sphagnum Peatland
- Alaskan Pacific Maritime Fen and Wet Meadow
- Alaskan Pacific Maritime Floodplain Forest and Shrubland
- Alaskan Pacific Maritime Mesic Herbaceous Meadow
- Alaskan Pacific Maritime Mountain Hemlock Forest
- Alaskan Pacific Maritime Mountain Hemlock Peatland
- Alaskan Pacific Maritime Periglacial Woodland and Shrubland
- Alaskan Pacific Maritime Poorly Drained Conifer Woodland
- Alaskan Pacific Maritime Shore Pine Peatland
- Alaskan Pacific Maritime Shrub and Herbaceous Floodplain Wetland
- Alaskan Pacific Maritime Sitka Spruce Beach Ridge
- Alaskan Pacific Maritime Sitka Spruce Forest
- Alaskan Pacific Maritime Subalpine Alder-Salmonberry Shrubland
- Alaskan Pacific Maritime Subalpine Copperbush Shrubland
- Alaskan Pacific Maritime Subalpine Mountain Hemlock Woodland
- Alaskan Pacific Maritime Western Hemlock Forest
- Alaskan Pacific Maritime Wet Low Shrubland
- Aleutian American Dunegrass Grassland
- Aleutian Crowberry-Herbaceous Heath
- Aleutian Floodplain Forest and Shrubland
- Aleutian Floodplain Wetland
- Aleutian Freshwater Marsh
- Aleutian Kenai Birch-Cottonwood-Poplar Forest
- Aleutian Marine Beach and Beach Meadow
- Aleutian Mesic Alder-Salmonberry Shrubland
- Aleutian Mesic Herbaceous Meadow
- Aleutian Mesic-Wet Willow Shrubland
- Aleutian Mixed Dwarf-Shrub-Herbaceous Shrubland
- Aleutian Nonvascular Peatland
- Aleutian Oval-leaf Blueberry Shrubland
- Aleutian Rocky Headland and Sea Cliff
- Aleutian Shrub and Herbaceous Meadow Floodplain
- Aleutian Shrub-Sedge Peatland
- Aleutian Sparse Heath and Fell-Field
- Aleutian Tidal Marsh
- Aleutian Volcanic Rock and Talus
- Aleutian Wet Meadow and Herbaceous Peatland
- Barren (used for land use barren, also see sparsely vegetated systems)
- Developed-High Intensity
- Developed-Low Intensity
- Developed-Medium Intensity
- Developed-Open Space
- North Pacific Alpine and Subalpine Bedrock and Scree
- North Pacific Hypermaritime Western Red-cedar-Western Hemlock Forest
- North Pacific Maritime Eelgrass Bed
- North Pacific Maritime Mesic Subalpine Parkland
- North Pacific Mesic Western Hemlock-Yellow-cedar Forest
- North Pacific Shrub Swamp
- Open Water
- Snow/Ice
- Temperate Pacific Freshwater Aquatic Bed
- Temperate Pacific Freshwater Emergent Marsh
- Temperate Pacific Intertidal Flat
- Temperate Pacific Tidal Salt and Brackish Marsh
- Western North American Boreal Active Inland Dune
- Western North American Boreal Alpine Dryas Dwarf-Shrubland
- Western North American Boreal Alpine Dwarf-Shrub Summit
- Western North American Boreal Alpine Dwarf-Shrub-Lichen Shrubland
- Western North American Boreal Alpine Ericaceous Dwarf-Shrubland
- Western North American Boreal Alpine Floodplain
- Western North American Boreal Alpine Mesic Herbaceous Meadow
- Western North American Boreal Alpine Talus and Bedrock
- Western North American Boreal Black Spruce Dwarf-Tree Peatland
- Western North American Boreal Black Spruce Wet-Mesic Slope Woodland
- Western North American Boreal Black Spruce-Tamarack Fen
- Western North American Boreal Deciduous Shrub Swamp
- Western North American Boreal Dry Aspen-Steppe Bluff
- Western North American Boreal Dry Grassland
- Western North American Boreal Freshwater Aquatic Bed
- Western North American Boreal Freshwater Emergent Marsh
- Western North American Boreal Herbaceous Fen
- Western North American Boreal Low Shrub Peatland
- Western North American Boreal Low Shrub-Tussock Tundra
- Western North American Boreal Lowland Large River Floodplain Forest and Shrubland
- Western North American Boreal Mesic Birch-Aspen Forest
- Western North American Boreal Mesic Black Spruce Forest
- Western North American Boreal Mesic Scrub Birch-Willow Shrubland
- Western North American Boreal Montane Floodplain Forest and Shrubland
- Western North American Boreal Riparian Stringer Forest and Shrubland
- Western North American Boreal Sedge-Dwarf-Shrub Bog
- Western North American Boreal Shrub and Herbaceous Floodplain Wetland
- Western North American Boreal Spruce-Lichen Woodland
- Western North American Boreal Subalpine Balsam Poplar-Aspen Woodland
- Western North American Boreal Treeline White Spruce Woodland
- Western North American Boreal Tussock Tundra
- Western North American Boreal Wet Black Spruce-Tussock Woodland
- Western North American Boreal Wet Meadow
- Western North American Boreal White Spruce Forest
- Western North American Boreal White Spruce-Hardwood Forest
- Western North American Sub-boreal Mesic Bluejoint Meadow

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
|---|---|---|---|---|
| **CES1.10** | **Developed-Low Intensity** | Land Use | | |
| **CES1.11** | **Developed-Medium Intensity** | Land Use | | |
| **CES1.12** | **Developed-Open Space** | Land Use | | |
| **CES1.4** | **Agriculture-Cultivated Crops and Irrigated Agriculture** | Land Use | | |
| **CES1.6** | **Agriculture-Pasture/Hay** | Land Use | | |
| **CES1.7** | **Barren** | Land Use | | |
| **CES1.9** | **Developed-High Intensity** | Land Use | | |
| **CES102.179** | **Alaska Arctic Tussock Tundra** | Herbaceous Wetlands | Tussock tundra is common in valleys and slopes throughout arctic Alaska. These sites are cold, poorly drained, and underlain by mesic, silty mineral soils with a shallow surface organic layer surrounding the tussocks. Permafrost is present. Patch size is small to large. Tussock tundra has >35% cover of sedges in a tussock growth form; the combined cover of dwarf- and low shrubs is <25%, and lichen cover is <25%. Eriophorum vaginatum is the primary tussock-former in most stands, but Carex bigelowii may dominate some sites. Calamagrostis canadensis, Arctagrostis latifolia, and Chamerion latifolium (= Epilobium latifolium) may be common. Shrubs include Betula nana, Ledum palustre ssp. decumbens, and Vaccinium spp. Mosses (Sphagnum spp., Polytrichum strictum, and Hylocomium splendens) may form a nearly continuous mat between tussocks. There are also distinctions between acidic and non-acidic tussock tundra. Acidic sites have more ericaceous shrubs and Sphagnum and less Eriophorum spp., Betula nana, and Carex bigelowii. Acidic sites also have more organic matter buildup and the tussocks tend to be larger. Comments: This system is known as Tussock Tundra by the | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | Alaska Natural Heritage Program. | |
| **CES102.180** | **Alaska Arctic Shrub-Tussock Tundra** | Woody Wetlands and Riparian | Tussock shrub tundra is common in valleys and slopes throughout arctic Alaska. These sites are cold, poorly drained, and underlain by mesic, silty mineral soils with a shallow surface organic layer surrounding the tussocks. Permafrost is present. Patch size is small to matrix-forming. Tussock shrub tundra has >35% cover of sedges in a tussock growth form, and the combined cover of dwarf- and low shrubs is >25%. Eriophorum vaginatum is the primary tussock-former in most stands, but Carex bigelowii may dominate some sites. Betula nana and Salix pulchra dominate the low-shrub layer. Other species include Ledum palustre ssp. decumbens, Vaccinium vitis-idaea, Vaccinium uliginosum, Empetrum nigrum, and Carex spp. There are also distinctions between acidic and non-acidic tussock tundra. Acidic sites have more ericaceous shrubs and Sphagnum and less Eriophorum spp., Betula nana, and Carex bigelowii. Acidic sites also have more organic matter buildup and the tussocks tend to be larger. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES102.181** | **Alaska Arctic Tussock-Lichen Tundra** | Herbaceous Wetlands | The tussock lichen tundra system is common in valleys and slopes throughout arctic Alaska. These sites are cold, poorly drained, and underlain by mesic, silty mineral soils with a shallow surface organic layer surrounding the tussocks. Permafrost is present. Lichens are more common on the drier tussock tundra sites in western Alaska. Patch size is small to large. Tussock lichen tundra has >35% cover of sedges in a tussock growth form, shrub cover is <25%, and lichen cover is >25%. Dwarf-shrubs may be common. Eriophorum vaginatum is the primary tussock-former in most stands, but Carex bigelowii may dominate some sites. Lichens may include Flavocetraria cucullata (= Cetraria cucullata), Cetraria islandica, Cladonia spp., Cladina rangiferina, and Thamnolia subuliformis. There are also distinctions between acidic and non-acidic tussock tundra. Acidic sites have more ericaceous shrubs and Sphagnum and less Eriophorum spp., Betula nana, and Carex bigelowii. Acidic sites also have more organic matter buildup and the tussocks tend to be larger. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.182** | **Alaska Arctic Freshwater Aquatic Bed** | Herbaceous Wetlands | This system is found throughout arctic Alaska as small patches confined to lakes and ponds. In large bodies of water, it is usually restricted to the littoral region where penetration of light is the limiting factor for growth. Large to small floodplains support the various wetlands that form in oxbows, wet depressions, low-lying areas, and abandoned channels, including freshwater aquatic beds. This system has standing water (typically more than 30 cm deep) with >25% cover of submerged or floating aquatic species, including Potamogeton spp., Sparganium spp., aquatic Ranunculus spp., Myriophyllum spp., and Callitriche spp. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES102.183** | **Alaska Arctic Pendantgrass Freshwater Marsh** | Herbaceous Wetlands | Freshwater marshes dominated by Arctophila fulva occur as small patches throughout arctic Alaska, typically on the margins of ponds and lakes. They are semipermanently flooded, but some have seasonal flooding, and the water depth typically exceeds 10 cm. It is also found on large to small floodplains where various wetlands form in oxbows, wet depressions, low-lying areas, and abandoned channels, including freshwater marshes. Soils are muck or mineral, and water is nutrient-rich. In floodplains, permafrost is absent. This system has standing water with >10% cover of emergent herbaceous vegetation, primarily Arctophila fulva. Species diversity is low. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.184** | **Alaska Arctic Sedge Freshwater Marsh** | Herbaceous Wetlands | Freshwater marshes occur as small patches throughout arctic Alaska, typically on the margins of ponds, lakes and beaded streams. This system is also found on large to small floodplains where various wetlands form in oxbows, wet depressions, low-lying areas, and abandoned channels, including freshwater marshes. Soils are muck or mineral, and water is nutrient-rich. In floodplains, permafrost is absent. This system typically has standing water. It is often dominated by Carex aquatilis or Eriophorum angustifolium, but other emergent species may occur, including Comarum palustre, Hippuris vulgaris, Carex utriculata, Menyanthes trifoliata, Lysimachia thyrsiflora, and Equisetum fluviatile. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES102.185** | **Alaska Arctic Wet Sedge Meadow** | Herbaceous Wetlands | This ecological system occurs on wet sites (typically with 0-10% visible surface water) with >25% cover of sedge species. Sites are flat to sloping in valley bottoms, basins, low-center polygons, water tracks and adjacent to streams. It also includes patterned wetlands such as ribbed fens. These wet sedge meadows are also found on large to small floodplains, which support the various wetlands that form in oxbows, wet depressions, low-lying areas, and abandoned channels, including wet sedge meadows. Soils range from acidic to non-acidic, are saturated during the summer, and have an organic horizon over silt with permafrost, although on floodplains, permafrost is absent. Patch size is small to moderate and may be linear. Species diversity is much higher than in the freshwater marsh systems. Sites are typically dominated by Carex aquatilis and Eriophorum angustifolium but may also be dominated or codominated by Carex glareosa, Carex rotundata, Carex rariflora, Carex chordorrhiza, Carex rostrata, Carex saxatilis, Carex utriculata, Eriophorum russeolum, and Eriophorum scheuchzeri. Dupontia fisheri may also occur. Dwarf-shrubs such as Salix fuscescens, Salix pulchra, Andromeda polifolia, Betula nana, Empetrum nigrum, Ledum palustre ssp. decumbens, and Vaccinium uliginosum may be common but make up <25% cover. Moss species include Drepanocladus spp. and Sphagnum spp. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.186** | **Alaska Arctic Mesic Herbaceous Meadow** | Upland Grasslands and Herbaceous | This mesic herbaceous system occurs throughout arctic Alaska on hill and mountain slopes, upper drainages, and lowlands including drained lake basins. It typically occurs as small patches and is more common in the western arctic. This system occurs on mesic sites with >25% cover of herbaceous species. Species include Carex microchaeta ssp. nesophila (dominant sedge in higher elevations), Alopecurus alpinus, Artemisia arctica, Polygonum bistorta, Valeriana capitata, | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | Pedicularis spp., Polemonium acutiflorum, Salix rotundifolia, and Salix reticulata. Collapsed acidic lowland snowbeds that support Phippsia algida and Alopecurus alpinus and drained lake basins dominated by Calamagrostis canadensis (western Alaska) are also included in this system. | |
| **CES102.187** | **Alaska Arctic Mesic Sedge-Willow Tundra** | Upland Shrubland | This ecological system is common on mountain slopes, hillslopes, drained lake basins, stabilized dunes, and snowbeds throughout arctic Alaska. Permafrost is present. Patch size is small to large. The mesic sedge-willow tundra system is codominated by sedges and dwarf- and low shrubs, although low-shrub cover is <25%; Salix cover is >20%. The dominant shrubs are Betula nana, Salix pulchra, Salix richardsonii (= Salix lanata ssp. richardsonii), and Vaccinium uliginosum. Other willows that may occur include Salix bebbiana, Salix glauca, and Salix planifolia. The dominant sedges are Carex aquatilis, Eriophorum angustifolium, and Carex microchaeta. Other species include Petasites frigidus, Polemonium acutiflorum, and Sphagnum spp. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.199** | **Alaska Arctic Mesic Sedge-Dryas Tundra** | Upland Shrubland | This mesic sedge-Dryas tundra system is common on mountain slopes, hillslopes, drained lake basins, stabilized dunes, and snowbeds throughout arctic Alaska. Patch size is small to matrix-forming. pH ranges from circumneutral to non-acidic. Permafrost is present, and the soil surface is mesic but may be saturated below 15 cm. This system is codominated by sedges and dwarf- or low shrubs. Dryas spp. cover is >10%, and total low-shrub cover is <25%. Dryas integrifolia typically dominates or codominates with Salix richardsonii (= Salix lanata ssp. richardsonii), Salix pulchra, Salix reticulata, and Rhododendron lapponicum. The dominant sedges are Carex bigelowii, Carex aquatilis, and Eriophorum angustifolium. Other common | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | species are Eriophorum vaginatum and Equisetum arvense. Nonvascular species include Oncophorus wahlenbergii, Hylocomium splendens, Tomentypnum nitens, and Thamnolia vermicularis. | |
| **CES102.200** | **Alaska Arctic Wet Sedge-Sphagnum Peatland** | Herbaceous Wetlands | This system occurs on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions. It is common in wet depressions and old lake basins. Soils are poorly drained and acidic, typically with a well-developed peat layer. Permafrost may be present. Patch size is small to large. Sphagnum cover is >25% (usually continuous), and herbaceous species (primarily sedges) cover is >25%. The dominant sedges are Eriophorum spp. and Carex utriculata. Other common species include Betula nana, Comarum palustre (= Potentilla palustris), and Equisetum fluviatile. | This system occurs on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions of Alaska. |
| **CES102.201** | **Alaska Arctic Dwarf-Shrub-Sphagnum Peatland** | Woody Wetlands and Riparian | This system occurs on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions. It is common in wet depressions and old lake basins. Soils are poorly drained and acidic, typically with a well-developed peat layer. Permafrost may be present. Patch size is small to large. Sphagnum cover is >25% (usually continuous), and herbaceous species (primarily sedges) cover is >25%. The dominant sedges are Eriophorum spp. and Carex utriculata. Other common species include Betula nana, Comarum palustre (= Potentilla palustris), and Equisetum fluviatile. | This system occurs on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions of Alaska. |

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| **CES102.202** | **Alaska Arctic Permafrost Plateau Dwarf-Shrub Lichen Tundra** | Woody Wetlands and Riparian | This system occurs on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions but not on the Beaufort Coastal Plain. It occurs on flat permafrost plateaus and gently sloping terrain. Soils are poorly drained and acidic, typically with a well-developed peat layer. Permafrost is present. Patch size is small to large. Dwarf- and low-shrub cover is >25% and lichen cover is >25%. Fruticose lichen species (Cladina and Cladonia) codominate with Betula nana and Ledum palustre ssp. decumbens. Other possible shrubs include Empetrum nigrum, Chamaedaphne calyculata, Vaccinium uliginosum, Salix pulchra, Spiraea stevenii (= Spiraea beauverdiana), Vaccinium vitis-idaea, and Arctostaphylos spp. Graminoids usually have <10% cover and may include Eriophorum spp., Carex aquatilis, and Carex microchaeta. | This system occurs on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions of Alaska. |
| **CES102.203** | **Alaska Arctic Polygonal Ground Wet Sedge Tundra** | Herbaceous Wetlands | Ice-wedge polygons and the thaw-lake cycle dominate the Beaufort Coastal Plain ecoregion. The ice-wedge polygons generally occur on level surfaces (0- to 2-degree slopes), and the ice wedges may be 2 m wide at the top. Polygon diameter ranges from several to more than 30 m. In addition to the Beaufort Coastal Plain, ice-wedge polygons are a common feature on level ground within foothills and mountains, on glacial drift, lacustrine and floodplain terrace surficial deposits. This system typically occurs on low-center polygons. The polygon centers have standing water, marsh and wet sedge vegetation, primarily Carex aquatilis and Eriophorum angustifolium. The polygon perimeters typically support wet sedge vegetation also dominated by Carex aquatilis and Eriophorum angustifolium. More elevated perimeters support low shrubs and tussocks. Common shrubs include Betula nana, Salix pulchra, Ledum palustre ssp. decumbens, Vaccinium vitis-idaea, Vaccinium uliginosum, and Empetrum nigrum. Eriophorum vaginatum is the primary tussock-former in most | This system is typically found in the lowland regions of arctic Alaska, particularly on the Beaufort Coastal Plain in northern Alaska, and the Kotzebue Sound lowlands of west-central Alaska, but it also occurs in other scattered locations of arctic Alaska |

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| | | | sites, but Carex bigelowii may dominate some sites. Common mosses include Sphagnum spp., Polytrichum strictum, and Hylocomium splendens. | |
| **CES102.204** | **Alaska Arctic Polygonal Ground Tussock Tundra** | Herbaceous Wetlands | Ice-wedge polygons and the thaw-lake cycle dominate the Beaufort Coastal Plain ecoregion. The ice-wedge polygons generally occur on level surfaces (0- to 2-degree slopes), and the ice wedges may be 2 m wide at the top. Polygon diameter ranges from several to more than 30 m. In addition to the Beaufort Coastal Plain, ice-wedge polygons are a common feature on level ground within foothills and mountains, on glacial drift, lacustrine and floodplain terrace surficial deposits. These sites are cold, poorly drained, and underlain by mesic, silty mineral soils with a shallow surface organic layer surrounding the tussocks. Permafrost is present. Patch size is small to large. This ecological system occurs primarily on high-center polygons. Their centers are commonly mesic, dominated by tussocks, and their perimeters are typically wet, supporting wet sedges. Eriophorum vaginatum is the primary tussock-former in most sites, but Carex bigelowii may dominate some sites. Calamagrostis canadensis, Arctagrostis latifolia, and | This system is typically found in the lowland regions of arctic Alaska, particularly on the Beaufort Coastal Plain in northern Alaska, and the Kotzebue Sound lowlands of west-central Alaska, but it also occurs in other scattered locations of arctic Alaska |

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| **CES102.205** | **Alaska Arctic Polygonal Ground Shrub-Tussock Tundra** | Woody Wetlands and Riparian | Ice-wedge polygons and the thaw-lake cycle dominate the Beaufort Coastal Plain ecoregion. The ice-wedge polygons generally occur on level surfaces (0- to 2-degree slopes), and the ice wedges may be 2 m wide at the top. Polygon diameter ranges from several to more than 30 m. In addition to the Beaufort Coastal Plain, ice-wedge polygons are a common feature on level ground within foothills and mountains, on glacial drift, lacustrine and floodplain terrace surficial deposits. These sites are cold, poorly drained, and underlain by mesic, silty mineral soils with a shallow surface organic layer surrounding the tussocks. Permafrost is present. Patch size is small to large. This tundra ecological system occurs primarily on high-center polygons. Their centers are mesic and dominated by tussocks and shrubs, and their perimeters are commonly wet, supporting wet sedges. Betula nana and Salix pulchra dominate the shrub layer. Other species include Ledum palustre ssp. decumbens, Vaccinium vitis-idaea, Vaccinium uliginosum, and Empetrum nigrum. Eriophorum vaginatum is the primary tussock-former in most sites, but Carex bigelowii may dominate some sites. Calamagrostis canadensis, Arctagrostis latifolia, and Chamerion latifolium may be common. Common mosses include Sphagnum spp., Polytrichum strictum, and Hylocomium splendens. The wet perimeters typically support Carex aquatilis and Eriophorum angustifolium. | This system is typically found in the lowland regions of arctic Alaska, particularly on the Beaufort Coastal Plain in northern Alaska, and the Kotzebue Sound lowlands of west-central Alaska, but it also occurs in other scattered locations of arctic Alaska |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES102.206** | **Alaska Arctic Polygonal Ground Mesic Shrub Tundra** | Woody Wetlands and Riparian | Ice-wedge polygons and the thaw-lake cycle dominate the Beaufort Coastal Plain ecoregion. The ice-wedge polygons generally occur on level surfaces (0- to 2-degree slopes), and the ice wedges may be 2 m wide at the top. Polygon diameter ranges from several to more than 30 m. In addition to the Beaufort Coastal Plain, ice-wedge polygons are a common feature on level ground within foothills and mountains, on terraces, glacial drift, and lacustrine surficial deposits. This mesic shrub tundra system occurs on high-center polygons, raised areas along drainages, terraces and other mesic flat to slightly sloping sites. The combined cover of dwarf-shrubs and low shrubs is >25%, and sedge cover is typically <25%. Some tussocks may occur but are often degenerating. The open to closed shrub canopy has Salix pulchra, Betula nana, Vaccinium vitis-idaea, Ledum palustre ssp. decumbens, and Cassiope tetragona. Common herbaceous species include Eriophorum angustifolium, Carex aquatilis, and Eriophorum vaginatum (the latter is often dead). Common mosses include Sphagnum spp., Hylocomium splendens, and Aulacomnium turgidum. Lichens are common. | This system is typically found in the lowland regions of arctic Alaska, particularly on the Beaufort Coastal Plain in northern Alaska, and the Kotzebue Sound lowlands of west-central Alaska, but it also occurs in other scattered locations of arctic Alaska |
| **CES102.207** | **Alaska Arctic Marine Beach and Beach Meadow** | Upland Grasslands and Herbaceous | This system consists of coastal beaches, beach dunes, and vegetation that has stabilized sand or cobble deposits. Soils are dry to mesic and typically sandy. Patch size is small to moderate and often linear. Two different physiognomic structures are found in the system: Leymus mollis grasslands and dwarf-shrublands; bare sand or cobble are also common. Salt-tolerant forb communities occur just above mean high tide and are dominated or codominated by Cochlearia groenlandica, Achillea millefolium var. borealis, Honckenya peploides, and/or Mertensia maritima. As dune height and distance from the ocean increase, sites are dominated by Leymus mollis communities that may include near- | This system occurs along Alaska's arctic coastline, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | monocultures of Leymus mollis to more species-rich associations including Leymus mollis, Lathyrus japonicus var. maritimus (= Lathyrus maritimus), and Poa eminens. Older dunes support dwarf-shrubs (primarily Empetrum nigrum) mixed with herbaceous species which often grow in narrow stringers on the older beach ridges behind the Leymus mollis zone. Lathyrus japonicus var. maritimus, Conioselinum chinense, and Cnidium cnidiifolium are uncommon east of Cape Lisburne. The Leymus mollis and Empetrum nigrum zones are above the high tide line but still experience storm surges, high winds and salt spray. | |
| **CES102.208** | **Alaska Arctic Tidal Flat** | Barren/Sparsely Vegetated | Tidal flats are subject to regular tidal inundation, have <10% vascular species cover, and are dominated by bare ground or algae. This system often forms a narrow band along oceanic inlets, deltas, and tidal marshes. Algae are the dominant vegetation. | This system occurs along Alaska's arctic coastline, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES102.209** | **Alaska Arctic Tidal Marsh** | Herbaceous Wetlands | This system consists of herbaceous marshes with >10% vascular species cover that are subject to regular tidal inundation. The marshes are salt or brackish. Some are primarily freshwater that are infrequently flooded during storm surges or extreme high tides. Tidal marshes are primarily associated with estuaries or coastal lagoons or other locations protected from wave action. Two different types of tidal marshes are included in this system: tidal sedge marshes and tidal herbaceous (non-sedge) marshes. Carex ramenskii or Carex subspathacea dominate the tidal sedge marshes. Carex subspathacea is more common along the Beaufort Sea. Carex lyngbyei may dominate on portions of the Yukon-Kuskokwim Delta and is often found more inland or adjacent to tidal creeks. Dupontia fisheri and Puccinellia spp. dominate the tidal herbaceous marshes. Argentina egedii (= Potentilla egedii) may dominate on Alaska's west coast but not on the Beaufort Coastal Plain.<br><br>Tidal marshes often form an ecotone with freshwater non-tidal wetlands, especially on the Yukon-Kuskokwim Delta. On this delta, the first system moving inland is tidal marsh (Puccinellia spp. Then Carex ramenskii or Carex subspathacea), then Alaska Arctic Coastal Brackish Meadow (CES102.210) (Carex rariflora, Calamagrostis deschampsioides, and Dendranthema arcticum (= Chrysanthemum arcticum)), then Alaska Arctic Coastal Sedge-Dwarf-Shrubland (CES102.211) (Empetrum nigrum, Salix fuscescens, Salix ovalifolia, Carex rariflora, Calamagrostis deschampsioides, Deschampsia caespitosa), and then raised bogs or permafrost plateaus supporting Alaska Arctic Dwarf-Shrub-Sphagnum Peatland (CES102.201) or Alaska Arctic Permafrost Plateau Dwarf-Shrub Lichen Tundra (CES102.202). | This system occurs along Alaska's arctic coastline, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES102.210** | **Alaska Arctic Coastal Brackish Meadow** | Herbaceous Wetlands | This coastal brackish meadow system typically occurs immediately above tidal marshes in arctic Alaska. It has >25% herbaceous cover and <25% shrub cover. These sites are tidally inundated during storm tides and extreme high tides and, consequently, are brackish. The soils typically lack organics, and permafrost is uncommon. The main indicators on the Yukon-Kuskokwim Delta and the Kotzebue Sound lowlands ecoregions are Carex rariflora (>10%), Calamagrostis deschampsioides, and Dendranthema arcticum (= Chrysanthemum arcticum). Other common species include Eriophorum russeolum, Carex ramenskii (usually present but not dominant), and Salix ovalifolia. Additional dominants on the Beaufort Coastal Plain are Eriophorum angustifolium, Carex aquatilis, and Dupontia fisheri. | This system occurs along Alaska's arctic coastline, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.211** | **Alaska Arctic Coastal Sedge-Dwarf-Shrubland** | Woody Wetlands and Riparian | This system typically occurs immediately above coastal brackish meadows or tidal marshes in arctic Alaska. These are tidal deposits that are only periodically tidally flooded and typically have permafrost. It is a dominant system on the Yukon-Kuskokwim Delta, but occurs elsewhere along the arctic Alaska coast. It has >25% dwarf- and low-shrub cover and >25% herbaceous cover. Dominant dwarf-shrubs are Empetrum nigrum, Salix fuscescens, Salix ovalifolia, and sometimes Betula nana. Diagnostic herbaceous species are Carex rariflora, Calamagrostis deschampsioides, Deschampsia caespitosa, and Puccinellia andersonii. Additional species include Dupontia fisheri, Arctagrostis latifolia, Alopecurus alpinus, Tanacetum bipinnatum (= Chrysanthemum bipinnatum), and Petasites frigidus. | This system occurs along Alaska's arctic coastline, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES102.212** | **Alaska Arctic Active Inland Dune** | Barren/Sparsely Vegetated | Inland active dunes are a minor but widespread system across the Alaskan arctic. The dunes or blowouts are dry to mesic sand deposits, and the slacks may be wet silts and sands. This system's patch size is small. Some common vegetation types include those dominated by low and tall willows, mesic herbaceous meadows, and wet sedge meadows. Low- and tall-willow communities are dominated by Salix glauca, Salix alaxensis, and Salix niphoclada (= Salix brachycarpa ssp. niphoclada), along with Bromus inermis var. pumpellianus (= Bromus pumpellianus). The mesic herbaceous meadows include Leymus mollis, Bromus inermis var. pumpellianus, and Chamerion latifolium (= Epilobium latifolium). Additional herbaceous species include Carex obtusata, Carex lachenalii, Festuca rubra, Festuca brachyphylla, Astragalus alpinus, and others. Ponds and wet depressions may occur in the slacks and support wet herbaceous communities dominated by Carex aquatilis and Arctophila fulva. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.213** | **Alaska Arctic Large River Floodplain** | Woody Wetlands and Riparian | This system includes floodplains associated with two of Alaska's high-volume arctic rivers: the Yukon and Kuskokwim. It includes active (flooded frequently) and inactive floodplains (flooded infrequently) and is mosaiced with the various floodplain wetland ecological systems. The flooding regime is characterized by large spring floods at ice break-up. The active flooding zone is often several kilometers wide. Permafrost is usually absent. Patch size is matrix-forming and linear, following the river courses. These floodplains are beyond the distribution of Picea glauca, which is a major component of interior boreal floodplains. Species composition is diverse, as are structural characteristics. Some of the predominant vegetation types include mesic herbaceous meadows, alder and alder-willow shrublands, tall and low willow shrublands, and Populus balsamifera. Some of the common woody species | This system occurs along the Yukon and Kuskokwim rivers in Alaska. |

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| | | | can include Populus balsamifera, Alnus viridis, Alnus incana ssp. tenuifolia, Salix spp., and a number of other shrubs. | |
| **CES102.227** | **Alaska Arctic Floodplain** | Woody Wetlands and Riparian | This ecological system includes active and inactive glacially- and non-glacially-fed floodplains. It is mosaiced with various floodplain wetland systems and is widespread and common. The rivers are typically braided, and floodplain terraces may be short-lived (<100 years) or last for more than a 1000 years. Soils develop on alluvium and are typically shallow and well-drained; barren alluvium is common. Permafrost is usually absent. The low- and tall-willow-dominated communities may be absent at higher elevations. Common existing vegetation types include mesic herbaceous meadow, low-tall willow shrublands, Dryas dwarf-shrubland, ericaceous dwarf-shrublands, and patches of Populus balsamifera or Betula papyrifera. Herbaceous species include Chamerion latifolium and Lupinus spp. Common willows include Salix alaxensis, Salix arbusculoides, Salix richardsonii (= Salix lanata), Salix glauca, and Salix pulchra. Dryas integrifolia dominates the Dryas communities, but other species may also be common, such as Lupinus spp., Cassiope tetragona, Vaccinium uliginosum, Salix spp., and Arctostaphylos rubra. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES102.228** | **Alaska Arctic Bedrock and Talus** | Barren/Sparsely Vegetated | | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern |

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| | | | | Alaska to the North Slope on the Arctic Ocean. |
| **CES104.168** | **Alaska Arctic Mesic Alder Shrubland** | Upland Shrubland | The alder system is widespread but uncommon on mountain slopes, hillslopes and small steep streams throughout arctic Alaska. Patch size is typically small. Soils are mesic but sometimes wet if found adjacent to a small stream. Total shrub cover is >25% and dominated by alders. Alnus viridis ssp. crispa is the dominant shrub species but may codominate with Salix glauca and Salix pulchra. Additional species include Vaccinium uliginosum, Vaccinium vitis-idaea, Betula nana, Ledum palustre ssp. decumbens, Empetrum nigrum, Equisetum spp., Spiraea stevenii (= Spiraea beauverdiana), Dryas spp., and Cassiope tetragona. Mosses include Hylocomium splendens and Dicranum spp. Low-shrub tundra and dwarf-shrubs are common in the gaps between alder patches. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES104.169** | **Alaska Arctic Mesic-Wet Willow Shrubland** | Upland Shrubland | The low-tall willow system is widespread and common on mesic to wet mountain slopes, hillslopes, flats, and adjacent to streams throughout arctic Alaska. Patch size is small to large and often linear along small streams. Soils are mesic to wet, including wet sites with subsurface waterflow, water tracks, adjacent to narrow constrained streams, and on snow accumulation areas with late snowmelt. Total low- and tall-shrub (>0.2 m tall) cover is >25% and dominated by willows. This system does not include floodplain or tussock-dominated (>35% tussocks) sites. Salix alaxensis, Salix pulchra, and Salix glauca are the dominant species. Other shrubs may codominate, such as Salix niphoclada, Salix chamissonis, Salix bebbiana, Salix planifolia, Salix richardsonii, Alnus viridis ssp. crispa, Betula nana, Vaccinium uliginosum, and Ledum palustre ssp. decumbens. Dwarf-shrubs such as Empetrum nigrum and Vaccinium vitis-idaea may be common under the low-shrub | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | layer. Herbaceous species are sparse but sedges are sometimes common. Feathermosses (Hylocomium splendens and Pleurozium schreberi) and lichens may be common. | |
| **CES104.170** | **Alaska Arctic Scrub Birch-Ericaceous Shrubland** | Upland Shrubland | This system is common throughout arctic Alaska on mesic mountain slopes, hillslopes and flats. Patch size is small to matrix-forming. Soils are mesic. The total low- and tall-shrub cover is >25%, and Betula nana, Vaccinium uliginosum, or Ledum palustre ssp. decumbens typically dominate or codominate. Salix spp. (such as Salix pulchra) do not dominate but may codominate. This system does not include tussock-dominated (>35% tussocks) sites. Dwarf-shrubs such as Empetrum nigrum and Vaccinium vitis-idaea may be common under the low-shrub layer. Herbaceous species are sparse, and feathermosses (Hylocomium splendens and Pleurozium schreberi) and lichens may be common. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES104.171** | **Alaska Arctic Acidic Sparse Tundra** | Upland Shrubland | This is a common system on acidic substrates (pH typically <6) in the hills and mountains of arctic Alaska. This system does not occur in the arctic lowlands. Common slope positions include valleys, sideslopes, and summits and ridges. The canopy is sparse due to extreme exposure, exposed bedrock or unstable substrates. Sites are typically dry to mesic and occur on acidic substrates. Soils are typically thin, stony, and well-drained. Patch size is small to matrix-forming. Total vascular plant cover is 10-25%, and lichen cover is <25%. Common | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | dwarf-shrub species include Dryas octopetala, Empetrum nigrum, Vaccinium uliginosum, Dryas integrifolia, Loiseleuria procumbens, and Salix phlebophylla. Herbaceous species may include Antennaria alpina, Hierochloe alpina (= Anthoxanthum monticola), Minuartia obtusiloba, Carex scirpoidea, Carex podocarpa, Carex microchaeta, and Festuca altaica. Lichens include Cladina spp., Sphaerophorus globosus, Nephroma arcticum, Flavocetraria spp., and Alectoria ochroleuca. | |
| **CES104.172** | **Alaska Arctic Non-Acidic Sparse Tundra** | Upland Shrubland | This is a common system on non-acidic substrates (pH typically >6) in the hills and mountains of arctic Alaska. This system does not occur in arctic lowlands. Common slope positions include valleys, sideslopes, and summits and ridges. The canopy is sparse due to extreme exposure, exposed bedrock or unstable substrates. Sites are typically dry to mesic and occur on non-acidic substrates. Soils are typically thin, stony, and well-drained. Non-acidic sites are more common near floodplains, on carbonate substrates, and loess deposition areas. Patch size is small to large. Total vascular plant cover is 10-25%, and lichen cover is <25%. Common dwarf-shrubs include Dryas octopetala, Dryas integrifolia, Saxifraga oppositifolia, Rhododendron lapponicum, Salix arctica, Salix reticulata, Cassiope tetragona, and Arctostaphylos rubra. Herbaceous species may include Lupinus arcticus, Hedysarum boreale ssp. mackenziei (= Hedysarum mackenziei), Carex scirpoidea, Carex rupestris, Oxytropis nigrescens, Potentilla uniflora, Artemisia senjavinensis, Artemisia globularia, Artemisia furcata, Saxifraga oppositifolia, and Equisetum spp. Lichens such as Thamnolia spp. and Cetraria islandica also occur. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES104.173** | **Alaska Arctic Acidic Dryas Dwarf-Shrubland** | Upland Shrubland | This is a common system on acidic substrates (pH typically <6) in the hills and mountains of arctic Alaska. This system does not occur in the arctic lowlands. Common slope positions include valleys, sideslopes, and summits and ridges. Sites are typically dry to mesic and are uncommon on late-lying snowbeds. Patch size is small to large. Dwarf-shrub cover is >25% and dominated by Dryas spp. (primarily Dryas octopetala). Other common shrubs include Empetrum nigrum, Vaccinium uliginosum, Dryas integrifolia, Loiseleuria procumbens, and Salix phlebophylla. Common herbaceous species include Antennaria alpina, Hierochloe alpina, Minuartia obtusiloba, Carex scirpoidea, Carex podocarpa, Carex microchaeta, and Festuca altaica. Mosses such as Tortula ruralis and Polytrichum spp. may be common. Lichens include Cladina spp., Sphaerophorus globosus, Nephroma arcticum, Flavocetraria spp., and Alectoria ochroleuca. In the Bering Land Bridge National Preserve and Cape Krusenstern National Monument (Jorgenson et al. 2004), this system differs from non-acidic Dryas by lacking the calciphilic species Saxifraga oppositifolia, Potentilla uniflora, Hedysarum boreale ssp. mackenziei (= Hedysarum mackenziei), and Oxytropis nigrescens. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES104.174** | **Alaska Arctic Non-Acidic Dryas Dwarf-Shrubland** | Upland Shrubland | This is a common system on non-acidic substrates (pH typically >6) in the hills and mountains of arctic Alaska. This system also occurs as small patches on river bluffs on the Beaufort Coastal Plain, but otherwise does not occur in the arctic lowlands. Common slope positions include valleys, sideslopes, and summits and ridges. Sites are typically dry to mesic and are rare on late-lying snowbeds. Non-acidic sites are more common near floodplains, on carbonate substrates, and loess deposition areas. Patch size is small to large. Dwarf-shrub cover is >25% and dominated by Dryas spp. Dryas octopetala and/or Dryas integrifolia codominate with Saxifraga oppositifolia and Rhododendron lapponicum. Other common dwarf-shrubs include Salix arctica, Salix reticulata, Cassiope tetragona, and Arctostaphylos rubra. Herbaceous species include Lupinus arcticus, Carex scirpoidea, Carex rupestris, Oxytropis nigrescens, Potentilla uniflora, Artemisia senjavinensis, Artemisia globularia, Artemisia furcata, Hedysarum boreale ssp. mackenziei (= Hedysarum mackenziei), Saxifraga oppositifolia, and Equisetum spp. Lichens such as Thamnolia spp. and Cetraria islandica also occur. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES104.175** | **Alaska Arctic Dwarf-Shrubland** | Upland Shrubland | This is a common system on acidic and non-acidic substrates in the hills and mountains of arctic Alaska. This system does not occur in arctic lowlands. Common slope positions include valleys, sideslopes (especially north-facing), late-lying snowbeds, and summits and ridges. Sites are typically dry to mesic. Patch size is small to large. Dwarf-shrub cover is >25%, dominated by dwarf-shrubs other than Dryas spp., and lichen cover is <25%. Dwarf-shrubs that dominate or codominate the system are Cassiope tetragona, Empetrum nigrum, Vaccinium uliginosum, Salix reticulata, Salix arctica, Salix rotundifolia, and Arctostaphylos alpina. Cassiope tetragona is more common on non-acidic sites. Other shrubs include Betula nana, Dryas | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| | | | octopetala, Dryas integrifolia, Ledum palustre ssp. decumbens, Loiseleuria procumbens, Vaccinium vitis-idaea, and Salix phlebophylla. Common herbaceous species include Hierochloe alpina, Boykinia richardsonii, Carex microchaeta, Carex scirpoidea, Geum glaciale, Pedicularis lanata, Eriophorum angustifolium ssp. triste, and Equisetum spp. Mosses such as Rhytidium rugosum, Aulacomnium turgidum, Distichium capillaceum, Racomitrium lanuginosum, Dicranum elongatum, and Polytrichum sp. may be common. | |
| **CES104.176** | **Alaska Arctic Non-Acidic Dwarf-Shrub Lichen Tundra** | Upland Shrubland | This is a common system on non-acidic substrates (pH typically >6) in the hills and mountains of arctic Alaska. This system does not occur in arctic lowlands. Common slope positions include valleys, sideslopes, and summits and ridges. Sites are typically dry to mesic, exposed to the wind, and do not accumulate much winter snow. Non-acidic sites are more common near floodplains, on carbonate substrates, and loess deposition areas. Patch size is small to large. Dwarf-shrub cover is >25%, and lichen cover is >25%. Common lichens include Flavocetraria cucullata (= Cetraria cucullata), Flavocetraria spp., Stereocaulon spp., Alectoria nigricans, and Thamnolia vermicularis. Cladonia and Cladina species are uncommon. Dwarf-shrubs include Dryas octopetala, Dryas integrifolia, Saxifraga oppositifolia, Rhododendron lapponicum, Salix arctica, Salix reticulata, Cassiope tetragona, and Arctostaphylos rubra. Mosses contribute little cover. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES104.177** | **Alaska Arctic Acidic Dwarf-Shrub Lichen Tundra** | Upland Shrubland | This is a common system on acidic substrates in the hills and mountains of arctic Alaska. This system does not occur in arctic lowlands. Common slope positions include valleys, sideslopes, and summits and ridges. Sites are typically dry to mesic, exposed to the wind, and accumulate little winter snow. Patch size is small to large. Dwarf-shrub cover is >25%, and lichen cover is >25%. The dominant lichens are Cladina rangiferina and/or Cladina stellaris. Common dwarf-shrubs include Dryas octopetala, Empetrum nigrum, Vaccinium uliginosum, Dryas integrifolia, Salix phlebophylla, Antennaria alpina, Hierochloe alpina, Festuca altaica, and Carex microchaeta. Mosses may be present but contribute little cover. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |
| **CES104.178** | **Alaska Arctic Lichen Tundra** | Upland Grasslands and Herbaceous | This is a common system in the hills and mountains of arctic Alaska. Common slope positions include sideslopes, summits and ridges. Sites are typically acidic and dry to mesic. It is especially common on recent volcanic deposits with little soil development. Patch size is small to large. Lichen cover is >25%, and vascular plant species cover is <25%. Foliose and fruticose lichens dominate and include Umbilicaria spp., Rhizocarpon geographicum, Cladina stellaris (= Cladonia stellaris), Racomitrium lanuginosum, Flavocetraria spp., and Alectoria ochroleuca. Common dwarf-shrubs include Loiseleuria procumbens, Betula nana, Ledum palustre ssp. decumbens, Empetrum nigrum, and Vaccinium uliginosum. | This system occurs throughout arctic Alaska, from the Bristol Bay lowlands in southwestern Alaska to the North Slope on the Arctic Ocean. |

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| **CES105** | **Aleutian Floodplain Wetland** | Woody Wetlands and Riparian | Floodplain wetlands occur within the active and inactive portions of the floodplain systems ("floodplain forest and shrub" and "floodplain herbaceous meadow and shrub"). Wetlands develop on poorly drained deposits, oxbows, and abandoned channels, and are often mosaiced with well-drained floodplain vegetation. River channel migration, flooding and other fluvial processes constitute the major disturbance in this system. Wetland succession and species composition is variable due to diverse environmental conditions such as water depth, substrate, and nutrient input. This floodplain wetland system includes the following existing vegetation types: freshwater aquatic beds, freshwater marshes, wet meadow and herbaceous peatland - complex, and Aleutian Mesic-Wet Willow Shrubland (CES105.148). These have been described as unique systems in this classification, but because floodplain wetland dynamics are different from wetland dynamics outside the floodplain, floodplain wetlands are considered a distinct system, and model succession accordingly. Each type, however, has the same species composition as its correspondingly named system. | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |
| **CES105.102** | **Alaska Sub-boreal White-Lutz Spruce Forest and Woodland** | Upland Forest and Woodland | This system occurs in the boreal transition of Alaska on well-drained upland terrain. Picea glauca or Picea X lutzii are the dominant conifers, although Betula papyrifera, Populus balsamifera, and Populus tremuloides are often present. Common shrubs include Menziesia ferruginea, Alnus viridis ssp. sinuata, Vaccinium ovalifolium, Oplopanax horridus, Vaccinium vitis-idaea, and Linnaea borealis. Common herbaceous species include Calamagrostis canadensis, Equisetum arvense, Dryopteris expansa, and Gymnocarpium dryopteris. The major disturbance processes include fire, human disturbance, blowdown and insect infestations. | This system occurs in the boreal transition region of Alaska. |

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| **CES105.103** | **Alaska Sub-boreal Mountain Hemlock-White Spruce Forest** | Upland Forest and Woodland | This ecological system occurs on sideslopes and rolling terrain on the inland side of the Kenai and Chugach mountains and represents a transition from maritime forests to south-central boreal forests. Soils are mesic and derived from colluvium, glacial deposits, or residual bedrock. Permafrost is rare. Picea X lutzii is the dominant spruce and Tsuga mertensiana is codominant in the canopy and has at least 15% cover. The major disturbance processes include fungal pathogens, human disturbance, fire, blowdown, and insect infestations. | This system occurs primarily in the Kenai and Chugach mountains of Alaska. |
| **CES105.104** | **Western North American Boreal White Spruce Forest** | Upland Forest and Woodland | This system is common throughout interior Alaska. Mature stands are dominated by open stands of Picea glauca, and Picea mariana, Betula papyrifera, and Populus tremuloides may be subdominant in the overstory. Ericaceous shrubs and feathermosses often dominate the understory. The disturbance regime is characterized by large crown fires, though other disturbances, such as insect infestations and blowdown are common. | This systems occurs in the boreal region may also occur in the northern portion of the boreal transition region of Alaska. |
| **CES105.105** | **Western North American Boreal Spruce-Lichen Woodland** | Upland Forest and Woodland | This system occurs primarily in the northern and western portion of boreal Alaska (west, northeast and northwest boreal) and less commonly in the western and southwestern boreal transition (Nulato Hills and Ahklun Mountains). These are cool dry sites on well-drained to excessively well-drained substrates. Soils are thin and develop on gravels, sandy loess deposits, or bedrock and are likely free of permafrost. Forest canopy is dominated by Picea glauca or Picea mariana, and cover is generally between 10% and 25%. The shrub layer is open and typically features low and dwarf-shrubs including Betula nana, Shepherdia canadensis, Arctostaphylos rubra, Arctostaphylos uva-ursi, Vaccinium uliginosum, or Empetrum nigrum. Lichens (primarily Cladina spp.) are an important component of the understory in mature stands. Feathermosses | This system occurs in the boreal and, less commonly, boreal transition regions of Alaska. It is most common in the northern and western portion of the boreal region and also occurs in the western and southwestern portion of the boreal transition region (N |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | are not as important as in other white spruce systems. | |
| **CES105.106** | **Western North American Boreal White Spruce-Hardwood Forest** | Upland Forest and Woodland | This system is common on well-drained upland terrain on south, west, and east aspects. Picea glauca codominates with Betula papyrifera and/or Populus tremuloides, and the mixed stands are persistent for over 75 years. | This system is found in the Boreal region of Alaska. |
| **CES105.107** | **Western North American Boreal Mesic Black Spruce Forest** | Upland Forest and Woodland | This ecological system is common throughout upland slopes and inactive alluvial deposits in the boreal region of Alaska east into the Yukon Territory, and probably elsewhere in western Canada. It is widespread in south-central Alaska on well-drained sites, including old alluvial plains, abandoned floodplains, and inactive terraces. Soils are well-drained, and permafrost may be absent. Picea mariana is typically the dominant species in mature stands, though Picea glauca may be codominant on some sites. Common understory species include Vaccinium vitis-idaea, Empetrum nigrum, and Linnaea borealis. Feathermosses (Hylocomium splendens and Pleurozium schreberi) are common in mature stands. Lichens may be an important component in late-seral stages. | This system is found in the subarctic regions of Alaska and northern Yukon Territory, and the North Pacific Coast of south-central Alaska. It may also occur in northern British Columbia, and further east into Alberta and the Northwest Territories. |

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| **CES105.108** | **Western North American Boreal Mesic Birch-Aspen Forest** | Upland Forest and Woodland | This hardwood system is common on well-drained upland terrain on south, west, and east aspects in the boreal region, and is widespread in the boreal transition region in south-central Alaska on well-drained upland terrain. Betula papyrifera is typically dominant in the canopy, but other dominants or subdominants include Populus balsamifera and Populus tremuloides. This type represents a persistent, often self-replacing, hardwood system and may represent a long-term seral stage of Alaska Sub-boreal White-Lutz Spruce Forest and Woodland (CES105.102), Alaska Sub-boreal Mountain Hemlock-White Spruce Forest (CES204.103), or Alaska Sub-boreal White Spruce-Hardwood Forest (CES105.106). Spruce may be present in the canopy and, in the absence of fire, could potentially occupy the site. | This system occurs in the boreal and boreal transition regions of Alaska. |
| **CES105.109** | **Western North American Boreal Dry Aspen-Steppe Bluff** | Upland Forest and Shrub-Steppe | This ecological system occurs commonly on moderately steep to very steep, south-facing slopes and windswept bluffs throughout the boreal and boreal transition regions of Alaska. Generally, the substrate is steep, unstable, dry mineral soil. This system is common above major rivers and is often associated with river bluffs above treeline. Soils are typically well-drained to excessively well-drained and develop on glacial, loess, or fluvial deposits or residual material. Soils are often unstable and rocky; outcrops are common. The system is a mosaic of open forests or woodlands, low shrub-dominated patches, or dry meadows. At increasing elevation, trees become less important, and at subalpine or low alpine locations, shrubs are the dominant lifeform. Tree patches are dominated by Populus tremuloides, but Picea glauca may also be present. Patches of low-shrub and dry herbaceous communities are interspersed within the aspen forest, where it occurs. Common shrubs include Artemisia frigida, Artemisia alaskana, Juniperus communis, and Arctostaphylos uva-ursi. | This system is found in the boreal and boreal transition (low elevation through alpine) regions of Alaska. It probably occurs further east into the Yukon Territories of Canada. |

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| | | | Important grasses include Pseudoroegneria spicata (= Agropyron spicatum), Bromus inermis var. pumpellianus (= Bromus pumpellianus), Calamagrostis purpurascens, Festuca altaica, and Poa spp. | |
| **CES105.110** | **Western North American Boreal Subalpine Balsam Poplar-Aspen Woodland** | Upland Forest and Woodland | Stands of Populus balsamifera ssp. balsamifera and Populus tremuloides occur along south-facing upper slopes with trees generally persisting in smaller size classes (seedling, sapling and pole). Clones often grow above the elevation limit of Picea glauca and into the subalpine zone. This system occurs commonly throughout the mountain ranges of south-central Alaska and also near the northern and western limit of the boreal region, and may be advancing in some areas. Small stands of Populus balsamifera occur on the north slope of the Brooks Range on valley bottoms and on sideslopes. | This system occurs beyond the coniferous treeline in western and northern Alaska (boreal and boreal transition regions). |
| **CES105.111** | **Alaska Sub-boreal Avalanche Slope Shrubland** | Upland Shrubland | This system occurs commonly throughout the boreal transition region and infrequently in boreal Alaska on mountain slopes where slopes are steep enough to produce frequent snow slides thus preventing forest development. Slopes that produce regular avalanches typically have an upper slope angle of at least 70%, but the lower slopes and run-out zones may be much less steep. The dominant shrub species is typically Alnus viridis ssp. sinuata, but other shrubs, including Sambucus racemosa, Salix spp., and Spiraea stevenii, may be common. Herbaceous patches are often dominated by Calamagrostis canadensis and Chamerion angustifolium; other common | Boreal transition is the dominant region, but this system also occurs infrequently in boreal Alaska. |

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| | | | herbs include Athyrium filix-femina, Dryopteris expansa, and Veratrum viride. Tree seedlings and saplings may be common on some slopes but do not emerge as an overstory due to frequent snow avalanche. | |
| **CES105.112** | **Alaska Sub-boreal Mesic Subalpine Alder Shrubland** | Upland Shrubland | This system is widespread on upper mountain slopes above treeline throughout south-central and southwestern Alaska. It occurs less commonly throughout the northern boreal region to the southern slopes of the Brooks Range. This system often appears as a band of alder above treeline and below alpine systems. Low shrub replaces this system as the dominant subalpine shrub type in the northern boreal region of the state. Alnus viridis ssp. sinuata is the dominant shrub species, but other shrubs including Salix spp. (sometimes the dominant shrub), Sambucus racemosa, and Spiraea stevenii (= Spiraea beauverdiana) may be common. In the boreal transition region, the alder zone is intermixed with mesic herbaceous meadows (Calamagrostis canadensis and Chamerion angustifolium); in boreal Alaska, low-shrub tundra is more common in the gaps between alder patches. | This system occurs at mid-elevation through subalpine in the boreal transition and, less commonly, boreal regions of Alaska. |
| **CES105.113** | **Western North American Boreal Mesic Scrub Birch-Willow Shrubland** | Upland Shrubland | This ecological system occurs throughout the boreal and boreal transition regions of Alaska on mesic sites on mid- to upper slopes, above treeline and on flats and sideslopes. Betula nana usually dominates the shrub layer, but Vaccinium uliginosum, Ledum palustre ssp. decumbens, Salix pulchra, Salix barclayi, or other Salix spp. may also be common. Salix spp. may occasionally be dominant. Dwarf-shrubs such as Empetrum nigrum and Vaccinium vitis-idaea may be common under the low-shrub layer. Herbaceous species are sparse, but | This system occurs in the boreal and, less commonly, boreal transition regions of Alaska at low elevation through subalpine. |

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| | | | feathermosses (Hylocomium splendens and Pleurozium schreberi) and lichens may be common. Sites with organic soils are not included in this type. | |
| **CES105.114** | **Western North American Sub-boreal Mesic Bluejoint Meadow** | Upland Grasslands and Herbaceous | This system occurs throughout the boreal and boreal transition regions of Alaska. Soils are typically fine-textured mineral and may be poorly drained (on flats) to well-drained (on sideslopes). In the boreal transition region, mesic Calamagrostis canadensis meadows often occur near treeline interspersed with subalpine tall shrub. Its elevational limit is just above the limit of tall shrubs (within 100 m). This system appears to be less common north of the Alaska Range. Mesic meadows also occur as seral stages in drained lakebeds, or after disturbance such as fire or logging. The vegetation is usually dense, with canopy height of 0.8 to 1.4 m, occasionally reaching 2 m. Species composition ranges from nearly pure stands of Calamagrostis canadensis to mixtures of Calamagrostis canadensis with forbs, such as Chamerion angustifolium. Forb- or fern -dominated patches also occur. Common forbs and ferns include Heracleum maximum, Veratrum viride, Angelica lucida, Athyrium filix-femina, Dryopteris expansa, and Equisetum arvense. Short-term mesic meadow seral stages, such as post-fire Chamerion angustifolium, are considered seral stages of the forested system they replaced and not included in this description. | This systems occurs in the upland, lowland, and subalpine zones of the boreal transition and, less commonly, boreal regions of Alaska. |
| **CES105.115** | **Western North American Boreal Dry Grassland** | Upland Grasslands and Herbaceous | This system occurs across the boreal and boreal transition regions of Alaska on dry sideslopes or well-drained lowland sites. Soils are well-drained to excessively drained and permafrost is absent. These sites are typically dominated by | This system occurs in upland through alpine in the boreal and boreal transition regions of Alaska. |

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| | | | grasses, though forbs may codominate on some sites. Shrub cover is less than 25%. Common species include Festuca altaica, Festuca rubra, Calamagrostis purpurascens, Leymus innovatus (= Elymus innovatus), Artemisia frigida, and Achillea spp. | |
| **CES105.116** | **Western North American Boreal Active Inland Dune** | Barren/Sparsely Vegetated | Active inland dunes occur in boreal Alaska as remnants of a larger system of dunes and sandsheets that developed under the climatic conditions of the late Pleistocene. Strong storm winds carried glacio-fluvial silts and sands across vast areas of northwestern North America. Most of these sand deposits have been stabilized by forest and tundra vegetation, but areas of active transport and deposition still exist. Some of the most noteworthy active areas are the Kobuk Dunes in western Alaska, the Carcross Dunes in southern Yukon, and the Lake Athabasca Dunes in northern Saskatchewan. These active dunes share many floristic elements and geomorphic processes. The main disturbance process is the transport and deposition of sand. Common landforms include transverse and longitudinal dunes, sandsheets, desert pavements, blowouts, and interdune slacks. Three dominant habitat types occur within boreal active dune systems: grassy, dry mountainous and boreal forest. | Active inland dunes occur as isolated features in western Alaska and western Canada. |
| **CES105.117** | **Western North American Boreal Lowland Large River Floodplain Forest and Shrubland** | Woody Wetlands and Riparian | This system includes large floodplains associated with high-volume interior rivers (such as the Yukon, Kuskokwim, Koyukuk, and Tanana rivers). Flooding regime is characterized by large spring floods at ice break-up. Young successional stages are dominated by willow and alder followed by balsam poplar and/or white spruce. Wetland development in abandoned channels is intermixed with succession on more mesic sites [see description for Western North American Boreal Shrub and Herbaceous Floodplain Wetland | This system is found in the boreal region of Alaska. |

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| | | | (CES105.118)]. The active flooding zone is often several km wide. Permafrost is usually absent. | |
| **CES105.118** | **Western North American Boreal Shrub and Herbaceous Floodplain Wetland** | Woody Wetlands and Riparian | This system occurs within the active and inactive portions of floodplains. Wetlands develop on poorly drained deposits, oxbows, and abandoned channels and are often mosaiced with well-drained floodplain vegetation. Frequent river channel migration and associated flooding and fluvial processes constitute the major disturbances. Wetland succession and species composition are variable due to diverse environmental conditions such as water depth, substrate, and nutrient input. Floodplain wetland vegetation includes the following classes: aquatic bed, freshwater marsh, fen, and wet low shrub. These have been described as unique systems in this classification, but because floodplain wetland dynamics differ from wetland dynamics outside the floodplain, we will consider floodplain wetlands a distinct system and model succession accordingly. Wetland succession beginning in open water can proceed through the following wetland classes: aquatic bed, marsh, wet meadow or fen. Over time, fens can succeed to shrub bogs or wet low shrub. At any stage in succession, flooding can set back the vegetation to open water. Less dramatic changes in hydrology (such as an increase in water table from beaver activity) can reverse the direction of succession. Wetlands can also develop through paludification on poorly drained, fine-textured deposits. | This system is found in the boreal and boreal transition regions of Alaska. |

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| **CES105.119** | **Western North American Boreal Herbaceous Fen** | Herbaceous Wetlands | This system occurs in shallow depressions and basins, pond margins, and thermokarst pits with an open hydrologic regime. Fens are nutrient-rich and have a thick peat layer that may be floating or submerged. Standing water is usually present. Dominant species may include Menyanthes trifoliata, Equisetum fluviatile, Comarum palustre, Calla palustris, Eriophorum angustifolium, and Carex aquatilis. Other common but non-dominant species include Caltha palustris, Cicuta virosa (= Cicuta mackenzieana), Galium trifidum, Rumex arcticus, and Utricularia spp. Shrubs, including Myrica gale, Salix candida, Betula nana, and Alnus incana ssp. tenuifolia, are occasionally present but do not exceed 25% cover. Aquatic plants such as Myriophyllum spicatum, Hippuris vulgaris, Potamogeton spp., and Sparganium spp. may be present, and aquatic mosses are often present.This system is not associated with permafrost processes. | This system is found in lowlands of the boreal transition and boreal regions of Alaska. |
| **CES105.120** | **Western North American Boreal Black Spruce Wet-Mesic Slope Woodland** | Woody Wetlands and Riparian | This system occurs on north-facing slopes underlain by permafrost with low productivity Picea mariana. Soils are poorly drained and acidic with a well-developed peat layer. Sites on lower concave slopes and toeslopes are wet, while sites on upper slopes, convex slopes and ridges may be mesic. Common species include Ledum groenlandicum, Ledum palustre ssp. decumbens, Betula nana, Empetrum nigrum, Vaccinium vitis-idaea, Vaccinium uliginosum, Carex spp., and Sphagnum spp. This system has less Sphagnum than Western North American Boreal Black Spruce Dwarf-Tree Peatland (CES105.139). The slope angle is generally greater than 8 degrees. | This system occurs on lower to upper north-facing slopes in the boreal region of Alaska. |

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| **CES105.121** | **Western North American Boreal Black Spruce-Tamarack Fen** | Woody Wetlands and Riparian | This ecological system occurs in lowlands across boreal Alaska and includes treed fens and other organic-rich lowland black spruce-tamarack forests. Soils are poorly drained and often have a well-developed peat layer. Sites are less acidic than Western North American Boreal Black Spruce Dwarf-Tree Peatland (CES105.139). Sites with at least 40 cm of peat are classified as fens. The forest canopy is typically open to woodland and trees may be stunted. Common species include Picea mariana, Larix laricina, Betula nana, Ledum groenlandicum, Ledum palustre ssp. decumbens, Empetrum nigrum, Vaccinium vitis-idaea, Vaccinium uliginosum, Chamaedaphne calyculata, Carex spp., Eriophorum angustifolium, and Sphagnum spp. | This system is found in the lowlands of the boreal region of Alaska. The range of Larix laricina in Alaska is disjunct from the Canadian population. |
| **CES105.122** | **Western North American Boreal Deciduous Shrub Swamp** | Woody Wetlands and Riparian | Shrub swamps occur throughout the boreal and boreal transition regions of Alaska on poorly drained, fine-textured soil. Depressions with standing water are common throughout the growing season. Soils range from muck to mineral and are relatively nutrient-rich. Some sites have a thin peat layer. The shrub layer is typically dominated by Alnus incana ssp. tenuifolia, but Alnus viridis ssp. sinuata, Salix pulchra, or Salix richardsonii (= Salix lanata ssp. richardsonii) may be dominant or codominant. Common understory species include Calamagrostis canadensis, Equisetum spp., Comarum palustre (= Potentilla palustris), and hydrophytic mosses. | This system occurs in lowlands of the boreal and boreal transition regions of Alaska. |

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| **CES105.123** | **Western North American Boreal Freshwater Emergent Marsh** | Herbaceous Wetlands | Freshwater marshes are found throughout boreal transition and boreal regions of western and northern Alaska. They are characterized by emergent herbaceous vegetation. Freshwater marshes typically occur with other wetland systems. They occur on the margins of ponds, lakes, and riparian systems and on inland deltas where rivers drain into large lakes. Inland marshes are mostly small patch, confined to limited areas in suitable floodplain or basin topography. They are typically semipermanently flooded, but some marshes have seasonal flooding. Water is at or above the surface for most of the growing season (typically 10 cm above the surface). Soils are muck or mineral, and water is nutrient-rich. These systems are highly productive and have high rates of decomposition. Freshwater marsh vegetation is dominated by emergent vegetation such as Carex utriculata, Schoenoplectus tabernaemontani (= Scirpus validus), Typha latifolia, Menyanthes trifoliata, and Equisetum fluviatile. Arctophila fulva becomes more common in the northern portions of boreal Alaska. | This system is found from lowlands through subalpine valley bottoms in the boreal and boreal transition regions of Alaska. |
| **CES105.124** | **Western North American Boreal Wet Meadow** | Herbaceous Wetlands | This ecological system is common throughout the boreal and boreal transition regions of Alaska in wet depressions, low-lying areas, and shallow drainage ways. These systems are minerotrophic with high nutrient levels and high rates of decomposition. Soils are mineral or muck and are saturated at some point during the growing season, but do not have standing water (water may be up to 5-10 cm deep during portions of the growing season, but it is not persistent). Wet meadows typically have a well-developed organic mat but not deep enough to be considered peatlands. Wet meadow vegetation may be seral to fens. Dominant species include Carex aquatilis, Carex utriculata, Carex lasiocarpa, Eriophorum angustifolium, Calamagrostis canadensis, and Equisetum | This system is known from lowlands through mid-alpine valleys and benches in the boreal and boreal transition regions of Alaska. |

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| | | | palustre. Comarum palustre, Menyanthes trifoliata, Equisetum fluviatile are often present but not dominant. Shrubs may be a minor component of the canopy cover (less than 25% cover) and include Myrica gale, Alnus incana ssp. tenuifolia, and Salix spp. | |
| **CES105.125** | **Western North American Boreal Freshwater Aquatic Bed** | Herbaceous Wetlands | Freshwater aquatic beds are found at all elevations below timberline throughout boreal Alaska. It is small patch in size and confined to lakes, ponds, and slow-moving portions of rivers and streams. In large bodies of water, it is usually restricted to the littoral region where penetration of light is the limiting factor for growth. A variety of rooted or floating aquatic herbaceous species may dominate, including Nuphar lutea ssp. polysepala (= Nuphar polysepala), Potamogeton spp., Lemna minor, Sparganium spp., Ranunculus spp., Myriophyllum spp., Hippuris vulgaris, and Callitriche spp. | This system is found in lowlands of the boreal and boreal transition regions of Alaska. |
| **CES105.126** | **Western North American Boreal Low Shrub-Tussock Tundra** | Woody Wetlands and Riparian | This is a common lowland system dominated by tussock sedges and low shrubs. Eriophorum vaginatum is the primary tussock-former in most stands, but Carex bigelowii may be the dominant tussock sedge on some sites. Other indicator species include Betula nana, Salix pulchra, Ledum palustre ssp. decumbens, Ledum groenlandicum, Vaccinium vitis-idaea, Vaccinium uliginosum, Empetrum nigrum, and Carex spp. Grasses, including Calamagrostis canadensis and Arctagrostis spp., may also be present. Lichens are scarce (with the possible exception of Peltigera canina). Sites are often underlain by permafrost. This ecological system is similar to Alaska Arctic Shrub-Tussock Tundra (CES102.180) (and the Tussock Tundra 2 PNV) that occurs in Alaska's arctic and has a longer mean fire- | This system occurs in lowland through subalpine zones of the boreal and boreal transition (northern portion and higher elevation) regions of Alaska. |

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| | | | return interval. Geographic location is the best determinant between these two systems. | |
| **CES105.127** | **Western North American Boreal Tussock Tundra** | Herbaceous Wetlands | This ecological system is dominated by sedges in a tussock growth form. Eriophorum vaginatum is the primary tussock-former in most stands and Carex bigelowii is also common. On wetter sites, Vaccinium spp. (= Oxycoccus spp.) and Chamaedaphne calyculata may be present. Total shrub cover is less than 25%, although shrubs such as Betula nana, Ledum palustre ssp. decumbens, Ledum groenlandicum, Vaccinium vitis-idaea, Vaccinium uliginosum may be present. Mosses (Sphagnum spp., Pleurozium schreberi, Hylocomium splendens) may form a nearly continuous mat between tussocks. | This system is found in lowland through subalpine zones of boreal and boreal transition (northern portion and higher elevation) regions of Alaska. |
| **CES105.128** | **Western North American Boreal Wet Black Spruce-Tussock Woodland** | Woody Wetlands and Riparian | This ecological system is common throughout boreal Alaska on north-facing slopes, gentle hills, and inactive alluvial surfaces underlain by permafrost. Soils are poorly drained and consist of tussocks over peat or mineral soil. Picea mariana is the dominant overstory species in an open to woodland canopy. Tussock-forming sedges contribute at least 25% of the vegetation cover. Common understory shrubs include Betula nana, Ledum palustre ssp. decumbens, Ledum groenlandicum, Vaccinium uliginosum, and Vaccinium vitis-idaea. Herbaceous species include Eriophorum vaginatum, Carex bigelowii, and Rubus chamaemorus. Mosses may be abundant and include Sphagnum spp. and Hylocomium splendens. | This system is common throughout lowlands of boreal Alaska. |

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| **CES105.129** | **Western North American Boreal Alpine Dwarf-Shrub Summit** | Upland Shrubland | This system occurs on windswept summits and ridges on alpine sites in the boreal and boreal transition regions of Alaska. Soils are thin, stony, and well-drained to excessively well-drained. Canopy cover is sparse, generally less than 25%, due to extreme exposure. Common species include Dryas spp., Vaccinium uliginosum, Empetrum nigrum, Vaccinium vitis-idaea, Diapensia lapponica, Loiseleuria procumbens, and dwarf Salix spp. Exposed rock and lichens are abundant. | This system occurs on alpine sites in the boreal and boreal transition regions of Alaska. |
| **CES105.130** | **Western North American Boreal Alpine Talus and Bedrock** | Barren/Sparsely Vegetated | This ecological system occurs on talus- and bedrock-dominated sites above the dwarf-shrub zone, and also on early-seral alpine sites near glaciers. Sites are well-drained to excessively drained, and there is little soil development. They are often rocky and sparsely vegetated with forbs and graminoids such as Draba spp., Saxifraga spp., Oxyria digyna, Festuca brachyphylla, Carex pyrenaica ssp. micropoda (= Carex micropoda), and Luzula spp. Dwarf-shrubs are uncommon. | This system occurs in the high alpine (>1000 m elevation) of the boreal and boreal transition regions of Alaska. |
| **CES105.131** | **Western North American Boreal Alpine Mesic Herbaceous Meadow** | Upland Grasslands and Herbaceous | This ecological system occurs throughout boreal Alaska on gentle slopes in subalpine and alpine environments. Carex bigelowii is the dominant species. Other common species may include Luzula confusa and lichens. Dwarf-shrubs such as Arctostaphylos alpina, Empetrum nigrum, Salix pulchra, and Betula nana are usually present, but contribute less than 25% to the canopy cover. This system may form a mosaic with dwarf- and low-shrub systems. | This system occurs throughout boreal Alaska in subalpine and alpine sites. |

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| **CES105.132** | **Western North American Boreal Alpine Dryas Dwarf-Shrubland** | Upland Shrubland | This alpine and subalpine system occurs commonly on mountain sideslopes, low summits and ridges, and in alpine valleys, throughout the boreal region and northern Alaska; it is uncommon throughout the boreal transition. Sites are well-drained and mesic to somewhat dry. Dryas integrifolia and/or Dryas octopetala dominate the shrub layer with at least 20% cover. Lichen cover is less than 25% and may include species of the genera Cladina, Cetraria, and Stereocaulon. Other dwarf-shrubs that may be common include Cassiope tetragona, Salix arctica, Salix reticulata, Vaccinium uliginosum, Empetrum nigrum, Ledum palustre ssp. decumbens, Diapensia lapponica, and Oxytropis nigrescens. Common herbaceous species include Carex microchaeta, Senecio lugens, Minuartia arctica, Anemone parviflora, Podistera macounii (= Ligusticum mutellinoides ssp. alpinum), Castilleja elegans, Poa arctica, Trisetum spicatum, Silene acaulis, Saxifraga spp., Campanula lasiocarpa, and Polygonum bistorta. Common mosses include Hylocomium splendens, Polytrichum spp., and Racomitrium spp. Lichen cover is less than 25% and may include species of the genera Cladina, Cetraria, and Stereocaulon. | This systems occurs on subalpine to alpine sites of the boreal and boreal transition (less frequently) regions of Alaska. |
| **CES105.133** | **Western North American Boreal Alpine Ericaceous Dwarf-Shrubland** | Upland Shrubland | This is a common alpine system throughout the boreal and boreal transition regions and in northern Alaska. Common slope positions include alpine valleys, sideslopes, and low summits and ridges. Ericaceous dwarf-shrubs typically dominate, but a wide range of species and plant communities are encompassed in this system. Total lichen cover is less than 25% and may include species of Cetraria, Cladina, and Cladonia. Common dwarf-shrub dominants include Cassiope tetragona (more common north of the Alaska Range), Empetrum nigrum, Vaccinium uliginosum, Harrimanella stelleriana (more common south of the Alaska Range), and Arctostaphylos spp. Other shrubs that may be common include | This system is found on subalpine to alpine sites in the boreal and boreal transition regions of Alaska. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | Betula nana, Diapensia lapponica, Dryas octopetala, Ledum palustre ssp. decumbens, Vaccinium vitis-idaea, Salix reticulata, Salix phlebophylla, and Salix rotundifolia. Common herbaceous species include Hierochloe alpina (= Anthoxanthum monticola ssp. alpinum), Arnica lessingii, Carex bigelowii, and Carex microchaeta. Mosses such as Aulacomnium palustre, Hylocomium splendens, Pleurozium schreberi, and Polytrichum may be common. Sites are typically mesic. Cassiope and Harrimanella tundra sites occur on terrain that is well-protected by snow in the winter, and often remains snow-covered until the middle of the growing season. | |
| **CES105.134** | **Western North American Boreal Alpine Dwarf-Shrub-Lichen Shrubland** | Upland Shrubland | This ecological system is common on summits and ridges throughout boreal, northern, and western Alaska. The shrub component is often mixed, with ericaceous shrubs, Dryas, and willows contributing to the layer. Lichen cover is at least 25%. Sites are generally exposed to the wind and do not accumulate much winter snow. Common shrub species include Vaccinium uliginosum, Vaccinium vitis-idaea, Empetrum nigrum, Arctostaphylos rubra, Arctostaphylos alpina, Dryas integrifolia, Salix arctica, Salix rotundifolia, and Salix reticulata. Fruticose lichens often codominate with the shrubs. Common lichens include Cladina rangiferina, Cladina stellaris, Flavocetraria cucullata (= Cetraria cucullata), Stereocaulon spp., Alectoria nigricans, and Thamnolia vermicularis. Herbaceous species include Hierochloe alpina (= Anthoxanthum monticola ssp. alpinum), Polygonum bistorta, Anemone spp., Festuca spp., and Luzula spp. Mosses may be present but do not contribute much cover. | This system occurs on subalpine to alpine sites in the boreal and boreal transition regions of Alaska. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES105.135** | **Western North American Boreal Alpine Floodplain** | Barren/Sparsely Vegetated | This system includes active alpine and subalpine floodplains. Frequent river channel migration and associated flooding and fluvial processes constitute the major disturbances in this type. Soils develop on alluvium and are typically shallow and well-drained. This system includes a range of floodplain vegetation including shrubs (dwarf-, low, and tall), mesic herbaceous meadow, early-seral forbs, and barren gravel. Common shrubs include Salix alaxensis, Salix spp., Betula nana, and Alnus viridis ssp. sinuata. Common herbaceous species include Chamerion latifolium, Lupinus spp., Mertensia paniculata, Erigeron acris, Achillea millefolium var. borealis, and Crepis spp. (Crepis nana and Crepis elegans). | This system occurs in alpine and subalpine valleys of the boreal and boreal transition regions of Alaska. |
| **CES105.136** | **Alaska Sub-boreal White Spruce-Hardwood Forest** | Upland Forest and Woodland | This ecological system is widespread in south-central Alaska on well-drained upland terrain. Picea glauca and Betula papyrifera are typically codominant in an open canopy. | This system occurs in the boreal transition region of Alaska. |
| **CES105.137** | **Western North American Boreal Treeline White Spruce Woodland** | Upland Forest and Woodland | This ecological system occurs primarily near the elevational and latitudinal limits of white spruce tree growth. Soils are cold, but peat-forming mosses are not common in the ground layer. Forest canopy is dominated by Picea glauca and cover is generally between 10% and 25% (40%). In some locations Alnus viridis is the dominant understory shrub. The shrub layer typically features Betula nana, but other low shrubs such as Vaccinium uliginosum, Ledum groenlandicum, and Salix spp. may be common or dominant. In the western and southwestern portions of the boreal transition region, lichens are commonly abundant in the understory. | This system occurs in the boreal and boreal transition regions of Alaska, although it is not common in the Kenai Mountains where Tsuga mertensiana dominates treeline forest systems. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES105.138** | **Western North American Boreal Sedge-Dwarf-Shrub Bog** | Woody Wetlands and Riparian | This ecological system occurs in the boreal and boreal transition regions of Alaska and is not associated with permafrost processes. It includes bogs and poor fens (systems with little or no groundwater inputs) with thick (>40 cm) peat deposits. Organic soils are acidic and nutrient-poor. Common species include Vaccinium oxycoccos (= Oxycoccus microcarpos), Andromeda polifolia, Vaccinium uliginosum, Ledum palustre ssp. decumbens, Ledum groenlandicum, Betula nana, Empetrum nigrum, Carex microglochin, Carex rotundata, Carex rariflora, Carex lasiocarpa, Carex limosa, Carex chordorrhiza, Carex livida, Carex pluriflora, Carex pauciflora, Carex stylosa, Carex membranacea, Eriophorum brachyantherum, Eriophorum angustifolium, Rubus chamaemorus, and Drosera spp. Sphagnum spp. are usually abundant in the ground layer. | This system occurs in lowlands of the boreal and boreal transition regions of Alaska. |
| **CES105.139** | **Western North American Boreal Black Spruce Dwarf-Tree Peatland** | Woody Wetlands and Riparian | This system occurs in the boreal and boreal transition regions of Alaska in valley bottoms and on abandoned floodplains and includes treed bogs (and poor fens) and other organic-rich lowland black spruce forests. Sites are generally flat to gently sloping terrain, on slopes up to 8 degrees. Soils are poorly drained and acidic, often with a well-developed peat layer. Permafrost is generally present and may form permafrost plateaus supporting the system in boreal Alaska but is generally absent in the boreal transition region. The forest canopy is typically open to woodland and trees are generally stunted. Common species include Picea mariana, Ledum palustre ssp. decumbens, Ledum groenlandicum, Andromeda polifolia, Betula nana, Empetrum nigrum, Vaccinium vitis-idaea, Vaccinium uliginosum, Chamaedaphne calyculata, Carex pluriflora, Carex spp., Eriophorum angustifolium, Calamagrostis canadensis, and Sphagnum spp. The major disturbances in this | This system occurs in lowlands of the boreal and boreal transition regions of Alaska. |

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| | | | type are fire and thermokarst collapse. | |
| **CES105.140** | **Western North American Boreal Low Shrub Peatland** | Woody Wetlands and Riparian | This ecological system occurs in lowlands of the boreal and boreal transition regions of Alaska and includes low shrub-dominated wetlands. Sites may be bogs, fens, or wetlands. Soils are saturated for at least a portion of the growing season, and permafrost is absent. An organic peat layer is usually present, but peat depth is variable but often less than 40 cm deep. Common species include Ledum palustre ssp. decumbens, Ledum groenlandicum, Betula nana, Rubus chamaemorus, Vaccinium oxycoccos (= Oxycoccus microcarpos), Myrica gale, Calamagrostis canadensis, Carex aquatilis, Comarum palustre, Salix fuscescens, Salix pulchra, Empetrum nigrum, Chamaedaphne calyculata, and Sphagnum spp. Myrica gale and Chamaedaphne calyculata indicate fen conditions. This system often occurs in association with other peatland systems. | This system occurs in lowlands of the boreal transition region and lowlands through subalpine in boreal Alaska. |

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| **CES105.141** | **Western North American Boreal Montane Floodplain Forest and Shrubland** | Woody Wetlands and Riparian | This system includes glacially-fed and non-glacially-fed rivers and streams throughout the boreal and boreal transition regions of Alaska. It includes the active and inactive portions of the floodplain, but not abandoned floodplains. Soils are alluvial, well-drained and poorly developed. Frequent river channel migration and associated flooding and fluvial processes constitute the major disturbances in this type. On glacially-fed rivers, braided outwash plains occur near the glacier terminus. This portion of the river is characterized by high sediment input and very frequent flooding. Substrates are excessively well-drained and frequently scoured. A high proportion of barren and early-seral landscape classes characterize the outwash plain. Farther downstream (distal outwash), vegetation dominance on the floodplain depends on seral stage and frequency of flooding: later seral stages and wetlands become more common. On rivers and streams without major glacial inputs, flooding and sediment deposition still drive the disturbance cycle; however, the timing and severity of flooding may differ from that on glacial rivers. Both glacially-fed and non-glacially-fed rivers are characterized by young successional stages dominated by willow and alder followed by extensive stands of balsam poplar and/or white spruce. Floodplains range in width from less then 50 m to over 1 km. Large floodplains (several km wide, such as the Yukon) are classified as separate systems. Oxbows and other wet depressions commonly form on the floodplains. Wetland succession and species composition are variable due to diverse environmental conditions such as water depth, substrate, and nutrient input. Wetland classes and succession are described in the floodplain wetlands ecological system. | This system occurs along glacially-fed and non-glacially-fed rivers and streams throughout the boreal and boreal transition regions of Alaska. |

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| **CES105.144** | **Western North American Boreal Riparian Stringer Forest and Shrubland** | Woody Wetlands and Riparian | This system occurs throughout the boreal and boreal transition regions of Alaska and is characterized by low-energy riparian communities. These riparian zones are typically narrow bands of forest or shrubs along streams in low-gradient and low-volume drainages. Seasonal overbank flooding may occur, but generally it does not result in shifting channels or gravel bar formation. Common species include Picea glauca, Betula papyrifera, Populus balsamifera, Alnus spp., Salix spp., Carex spp., and Calamagrostis canadensis. | This system occurs throughout the boreal and boreal transition regions of Alaska. |
| **CES105.146** | **Aleutian Kenai Birch-Cottonwood-Poplar Forest** | Upland Forest and Woodland | These hardwood-dominated forests are common on the eastern Alaska Peninsula and on Kodiak Island. This system occurs at low elevations and also at the upper elevational limit of broad-leaved trees. At low elevations it is found predominantly on well-drained, gentle lower hillslopes, large moraines, and old riparian terraces, although floodplain stands of cottonwood are not included in this system. Patch size is typically small to large. Total hardwood tree species cover is >25% and dominated by Betula papyrifera var. kenaica, Betula papyrifera, Populus balsamifera ssp. trichocarpa, or Populus balsamifera. Tree height ranges from 6 to 21 m. Understory shrubs include Alnus viridis ssp. sinuata, Salix barclayi, Rubus spectabilis, and Sambucus racemosa. Herbaceous species may also dominate the understory, such as Athyrium filix-femina, Calamagrostis canadensis, Calamagrostis lapponica, Chamerion angustifolium ssp. angustifolium, Equisetum spp., Gymnocarpium dryopteris, and Heracleum maximum. | This hardwood-dominated system is common on the eastern Alaska Peninsula and on Kodiak Island. |

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| **CES105.147** | **Aleutian Mesic Alder-Salmonberry Shrubland** | Upland Shrubland | The alder-salmonberry system is matrix-forming on the Alaska Peninsula and Kodiak Island, diminishes moving west, and is absent by Dutch Harbor. It occurs on flat to steep slopes (0-50 degrees) at low to mid elevations (1-1000 m) in valleys, hills and mountains. The slopes are typically ash-covered, colluvium, or glacial drift. Total low- and tall-shrub cover is >25%, and Alnus viridis or Rubus spectabilis contribute greater than 50% of the total shrub cover. Rubus spectabilis is dominant primarily on the oldest stabilized talus slopes and stable colluvial slopes (older substrates), while Alnus viridis may be the dominant shrub on recently disturbed sites, wind-sheltered sites or recent ash deposits. Common codominants include Sambucus racemosa, Oplopanax horridus, Spiraea stevenii, and tall willows such as Salix barclayi or Salix glauca. Alnus viridis ssp. sinuata is the most common alder species, however, Alnus viridis ssp. fruticosa dominates some sites. Alder height ranges from 0.5 m at higher elevations to 8 m downslope. In closed-canopy sites, Sambucus racemosa and Rubus spectabilis shrubs are usually woven in among and around the edges of the alder thickets, and the understory is sparse, often with Athyrium filix-femina, graminoids and sparse Rubus spectabilis. Litter cover is high. Sites codominated by tall willows typically occur along streams and at the upper limits of alder growth. Some Rubus spectabilis sites are mixed with herbaceous species of equal height, including Athyrium filix-femina, Aconitum maximum, Calamagrostis canadensis, Chamerion angustifolium ssp. angustifolium, Deschampsia caespitosa, Dryopteris expansa, Heracleum maximum, and Veratrum viride. In sites where patches of alder are mosaiced with mesic herbaceous meadows, common species include Athyrium filix-femina, Aconitum maximum, Calamagrostis canadensis, Chamerion angustifolium ssp. angustifolium, Deschampsia caespitosa, | This system occurs on the Alaska Peninsula and Kodiak Island, diminishes moving west, and is absent by Dutch Harbor. |

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| | | | Dryopteris expansa, Heracleum maximum, Lupinus nootkatensis, Solidago spp., and Veratrum viride. | |
| **CES105.148** | **Aleutian Mesic-Wet Willow Shrubland** | Upland Shrubland | This willow shrubland system is relatively uncommon yet widespread on the eastern Alaska Peninsula and Kodiak Island at low to mid elevations (range of 3-657 m in Katmai National Park and Preserve) and diminishes moving west. It typically occurs as small patches in broad valleys, on mountain sideslopes with slopes ranging from 0 to 30 degrees. It is also frequently found on wet sites in lowlands, along streams, terraces, lakeshores and the edge of small streams, as well as adjacent to peatlands and wet meadows. Some sites are not wet and support predominantly tall willows, but this is probably <10% of sites. The soil substrates range from mineral to peat. Total tall- and low-shrub cover (>20 cm height) is >25%, and Salix spp. contribute greater than 25% of the total shrub cover. The dominant willow species is Salix barclayi, although Salix alaxensis, Salix commutata, Salix glauca, and Salix pulchra are also important. Alnus viridis ssp. sinuata may codominate. Understory shrub species include Betula nana, Empetrum nigrum, Vaccinium vitis-idaea, and Vaccinium uliginosum. Understory herbaceous species include Achillea millefolium var. borealis, Angelica lucida, Calamagrostis canadensis, Chamerion angustifolium ssp. angustifolium, Equisetum arvense, Geranium erianthum, Heracleum | This willow shrubland system is relatively uncommon yet widespread on the eastern Alaska Peninsula and Kodiak Island at low to mid elevations and diminishes moving west. |

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| | | | maximum, Rubus arcticus, and Sanguisorba canadensis. Wetter sites support Carex lenticularis var. lipocarpa, Carex aquatilis var. aquatilis, Carex utriculata, and Equisetum pratense. | |
| **CES105.230** | **Aleutian Crowberry-Herbaceous Heath** | Upland Shrubland | This system is common in valley bottoms, sideslopes, stabilized dunes, terraces, moraines and fans. Patch size is small to matrix forming. It typically occupies lower elevation sites than Aleutian Mixed Dwarf-Shrub-Herbaceous Shrubland (CES105.231). Dwarf-shrub cover is >25% and dominated by Empetrum nigrum; herbaceous cover is variable, ranging from none to well over 50%. Other dwarf-shrub species include dwarf willows, Harrimanella stelleriana, Phyllodoce aleutica, Vaccinium vitis-idaea, and Arctostaphylos alpina. Herbaceous species include Lupinus nootkatensis, Polemonium acutiflorum, Chamerion angustifolium, Solidago spp., and grasses. A more abundant herbaceous component, particularly graminoids, may be due to nutrient inputs from seabird colonies; where seabirds have been impacted by introduced predators, the cover of herbaceous species appears to be lower (Croll et al. 2005). Fruticose lichens and Racomitrium lanuginosum may also be common. Heath hummocks may occur. | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES105.231** | **Aleutian Mixed Dwarf-Shrub-Herbaceous Shrubland** | Upland Shrubland | This is a common system throughout the Alaska Peninsula and Aleutian Islands from low to high elevations. It occurs in valleys, terraces, sideslopes, and ridges. In the mountains, this system often grades upslope into the Aleutian sparse heath and fell-field system. The continuous dwarf-shrub heaths often fragment into strips that alternate with almost bare ground, possibly due to wind erosion and frost action. In this system, dwarf-shrub cover is >25%, not dominated by Empetrum nigrum, and herbaceous cover varies from none to 75%. Various dwarf-shrub species dominate or codominate, including Harrimanella stelleriana, Phyllodoce aleutica, Salix arctica, Salix rotundifolia, Cassiope lycopodioides, Loiseleuria procumbens, Vaccinium vitis-idaea, Vaccinium uliginosum, and Arctostaphylos alpina. While Empetrum nigrum may codominate, it is mixed with other dwarf-shrubs. Common herbaceous species include Carex macrochaeta, Chamerion angustifolium, Deschampsia caespitosa, Lupinus nootkatensis, Leymus mollis, Geum calthifolium, Carex circinata, Polygonum viviparum, and Festuca rubra. Bryophyte cover is often high. | This system occurs throughout the Alaska Peninsula, Aleutian Islands and Kodiak Island. |

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| **CES105.232** | **Aleutian Mesic Herbaceous Meadow** | Upland Grasslands and Herbaceous | This system grows on all slopes and aspects with a mesic moisture regime, including windswept coastal headlands, coastal bluffs, old beach ridges, hillside slopes, stabilized talus, alluvial fans, and ravine sideslopes, and commonly forms a mosaic with alder patches. Patch size is small to matrix-forming. Herbaceous cover is >25%, Leymus mollis cover is <25%. This system includes four predominant vegetation types: (1) The Athyrium filix-femina meadow type is dominated by Athyrium filix-femina with Veratrum viride, Heracleum maximum, Streptopus amplexifolius, Angelica lucida, and Calamagrostis canadensis; (2) The Chamerion angustifolium ssp. angustifolium meadow type is dominated by Chamerion angustifolium ssp. angustifolium, usually with ferns, Calamagrostis canadensis, and often Heracleum maximum; (3) The Calamagrostis canadensis meadow type is dominated by Calamagrostis canadensis, usually with ferns and scattered forbs. It is common on disturbed sites (human or natural) that are in early stages of recovery; and (4) The mixed herbaceous meadow type includes mesic herbaceous meadows not dominated by Athyrium filix-femina, Chamerion angustifolium ssp. angustifolium, or Calamagrostis canadensis; these species, however, often codominate. Common forbs include Lupinus nootkatensis, Solidago canadensis var. lepida, Polemonium acutiflorum, Castilleja unalaschcensis, Sanguisorba canadensis, Veratrum viride, Valeriana capitata, Antennaria dioica, Cardamine oligosperma var. kamtschatica, Achillea millefolium var. borealis, Arnica unalaschcensis, Dendranthema arcticum ssp. arcticum, Claytonia sibirica, Geum calthifolium, Ranunculus occidentalis, Dryopteris expansa, and Angelica lucida. Graminoids include Carex macrochaeta, Festuca rubra, Agrostis exarata, Agrostis scabra, and Deschampsia beringensis. Empetrum nigrum may also be common. | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |

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| **CES105.233** | **Aleutian American Dunegrass Grassland** | Upland Grasslands and Herbaceous | Sites are level to steep. The substrates are commonly dunes or shallow to deep eolian sand deposits over bedrock, sometimes 2 km inland. This system is not subjected to typical coastal processes such as overwash. The sites may be unstable, including eroding coastal bluffs and isolated blowouts. Other sites have loamy soils on colluvium that are nutrient-enriched by seabirds. Sites may or may not receive salt spray. Patch size is small to large. Leymus mollis cover is >25%, and the sites are not part of Aleutian Marine Beach and Beach Meadow (CES105.239). Other dominant or codominant species include Festuca rubra, Heracleum maximum, Ligusticum scoticum, Angelica lucida, and Claytonia sibirica. Some sites have 1- to 2-foot tall tussocks. Recent research has shown that the abundance of graminoids in the Aleutian Islands has been significantly reduced due to a reduction in nutrient inputs from seabird colonies; where seabirds have been impacted by introduced predators, the cover of graminoid species is lower. | This system occurs on the Alaska Peninsula, Aleutian Islands and possibly Kodiak Island. |
| **CES105.235** | **Aleutian Freshwater Marsh** | Herbaceous Wetlands | Freshwater marshes typically occur with other wetland systems on the margins of ponds and lakes. They are mostly small patch, semipermanently flooded, but some have seasonal flooding. Water is at or above the surface for most of the growing season. Soils are muck or mineral. Freshwater marshes have >10% cover of emergent herbaceous vegetation. Species include Carex aquatilis, Carex utriculata, Menyanthes trifoliata, Comarum palustre, Equisetum fluviatile, Equisetum palustre, and Hippuris spp. Species of Eriophorum do not commonly occur in this system. Species diversity is often low. | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES105.236** | **Aleutian Wet Meadow and Herbaceous Peatland** | Herbaceous Wetlands | This system includes a variety of herbaceous wetlands. Wet meadows occur in shallow depressions, seepage channels on gentle slopes, old beaver ponds, pond margins, along streams, lake borders, wet slopes, valley toeslopes, terraces, late-melting snowbeds, in wet depressions of Empetrum heath, bedrock or colluvium. The organic layer ranges from thick (sometimes >40 cm) to relatively thin. It may be composed of sphagnum, sedge, or other organic material and can occur over mineral soil or may be floating. Vegetation has >25% herbaceous species cover and <25% shrub cover. Common genera and species include Eriophorum russeolum, Eriophorum angustifolium ssp. scabriusculum, Eriophorum scheuchzeri, Anthelia (liverwort), Saxifraga hirculus, Geum pentapetalum, Calamagrostis canadensis, Calamagrostis stricta ssp. inexpansa, Carex saxatilis, Carex nigricans, Carex pluriflora, Carex lyngbyei, Carex anthoxanthea, Leptarrhena pyrolifolia, Ranunculus eschscholtzii, Ranunculus flammula, Saxifraga rivularis, Caltha palustris, Claytonia sibirica, Deschampsia beringensis, Comarum palustre, Rubus chamaemorus, Juncus alpinoarticulatus ssp. nodulosus, Juncus triglumis, and Drosera spp. Shrubs include Salix planifolia, Ledum palustre ssp. decumbens, and Empetrum nigrum. Sphagnum may be common. | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |
| **CES105.237** | **Aleutian Nonvascular Peatland** | Herbaceous Wetlands | This system occurs in shallow depressions, seepage channels on gentle slopes, and pond margins. Peat depth is >40 cm and may be over mineral soil, floating or submerged. The sites are wet, and patch size is small. Dominance ranges from mosses (Sphagnum spp. or Philonotis fonatana var. americana and Parnassia kotzebuei) to liverworts (Scapania spp., Nardia spp., Marsupella spp., Siphula spp.). | This system occurs on the Alaska Peninsula and Aleutian Islands. |

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| **CES105.238** | **Aleutian Shrub-Sedge Peatland** | Woody Wetlands and Riparian | This system occurs in shallow depressions, seepage channels on gentle slopes, and pond margins. It is often mosaiced with the wet meadow and other wetland ecological systems. It occurs on peat, floating organic mats or mineral soil. The sites are wet, and patch size is small. This system has >25% shrub cover. Common shrubs include Andromeda polifolia, Betula nana, Empetrum nigrum, Ledum palustre ssp. decumbens, Salix pulchra, Vaccinium oxycoccos, and Vaccinium uliginosum. Common herbaceous species include Carex pluriflora, Cornus suecica, Comarum palustre, Rubus chamaemorus, Carex spp., and Eriophorum spp. Fruticose lichens may occur on the hummocks. | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |
| **CES105.239** | **Aleutian Marine Beach and Beach Meadow** | Upland Grasslands and Herbaceous | This ecological system consists of coastal beaches, beach dunes, and vegetation that has stabilized sand deposits. Cobble beaches are also included. Soils are dry to mesic (occasionally tidally inundated) and typically sandy. Patch size is small to moderate and often linear. This system sometimes grades into sandy loess deposits on rolling hills dominated Aleutian American Dunegrass Grassland (CES105.233). Three different vegetation types occur in this system: salt-tolerant forb communities, Leymus mollis grasslands, and Empetrum nigrum shrublands. Bare sand or cobble are also common. Salt-tolerant forb communities occur just above mean high tide and are dominated or codominated by Cochlearia groenlandica, Achillea millefolium var. borealis, Honckenya peploides, and/or Mertensia maritima. As dune height and distance from the ocean increase, sites are dominated by Leymus mollis communities that may include near-monocultures of Leymus mollis to more species-rich associations, including Leymus mollis, Lathyrus japonicus var. maritimus, Achillea millefolium var. borealis, Festuca rubra, Fragaria chiloensis, Senecio pseudoarnica, Deschampsia beringensis, Heracleum maximum, | This system occurs on the Alaska Peninsula and Aleutian Islands. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | and Poa eminens. Empetrum nigrum-dominated communities often grow in narrow stringers on the older beach ridges behind the Leymus mollis zone. Herbaceous species are common, including Cornus suecica. The Leymus mollis and Empetrum nigrum existing vegetation types are above the high tide line but still experience storm surges, high winds and salt spray. | |
| **CES105.279** | **Aleutian Tidal Marsh** | Herbaceous Wetlands | This system consists of herbaceous marshes with >10% vascular species cover that are subject to regular tidal inundation. The marshes are typically salt or brackish. Some, however, are primarily freshwater that are infrequently flooded by storm surges or extreme high tides. Tidal marshes are primarily associated with estuaries or coastal lagoons or other locations protected from wave action. Lagoons with outer spits and beaches are well developed and common in the Aleutians. Tidal marshes, however, are not extensive within these lagoons because of constant winds and waves, plus winter sea ice may be extensive and blown to shore, battering the vegetation. It appears that tectonic/isostatic uplift is common, lifting the marshes above the tide. Two existing vegetation types dominate the system: tidal sedge and tidal herbaceous. Carex lyngbyei, Carex glareosa, and Carex mackenziei dominate the tidal sedge class. Other species include Hippuris tetraphylla, Hippuris vulgaris, Ruppia cirrhosa, Stellaria humifusa, and Zannichellia palustris. Puccinellia spp. or Plantago maritima dominate the tidal herbaceous type, | This system occurs on the Alaska Peninsula and Aleutian Islands. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | often with <25% cover. | |
| **CES105.283** | **Aleutian Shrub and Herbaceous Meadow Floodplain** | Woody Wetlands and Riparian | This ecological system includes active and inactive unforested floodplains and outwash plains, and is mosaiced with Aleutian Floodplain Wetland (CES105.296). Small unforested floodplains and outwash plains are widespread in the Aleutian Islands and Alaska Peninsula. The substrate is typically well-drained sand or cobble alluvium, although finer silts and clays are found on higher terraces, on distal floodplains, and in lower energy systems (capped by an organic mat). Permafrost is absent. Patch size is small to large and often linear. These floodplains have several different kinds of plant communities, including shrublands dominated by tall or low willow, or alder (Alnus viridis ssp. sinuata), and mesic herbaceous meadows, or Leymus mollis grasslands. The tall willow, alder and mesic herbaceous types tend to dominate low-elevation floodplains on Kodiak Island and the Alaska Peninsula. The mesic herbaceous and Leymus mollis existing vegetation types dominate the Aleutian Island floodplains. Calamagrostis spp. is the dominant mesic herbaceous species, and others include Athyrium filix-femina, Leymus mollis, Gymnocarpium dryopteris, Geranium richardsonii, Fritillaria camschatcensis, Heracleum maximum, and Chamerion angustifolium ssp. angustifolium. Floodplains dominated by volcanic ash deposits | This system occurs on the Alaska Peninsula and Aleutian Islands and possibly Kodiak Island. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | are included. | |
| **CES105.295** | **Aleutian Floodplain Forest and Shrubland** | Woody Wetlands and Riparian | This floodplain system includes active and inactive forested floodplains and outwash plains, and is mosaiced with Aleutian Floodplain Wetland (CES105.296). Forested floodplains and outwash plains are widespread on Kodiak Island and the eastern Alaska Peninsula, but absent from the Aleutian Islands. The substrate is typically well-drained sand or cobble alluvium, although finer silts and clays are found on higher terraces, on distal floodplains, and in lower energy systems. Permafrost is absent. Patch size is small to large and often linear. These are rivers that always have a tree-dominated component. The primary existing vegetation types are: tall willow, alder (Alnus viridis ssp. sinuata), mesic herbaceous meadows on the younger deposits, and cottonwood-poplar (Populus balsamifera or Populus balsamifera ssp. trichocarpa) on the older sites. The cottonwood-poplar stands often have an understory of tall willow, Calamagrostis canadensis, ferns and scattered forbs. Floodplains dominated by volcanic ash deposits, the largest being the Katmai River floodplain, are included. | This system occurs on the Alaska Peninsula and Kodiak Island. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES105.305** | **Aleutian Rocky Headland and Seacliff** | Barren/Sparsely Vegetated | This system includes rocky headlands and sea cliffs. Sea cliffs typically occur below 50 m elevation; however, on some extremely exposed cliffs, such as those on outer headlands, salt spray from winter storms may affect cliffs at 100-200 m elevation. Vegetation cover is typically sparse to absent. Frequent exposure to salt spray distinguishes this system from inland and alpine rock outcrops and cliffs. In addition to salt spray, wind and wave erosion, desiccation, and slope failures create a harsh growing environment. Forbs, grasses and shrubs establish on ledges and in cracks. On Amchitka Island, Shacklette et al. (1969) described several sea cliff communities, including Eurhynchium-Puccinellia-Caloplaca, Potentiea-Draba-Saxifraga, Xanthoria-Ramalina, and (on less steep cliffs) Leymus-Ligusticum-Anemone. On the Alaska Peninsula, dominance may shift to Alnus viridis ssp. Sinuata, Rubus spectabilis, Aruncus dioicus var. acuminatus, Heuchera glabra, Potentilla villosa, Phegopteris connectilis, Carex macrochaeta, Deschampsia spp., Lupinus nootkatensis, Campanula spp., and Chamerion latifolium. | This system occurs on the Alaska Peninsula and Aleutian Islands. |
| **CES105.307** | **Aleutian Sparse Heath and Fell-Field** | Upland Shrubland | This system typically occurs at mid to high elevations on cliffs, rocky outcrops, exposed summits, windswept ridges, and fell-fields characterized by harsh environmental conditions. Slopes vary from flat to steep. Total vascular plant cover is 10-25%. Sites typically support vegetation similar to the adjacent ecological systems. The higher elevation windswept ridges, fell-fields and discontinuous heaths include Harrimanella stelleriana, Phyllodoce aleutica, Salix arctica, Salix rotundifolia, Empetrum nigrum, Cassiope lycopodioides, and Arctostaphylos alpina. Herbaceous species include Carex macrochaeta, Carex aquatilis var. dives, Carex circinata, Lupinus nootkatensis, Geum calthifolium, Polygonum viviparum, Agrostis mertensii, Heuchera glabra, Potentilla villosa, Saxifraga bronchialis, | This system occurs on the Alaska Peninsula, Aleutian Islands and Kodiak Island. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | Saxifraga oppositifolia, Veronica wormskjoldii var. stelleri, and Tofieldia coccinea. | |
| **CES105.308** | **Aleutian Volcanic Rock and Talus** | Barren/Sparsely Vegetated | | This system occurs on the Alaska Peninsula and Aleutian Islands. |
| **CES2.13** | **Recently Burned Forest and Woodland - Low Severity** | Altered Vegetation | | |
| **CES200.091** | **Temperate Pacific Tidal Salt and Brackish Marsh** | Herbaceous Wetlands | Intertidal salt and brackish marshes are found throughout the Pacific Coast, from Kodiak Island and south-central Alaska to the central California coast. They are primarily associated with estuaries or coastal lagoons. Salt marshes are limited to bays and behind sand spits or other locations protected from wave action. Typically these areas form with a mixture of inputs from freshwater sources into coastal saltwater, so they commonly co-occur with brackish marshes. This is a small-patch system, confined to specific environments defined by ranges of salinity, tidal inundation regime, and soil texture. Patches usually occur as zonal mosaics of multiple communities. They vary in location and abundance with daily and seasonal dynamics of freshwater input from inland balanced against evaporation and tidal flooding of saltwater. Summer-dry periods result in decreased freshwater inputs from inland. Hypersaline environments within salt marshes occur in "salt pans" where tidal water collects and evaporates. Characteristic plant species include Distichlis spicata, | This system is found throughout the Pacific Coast, from Kodiak Island and south-central Alaska to the California coast. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | Monanthochloe littoralis, Limonium californicum, Jaumea carnosa, Salicornia spp., Suaeda spp., Batis maritima, and Triglochin spp. Low marshes are located in areas that flood every day and are dominated by a variety of low-growing forbs and low to medium-height graminoids, especially Salicornia virginica, Distichlis spicata, Schoenoplectus maritimus (= Scirpus maritimus), Schoenoplectus americanus (= Scirpus americanus), Carex lyngbyei, and Triglochin maritima. In Alaska, tidal marshes are often dominated by near-monotypic stands of Carex lyngbyei, while the frequently inundated lower salt marshes are often dominated by Eleocharis palustris or Puccinellia spp. Other common species in Alaska include Hippuris tetraphylla, Plantago maritima, Cochlearia groenlandica (= Cochlearia officinalis), Spergularia canadensis, Honckenya peploides, or Glaux maritima. In the Cook Inlet and Alaska Peninsula, Carex ramenskii may be an associated species. High marshes are located in areas that flood infrequently and are dominated by medium-tall graminoids and low forbs, especially Deschampsia caespitosa, Argentina egedii, Juncus balticus, and Symphyotrichum subspicatum (= Aster subspicatus), and in Alaska Poa eminens, Argentina egedii, Festuca rubra, and Deschampsia caespitosa. Transition zone (slightly brackish) marshes are often dominated by Typha spp. or Schoenoplectus acutus. Atriplex prostrata (= Atriplex triangularis), Juncus mexicanus, Phragmites spp., Cordylanthus spp., and Lilaeopsis masonii are important species in California. The invasive weed Lepidium latifolium is a problem in many of these marshes. Rare plant species include Cordylanthus maritimus ssp. maritimus. | |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES200.876** | **Temperate Pacific Freshwater Aquatic Bed** | Herbaceous Wetlands | Freshwater aquatic beds are found throughout the humid temperate regions of the Pacific Coast of North America. They are small patch in size, confined to lakes, ponds, oxbows, and slow-moving portions of rivers and streams. In large bodies of water, they are usually restricted to the littoral region where penetration of light is the limiting factor for growth. A variety of rooted or floating aquatic herbaceous species may dominate, including Azolla spp., Nuphar lutea, Polygonum spp., Potamogeton spp., Ranunculus spp., and Wolffia spp. Submerged vegetation, such as Myriophyllum spp., Ceratophyllum spp., and Elodea spp., is often present. These communities occur in water too deep for emergent vegetation. | This system is found throughout the humid temperate regions of the Pacific Coast of North America, from the Gulf of Alaska through southeastern Alaska into central California. |
| **CES200.877** | **Temperate Pacific Freshwater Emergent Marsh** | Herbaceous Wetlands | Freshwater marshes are found at all elevations below timberline throughout the temperate Pacific Coast and mountains of western North America. In the Pacific Northwest, they are mostly small-patch, confined to limited areas in suitable floodplain or basin topography. They are mostly semipermanently flooded, but some marshes have seasonal hydrologic flooding. Water is at or above the surface for most of the growing season. Soils are muck or mineral (in Alaska typically muck over a mineral soil), and water is high-nutrient. Occurrences of this system typically are found in a mosaic with other wetland systems. It is often found along the borders of ponds, lakes or reservoirs that have more open basins and a permanent water source throughout all or most of the year. Some of the specific communities will also be found in floodplain systems where more extensive bottomlands remain. By definition, freshwater marshes are dominated by emergent herbaceous species, mostly graminoids (Carex, Scirpus and/or Schoenoplectus, Eleocharis, Juncus, Typha latifolia) but also some forbs. Common emergent and floating vegetation includes species of Scirpus and/or Schoenoplectus, Typha, | This system occurs throughout the temperate Pacific Coast and coastal mountains of western North America, from southern coastal California north into coastal areas of British Columbia and Alaska. |

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| | | | Eleocharis, Sparganium, Sagittaria, Bidens, Cicuta, Rorippa, Mimulus, and Phalaris. Maritime Alaska freshwater marshes are described as having Carex rostrata, Equisetum fluviatile (often pure stands), Carex aquatilis var. dives (= Carex sitchensis), Menyanthes trifoliata, Comarum palustre, Eleocharis palustris, and Schoenoplectus tabernaemontani. In relatively deep water, there may be occurrences of the freshwater aquatic bed system, where there are floating-leaved genera such as Lemna, Potamogeton, Polygonum, Nuphar, Hydrocotyle, and Brasenia. A consistent source of freshwater is essential to the function of these systems. | |
| **CES200.882** | **North Pacific Maritime Eelgrass Bed** | Herbaceous Wetlands | Eelgrass beds are found throughout the coastal areas of the North Pacific Coast, from southern Oregon (Coos Bay) north into the Gulf of Alaska, Cook Inlet, and Bristol Bay coasts. Intertidal zones are found with clear water in bays, inlets and lagoons, typically dominated by macrophytic algae and marine aquatic angiosperms along the temperate Pacific coast. Subtidal portions are never exposed while intertidal areas support species that can tolerate exposure to the air. Common substrates include marine silts, but may also include exposed bedrock and cobble, where many algal species become attached with holdfasts. Subtidal/lower intertidal in clear water. Substrate is usually marine silts, but may be cobble. Beds are dominated by Zostera marina. | This system is found throughout the coastal areas of the North Pacific Coast, from southern Oregon (Coos Bay) north into the Gulf of Alaska, Cook Inlet, and Bristol Bay coasts. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES204.142** | **Alaskan Pacific Maritime Mountain Hemlock Forest** | Upland Forest and Woodland | This ecological system occurs along the Gulf of Alaska Coast and Pacific Coast from Kenai Fjords through southeastern Alaska. It occurs primarily in the maritime region, but also occurs in the sub-boreal transition on the inland side of the Kenai and Chugach mountains. This system occurs on relatively stable sideslopes and benches, and soils are generally well-drained. The lower and upper elevational limits of this system decrease from south to north and from east to west. The climate is generally characterized by short, cool summers, rainy autumns and long, cool, wet winters with heavy snow cover for 5-9 months. Fire is very rare in the sub-boreal portion of the distribution and absent from the rest of the range. Tsuga mertensiana is the dominant conifer with at least 15% cover, but associated canopy trees vary by region. In the northern portion of its range (from Kenai Fjords to Yakutat), the system occurs from sea level to upper forest elevations.. Picea sitchensis or Tsuga heterophylla may be codominant. In the sub-boreal region, Picea X lutzii may be present in the canopy, but cover is less than 15%. In southeast Alaska, this system is the predominant forest of upper elevations. It occurs above the western hemlock, western hemlock - red-cedar, and western hemlock - yellow-cedar systems and below the subalpine mountain memlock dwarf-tree system. Elevations generally range from 300 to 1000 m. Tsuga mertensiana is the dominant tree species. Picea sitchensis, Chamaecyparis nootkatensis (northern limit is Prince William Sound), or Tsuga heterophylla may be present but are less abundant than Tsuga mertensiana. Throughout the entire range of the system, the dominant understory shrub is typically Vaccinium ovalifolium; other common shrubs include Menziesia ferruginea, Elliottia pyroliflorus, Vaccinium vitis-idaea, and Empetrum nigrum. Common herbaceous species include Rubus pedatus, Cornus canadensis, Gymnocarpium dryopteris, Blechnum spicant, and | This system occurs primarily in the Kenai Mountains and does not include coastal rainforest mountain hemlock systems. It also occurs from Kenai Fjords to Yakutat and possibly Glacier Bay. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | Listera cordata. Major disturbance processes include avalanche, fungal pathogens, and blowdown. Parklands (open woodlands or sparse trees with dwarf-shrub or herbaceous vegetation) are not part of this system but of North Pacific Maritime Mesic Subalpine Parkland (CES204.837) or Alaskan Pacific Maritime Subalpine Mountain Hemlock Woodland (CES204.143). | |
| **CES204.143** | **Alaskan Pacific Maritime Subalpine Mountain Hemlock Woodland** | Upland Forest and Woodland | This subalpine ecological system occurs in the upper slopes of mountain ranges along the Gulf Coast of Alaska, including the Kenai, Chugach, St. Elias, Fairweather, and Coast mountains. It is dominated by mountain hemlock forests and parkland growing near elevational treeline. Tsuga mertensiana is the dominant tree and often grows with a stunted growth form (krummholz). Patches of forest interspersed with alpine heath or tall shrub characterize this system. Treeline forests often grow as small patches at the lower elevation of alpine tundra and forb meadow systems. Common understory species include Phyllodoce aleutica (or Phyllodoce glanduliflora), Harrimanella stelleriana, Luetkea pectinata, Empetrum nigrum, Nephrophyllidium crista-galli, and Geum calthifolium. The | This system occurs primarily at the elevational limit of tree growth in the Kenai Mountains and does not include coastal rainforest mountain hemlock systems. It also occurs from the Kenai Fjords to southeastern Alaska and British Columbia. |

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| | | | major disturbance processes include avalanche, fungal pathogens, and blowdown. | |
| **CES204.145** | **Alaska Sub-boreal and Maritime Alpine Mesic Herbaceous Meadow** | Upland Grasslands and Herbaceous | These are mesic subalpine and alpine herbaceous meadows that occur on mountain sideslopes in the boreal transition and maritime regions of Alaska. The slope position is often above the tall-shrub zone and below alpine dwarf-shrub tundra, and the slope shape is usually straight to concave. The substrate is colluvium, residuum, or glacial till. This system often occurs as a continuous band above or mixed with subalpine and alpine shrublands on moderate to steep slopes underlain by colluvium, talus, or bedrock. Species composition is diverse and species richness is often very high, typically no single species is dominant. Vegetation is dominated by herbaceous species, including Carex macrochaeta, Geranium erianthum, Sanguisorba canadensis, Valeriana sitchensis, Lupinus nootkatensis, Veratrum viride, Aconitum delphiniifolium, Anemone narcissiflora, Polemonium acutiflorum, Chamerion angustifolium (= Epilobium angustifolium), Chamerion latifolium, Senecio triangularis, Nephrophyllidium crista-galli, Calamagrostis canadensis (often present but not dominant), Castilleja unalaschcensis, Artemisia arctica, Fritillaria camschatcensis, and Athyrium filix-femina. The dominant disturbances are snow avalanche, soil creep and freeze-thaw action. | This system occurs in the subalpine to alpine zones of the boreal transition region and from Kodiak Island through southeastern Alaska. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES204.151** | **Alaskan Pacific Maritime Sitka Spruce Forest** | Upland Forest and Woodland | This productive ecological system occurs on well-drained sideslopes and footslopes along the Gulf Coast of Alaska and the North Pacific, in the perhumid and subpolar rainforest zones. Sites dominated by Picea sitchensis are usually tied to disturbance such as slope instability, water movement (either downhill through the soil or in open streams), exposure to salt spray, or windthrow. Picea sitchensis is the dominant tree species, although Tsuga mertensiana or Tsuga heterophylla may be minor canopy associates. In southeastern Alaska, Alnus rubra may be an associated understory tree species, especially in upland alluvial fans. Common species in the shrub layer include Alnus viridis ssp. sinuata, Oplopanax horridus, Rubus spectabilis, and Vaccinium ovalifolium. Common herbaceous species include Maianthemum dilatatum, Tiarella trifoliata, Dryopteris expansa, and Gymnocarpium dryopteris. Calamagrostis nutkaensis may be common on exposed sites near the coast. In the northern portion of the temperate rainforest (Kodiak Island, Kenai Fjords, and Prince William Sound), Picea sitchensis is frequently the dominant canopy tree from sea level to treeline on productive sites, and it is the only conifer that occurs on Afognak and Kodiak islands, where its range is actively expanding. In the southern portion of the Alaskan rainforest, Picea sitchensis is linked more closely with disturbance (e.g., very steep sites, recently deglaciated landscapes, outer coast headlands, upland alluvial fans, ancient landslides) and karst substrates. It also occurs commonly at upper elevations just below the mountain hemlock zone. | This system occurs as a narrow band along the Gulf of Alaska coast and extends from the northern portion of Kodiak Island through southeast Alaska and into coastal British Columbia. The range coincides roughly with the subpolar and perhumid rainforest zon |

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| **CES204.152** | **Alaskan Pacific Maritime Subalpine Alder-Salmonberry Shrubland** | Upland Shrubland | This ecological system typically occurs just above treeline and below the alpine throughout the maritime region of Alaska. Soils are typically mesic, well-drained, shallow, and stony, and underlain by colluvium, glacial till or residuum. Alnus viridis ssp. sinuata is often the dominant species, but Rubus spectabilis may be codominant. Other common species include Sambucus racemosa, Oplopanax horridus, and Elliottia pyroliflorus. The tall shrub system is often mosaiced with the mesic herbaceous meadow system. Common herbaceous species include Calamagrostis canadensis, Chamerion angustifolium, Veratrum viride, Heracleum maximum, Athyrium filix-femina, Dryopteris expansa, Phegopteris connectilis, Equisetum arvense, Streptopus amplexifolius, Lupinus nootkatensis, Valeriana sitchensis, Geranium erianthum, Aconitum delphiniifolium, Castilleja unalaschcensis, Sanguisorba canadensis, and Carex macrochaeta.<br><br>This system also includes partially vegetated bedrock ridges and cliffs in the alpine and subalpine, where it is found primarily on or near ridgetops and is exposed to extremely harsh growing conditions. More exposed sites subject the vegetation to a very short growing season, freeze-thaw pattern, and desiccating winds. Exposed bedrock or talus is usually a major component of the sites. In the more extreme locations, the vegetation cover is often fragmented or sparse and includes a complex of sparse tall or low shrubs, dwarf-shrubs, and herbaceous species.<br><br>This system appears to be relatively stable, although there may be an upward trend in the elevation of this system. Treeline conifers appear to be invading from below in some areas, and the elevational limit of low and tall shrub establishment | This system occurs from Kodiak Island through southeastern Alaska. |

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| | | | appears to be rising. | |
| **CES204.153** | **Alaskan Pacific Maritime Sitka Spruce Beach Ridge** | Upland Forest and Woodland | This ecological system includes productive forests on beach ridges and occurs along the Alaska Gulf Coast in the following areas: Copper River Delta, Cape Yakataga, Yakutat Forelands, and outer coast of Glacier Bay National Park. Picea sitchensis is usually dominant in the canopy, but Tsuga heterophylla can be codominant especially on older sites. Oplopanax horridus is usually the most abundant understory shrub; other common shrubs include Vaccinium ovalifolium and Rubus spectabilis. Understory species include Circaea alpina, Rubus pedatus, Streptopus amplexifolius, Tiarella trifoliata, Athyrium filix-femina, Dryopteris expansa, and Gymnocarpium dryopteris. Mature forests usually have very little downed wood or snags. Beach ridges form and become removed from direct contact with saltwater through long shore sediment transport coupled with isostatic rebound (Shephard 1993). Coastal beach communities are often dominated by Leymus mollis and | This system occurs from the Copper River Delta to Glacier Bay in Alaska. It also occurs on Kodiak Island. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | brackish meadows. Picea sitchensis seedlings establish in the brackish meadows, but often do not survive, probably due to excessive salt spray. Further inland, Picea sitchensis seedlings establish and survive in these meadows, and the meadow transitions to forest. Picea sitchensis establishes about 130 years after beach ridge formation and may succeed to Tsuga heterophylla forest. | |
| **CES204.154** | **Alaskan Pacific Maritime Floodplain Forest and Shrubland** | Woody Wetlands and Riparian | This system includes glacially- and non-glacially-fed rivers and streams along the Gulf Coast of Alaska. It includes the active and inactive portions of the floodplain but not abandoned floodplains. Frequent flooding, shifting channels, and sediment deposition characterize the system. This system includes large and small channels as well as proximal outwash. Glacially-fed rivers occur primarily on the mainland, while non-glacially-fed rivers occur on both the mainland and large islands in the Gulf of Alaska. Since glacial and non-glacial floodplain types can not be mapped confidently as separate systems, they are considered one ecological system. However, vegetation composition and disturbance cycle vary depending on type of input (glacial vs. non-glacial) and proximity to the glacier, so descriptions that follow retain these distinctions. Two floodplain types are described below: glacial floodplains and non-glacial floodplains. (It may be possible to apply different successional models by region or proximity to glacier terminus.) | This system occurs from Kodiak Island through southeastern Alaska. |

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| **CES204.155** | **Alaskan Pacific Maritime Shrub and Herbaceous Floodplain Wetland** | Woody Wetlands and Riparian | Floodplain wetlands occur within the active and inactive portions of floodplain systems. Wetlands develop on poorly drained deposits, oxbows, and abandoned channels and are often mosaiced with well-drained floodplain vegetation. Frequent river channel migration and associated flooding and fluvial processes constitute the major disturbances. Wetland succession and species composition are variable due to diverse environmental conditions such as water depth, substrate, and nutrient input. Floodplain wetland vegetation includes the following classes: aquatic bed, freshwater marsh, fen, wet low shrub, and tall-shrub swamp. These have been described as unique systems in this classification, but because floodplain wetland dynamics are different from wetland dynamics outside the floodplain, we will consider floodplain wetlands a distinct system, and model succession accordingly. | This system includes glacially- and non-glacially-fed rivers and streams along the Gulf Coast of Alaska, from Kodiak Island through southeastern Alaska. |
| **CES204.156** | **Alaskan Pacific Maritime Mountain Hemlock Peatland** | Woody Wetlands and Riparian | This ecological system is a mosaic of dwarf-tree dominated communities (Tsuga mertensiana (more common), Cupressus nootkatensis, or Picea sitchensis), and dwarf-shrub- and herbaceous-dominated peatland communities. It typically occurs on sloping terrain and may develop on fairly steep sideslopes in areas with very high rainfall and low permeability (such as Prince William Sound and Kenai Fjords). Stunted Tsuga mertensiana (more common), Chamaecyparis nootkatensis (= Cupressus nootkatensis), or Picea sitchensis may be present. Shrubs include Vaccinium uliginosum, Vaccinium caespitosum, and Empetrum nigrum. Common herbaceous species include Nephrophyllidium crista-galli, Trichophorum caespitosum, Dodecatheon pulchellum, Geum calthifolium, Cornus canadensis, Carex pauciflora, Carex anthoxanthea, and Eriophorum angustifolium. Sphagnum spp. are usually abundant in the ground layer. This system occurs at higher elevations (usually above 500 m) in the southern portion of its | This system occurs from Kenai Fjords through southeastern Alaska and into British Columbia. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | range (southeastern Alaska and British Columbia). | |
| **CES204.157** | **Alaskan Pacific Maritime Wet Low Shrubland** | Woody Wetlands and Riparian | This wetland system typically occurs as a ring on the outer edge of peatlands or on uplifted tidal marshes that are relatively wet but no longer tidally influenced. It is a minor yet widespread system wherever mature peatlands and uplifted tidal marshes occur, such as the Copper River Delta and Yakutat Forelands. It also occurs on old lakebeds, drained beaver ponds, wet depressions, and the edge of tidal marshes. Soils are saturated for at least a portion of the growing season, and generally have a wet organic layer of variable depth (8 cm to 1 m deep) over silt, sand or gravel. The shrub layer is dominated by Myrica gale and/or Vaccinium uliginosum. In Katmai National Park and Preserve, Myrica gale is the dominant shrub, but Betula nana or Salix barclayi may also codominate. Species richness is often high and composition is variable. Common associated species may include Alnus viridis ssp. sinuata, Kalmia microphylla, Carex pauciflora, Carex livida, Carex aquatilis var. dives (= Carex sitchensis), Carex pluriflora, Carex viridula ssp. viridula, Trichophorum caespitosum, Eriophorum angustifolium, Equisetum variegatum, Drosera rotundifolia, Sanguisorba canadensis, Sanguisorba officinalis, Calamagrostis canadensis, and Rubus arcticus. Sphagnum spp. | This system occurs from the region of the eastern Alaska Peninsula, Katmai National Park and Preserve, east and south, on Kodiak Island and throughout southeastern Alaska. |

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| | | | may be abundant in the ground layer. | |
| **CES204.158** | **Alaskan Pacific Maritime Fen and Wet Meadow** | Herbaceous Wetlands | This ecological system includes herbaceous wetlands in fens (not including bogs) and non-peatlands. The fen/wet meadow system may be dominated either by sedges, sedges with a variety of forbs, or forbs. The organic layer ranges from thick to thin, and may be composed of sphagnum, sedge, or other organic material and can occur over mineral soil, or may be floating or submerged. Rich fens consistently feature Carex aquatilis var. dives (= Carex sitchensis), although a variety of other sedges and forbs may be present, including Dodecatheon pulchellum, Parnassia fimbriata, Eriophorum russeolum, Menyanthes trifoliata, and Comarum palustre. Ericaceous shrubs are absent. Bryophytes (when present) include Calliergon giganteum, Sphagnum squarrosum, and Sphagnum riparium. Mixed sedge and forb meadows include Carex saxatilis, Carex lyngbyei, Sanguisorba canadensis, Swertia perennis, and Platanthera dilatata. Forb-dominated sites include Equisetum fluviatile, Comarum palustre (= Potentilla palustris), and Menyanthes trifoliata. | This system occurs from Kodiak Island through southeastern Alaska. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES204.159** | **Alaskan Pacific Maritime Coastal Meadow and Slough-Levee** | Herbaceous Wetlands | This ecological system includes moist and wet meadows associated with delta deposits, uplifted marshes, or beach deposits. These meadows occur inland of tidal marshes and are also common along sloughs and levees. Meadows are dominated by a wide variety of graminoids and forbs, including Deschampsia beringensis, Festuca rubra, Argentina egedii (= Potentilla egedii), Lathyrus japonicus var. maritimus, Castilleja spp., Heracleum maximum, Parnassia palustris, Lupinus nootkatensis, Achillea millefolium var. borealis (= Achillea borealis), Angelica lucida, and Carex mackenziei. Leymus mollis and Lupinus nootkatensis are common on levees, and Carex lyngbyei often dominates in sloughs and wet depressions. | This system occurs from the eastern coast of the Alaska Peninsula through southeastern Alaska. |
| **CES204.160** | **Alaskan Pacific Maritime Alpine Wet Meadow** | Herbaceous Wetlands | This small-patch ecological system often occurs as a mosaic of alpine wetlands including headwater fens, marshes, and riparian zones. Common species include Salix reticulata, Salix stolonifera, Viola spp., Lupinus nootkatensis, Mimulus guttatus, Mimulus lewisii, Petasites frigidus var. frigidus, Sanguisorba canadensis, and Leptarrhena pyrolifolia; Valeriana sitchensis, Castilleja parviflora, Ranunculus spp., Caltha spp., and Saxifraga spp. often occur along streambanks. Peatlands and associated wet meadows and marshes often feature Trichophorum caespitosum, Carex anthoxanthea, and Juncus mertensianus. | This system occurs from Kodiak Island through southeastern Alaska. |
| **CES204.161** | **Alaskan Pacific Maritime Alpine Floodplain** | Barren/Sparsely Vegetated | This system includes active alpine and subalpine floodplains and consists of a complex of riparian vegetation, including gravel bars, herbaceous vegetation, and dwarf-, low, or tall shrub. Riparian zones are characterized by frequent flooding, shifting channels, and transport and deposition of alluvium. Tall and low shrubs reach their maximum elevation in riparian zones. This may be due to protection of the valley bottom and deeper winter snowpack or the favorable growing conditions | This system occurs from Kodiak Island through southeastern Alaska. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | of the riparian zone. Flooding regime and soil moisture control the pattern of vegetation cover. Common species occurring in frequently flooded areas include Chamerion latifolium, Chamerion angustifolium, Lupinus nootkatensis, Salix spp., and Alnus viridis ssp. sinuata. Species occurring in more stabilized areas of the floodplain may include Salix reticulata, Salix arctica(?), Phyllodoce aleutica, Harrimanella stelleriana, Luetkea pectinata, and Sanguisorba canadensis. | |
| **CES204.162** | **Alaskan Pacific Maritime Avalanche Slope Shrubland** | Upland Shrubland | This system occurs on mountain sideslopes from sea level to treeline where slopes are steep enough to produce frequent snowslides preventing forest development. Mass wasting, including rockfall and soil creep, also contributes to the disturbance cycle. This system is similar in species composition to Alaskan Pacific Maritime Subalpine Alder-Salmonberry Subalpine Shrubland (CES204.152), but it occurs below the subalpine zone, and tree growth is limited by disturbance frequency, not elevation and temperature as in the subalpine system. Sites are usually dominated by Alnus viridis ssp. sinuata and Rubus spectabilis. Other shrubs may include Sambucus racemosa, Salix alaxensis, Salix barclayi, and Oplopanax horridus. Herbaceous patches are common and are dominated by Calamagrostis canadensis and Chamerion angustifolium. Other common herbs include Athyrium filix-femina, Veratrum viride, Heracleum maximum, Streptopus amplexifolius, and Aruncus dioicus. Near treeline, forb-sedge meadows replace Calamagrostis meadows. Tree seedlings and saplings may be abundant on some slopes but do not emerge as an overstory due to frequent disturbance. | This system occurs from Kodiak Island through southeastern Alaska into British Columbia, but the southern boundary needs to be determined. |

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| **CES204.163** | **Alaskan Pacific Maritime Mesic Herbaceous Meadow** | Upland Grasslands and Herbaceous | This ecological system includes a wide variety of herbaceous vegetation types and occurs below subalpine shrublands on sideslopes, rolling hills, and alluvial deposits. Soils are typically mesic, well-drained, and underlain by colluvium, alluvium, glacial till or residuum. Vegetation may be dominated by forbs, graminoids, or ferns. The most common dominant species are Calamagrostis canadensis and Chamerion angustifolium. One or more of the following species can also be dominant: Veratrum viride, Athyrium filix-femina, or Heracleum maximum. Other common species may include Lupinus nootkatensis, Aconitum delphiniifolium, Sanguisorba canadensis, Senecio triangularis, and Nephrophyllidium crista-galli. | This system occurs from Kodiak Island through southeastern Alaska. Its southern boundary has yet to be determined. |
| **CES204.164** | **Alaskan Pacific Maritime Shore Pine Peatland** | Woody Wetlands and Riparian | This ecological system is a mosaic of shore pine-, dwarf-shrub- and herbaceous-dominated peatland communities. It includes well-developed peatlands on flat, rolling, or sloping terrain. Soils are poorly drained with deep organic layers. Trees are usually stunted and the tree canopy typically has less than <30% cover. Common species include Pinus contorta, Chamaecyparis nootkatensis (= Cupressus nootkatensis), Empetrum nigrum, Kalmia, Ledum spp., Vaccinium uliginosum, Carex aquatilis var. dives (= Carex sitchensis), Carex pluriflora, Carex pauciflora, Carex livida, Trichophorum caespitosum, Eriophorum angustifolium, Sanguisorba menziesii, and Cornus canadensis. Sphagnum spp. dominate the moss layer. This system includes a range of canopy structures and compositions from mixed conifer peatlands on sideslopes and benches with Chamaecyparis nootkatensis, Tsuga mertensiana, Tsuga heterophylla, and Pinus contorta, to peatlands on level ground with scrub Pinus contorta. | This system occurs from Yakutat south through southeastern Alaska. Pinus contorta does not occur north or west of Yakutat. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES204.165** | **Alaskan Pacific Maritime Dwarf-shrub-Sphagnum Peatland** | Woody Wetlands and Riparian | This ecological system is a mosaic of dwarf-shrub- and herbaceous-dominated peatlands. It includes well-developed peatlands (bogs and poor fens) in basins or on flat to gently sloping terrain. Soils are acidic and are usually saturated throughout the growing season. Sphagnum spp. (especially Sphagnum fuscum) dominate the ground layer. Shrub cover is typically low and may include Ledum spp., Andromeda polifolia, Kalmia polifolia, Vaccinium oxycoccos (= Oxycoccus microcarpos), Empetrum nigrum, and Vaccinium uliginosum. Other common species include Drosera spp., Carex livida, Carex pluriflora, Carex pauciflora, Carex aquatilis var. dives (= Carex sitchensis), Trichophorum caespitosum, and Eriophorum angustifolium. This system includes raised bogs. | This system occurs from Kodiak Island through southeastern Alaska. |
| **CES204.167** | **Alaska Pacific Maritime Rocky Coastline** | Barren/Sparsely Vegetated | Sea cliffs, rocky headlands, and cobble beaches occur commonly along the North Pacific coastline. Cobble beaches are associated with cliff and bluff systems or coarse-textured glacial deposits (i.e., coastal moraines). Beaches are often steep and feature distinct storm berms. These are typically high-energy environments exposed to wave action and storm swell. Cobble beaches may have a mixture of silts and sands below the surface (particularly in outwash plains), but the fine material is buried and not subjected to wind and water transport. Beach meadows may occupy well-drained stable portions of the upper beach. Vegetation typically includes herbaceous species with varying degrees of tolerance for salt spray and wind abrasion. Common species found on beach meadows on cobble substrates include Leymus mollis, Lathyrus japonicus var. maritimus, Honckenya peploides, Mertensia maritima, Ligusticum scoticum, Potentilla villosa, and Lupinus nootkatensis.Sea cliffs and rocky headlands are sparsely vegetated or barren landscapes that are usually exposed to wind and salt spray. Forbs, grasses and shrubs establish on | This system occurs from the eastern coast of the Alaska Peninsula through southeastern Alaska. |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| | | | ledges and in cracks. A variety of species may dominate depending on level of salt exposure, steepness, aspect, and available microsites. Shrubs such as Alnus viridis ssp. Sinuata or Rubus spectabilis may be present but usually account for less than 5% of the total vascular plant cover. Herbaceous cover is diverse and may include many of the following species: Aruncus dioicus var. acuminatus, Heuchera glabra, Potentilla villosa, Phegopteris connectilis, Carex macrochaeta, Deschampsia spp., Lupinus nootkatensis, Campanula spp., Prenanthes alata, Rhodiola rosea, and Chamerion latifolium (Boggs et al. 2008 [KEFJ]). Picea sitchensis may also occupy these rocky headlands and often does. They are characterized by somewhat stunted growth, usually with branches from top to bottom of bole. Epiphytic lichens are abundant in this system. | |
| **CES204.310** | **Alaskan Pacific Maritime Alpine Dwarf-Shrubland** | Upland Shrubland | This system occurs primarily on alpine and subalpine sites of southeastern, maritime Alaska, but it can also be found at lower elevations (e.g., Kenai Fjords and Prince William Sound). It occurs on sideslopes, shoulder slopes, and low summits, and the terrain varies from gently sloping to steep. The vegetation can be a mosaic of herbaceous meadow and alpine heath (dwarf-shrublands) or herbaceous meadow with a heath understory; however, in some areas dwarf-shrub cover is continuous. Dominant dwarf-shrub species include Empetrum nigrum, Phyllodoce aleutica, Phyllodoce glanduliflora, Cassiope mertensiana, Cassiope tetragona, Harrimanella stelleriana, and Luetkea pectinata. Other common species may include Vaccinium uliginosum, Vaccinium vitis-idaea, and Loiseleuria procumbens. Ericaceous species typically dominate this type, but sites dominated by Salix arctica and Salix reticulata are included in this system. Scattered tall shrubs and dwarf trees | This system occurs from Kodiak Island through southeastern Alaska. |

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| | | | may be present. Common herbaceous species include Carex macrochaeta, Lupinus nootkatensis, Valeriana sitchensis, Geranium erianthum, Aconitum delphiniifolium, Castilleja unalaschcensis, Sanguisorba canadensis, Anemone narcissiflora, Artemisia arctica, and Viola spp. On slopes on the outer coast and also in Kenai Fjords and Prince William Sound Nephrophyllidium crista-galli is common in this system. | |
| **CES204.311** | **Alaskan Pacific Maritime Periglacial Woodland and Shrubland** | Upland Forest and Woodland | This ecological system occurs as an early-successional sere on landscapes recently exposed through deglaciation since the end of the Little Ice Age (especially common in Glacier Bay and Kenai Fjords). This is not a riverine system, and glacial outwash systems are also not included. Soils are derived from glacial till, residuum and colluvium and are shallow, stony, and well-drained to excessively well-drained. Soil profile development is lacking or minimal. Early-seral stages of forested systems with low cover of Picea sitchensis and Populus balsamifera ssp. trichocarpa occur on older landscapes at low elevations near the maximum glacial extent. Depending on time since ice has receded, some sites may have woodlands of either Populus balsamifera or a mix of Populus balsamifera and Picea sitchensis. On other sites Alnus viridis ssp. sinuata often dominates the species composition, although Salix sitchensis, Salix alaxensis, or Salix barclayi may also be abundant. Salix spp. and Alnus viridis ssp. sinuata are commonly mixed with the trees on wooded sites as well. Rubus spectabilis is uncommon in this system. Common herbaceous species include Calamagrostis canadensis, Chamerion angustifolium, Chamerion latifolium, Heracleum maximum, Lupinus | This system occurs from Kodiak Island to southeastern Alaska. |

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| | | | nootkatensis, Equisetum arvense, Athyrium filix-femina, Dryopteris expansa, Phegopteris connectilis, Streptopus amplexifolius, Pyrola spp., Carex mertensii, and Epilobium spp. Mosses and lichens may be abundant on some sites; common early-seral nonvascular species include Racomitrium canescens, Pohlia nutans, Drepanocladus aduncus, Stereocaulon tomentosum, Cladonia crispata, and Cladina portentosa. | |
| **CES204.315** | **Alaskan Pacific Maritime Poorly Drained Conifer Woodland** | Woody Wetlands and Riparian | This ecological system occurs on low to mid elevations on rolling terrain, benches, and gentle slopes with restricted drainage from Kenai Fjords through southeast Alaska. Soils may be shallow to deep, are poorly drained, and usually have a thick organic layer or some peat development. In some places, stands are often a fine mosaic of peatlands and better-drained inclusions. These are low-productivity sites that are intermediate between shore pine or mountain hemlock peatland sites and productive forest systems. The forest canopy is open (less than 45% cover), and trees often show signs of stress such as spike-top (especially cedar) or chlorotic foliage (especially spruce). Standing dead trees are common. In the north, paludification on these sites may lead to conversion from mountain hemlock to mountain hemlock peatland over long time scales. Overstory trees may include several of the following species: Tsuga heterophylla, Tsuga mertensiana (often alone or with Picea sitchensis in the subpolar rainforest zone), Thuja plicata (southern portion of the Alaska distribution only), and Chamaecyparis nootkatensis (= Cupressus nootkatensis). Picea sitchensis and Pinus contorta may also be present but are not dominant. Common shrubs include Vaccinium ovalifolium, Gaultheria shallon (southern | This system occurs from Kenai Fjords and Prince William Sound to Yakutat, and south through southeastern Alaska. |

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| | | | portion of the Alaska distribution only), and Elliottia pyroliflorus. Common understory species include Nephrophyllidium crista-galli, Thelypteris quelpaertensis, Phegopteris connectilis, Trichophorum caespitosum, Carex anthoxanthea, Carex pluriflora, Carex stylosa, Eriophorum spp., Lysichiton americanus, and Sphagnum spp. | |
| **CES204.316** | **Alaskan Pacific Maritime Subalpine Copperbush Shrubland** | Upland Shrubland | This ecological system occurs in the lower alpine and subalpine. Elliottia pyroliflorus dominates the overstory (10 to 80% cover) and ranges in height from 0.6-1.5 m (2-5 feet). Other species include Phyllodoce aleutica, Nephrophyllidium crista-galli, Cornus suecica, Luetkea pectinata, Athyrium filix-femina, Cassiope mertensiana, Dryopteris expansa, Gymnocarpium dryopteris, Viola glabella, and Rubus spectabilis. Krummholz Tsuga mertensiana occur in some sites. Adjacent to this system at higher elevations are alpine herbaceous meadows or dwarf-shrublands; at lower elevations Tsuga mertensiana forests or woodlands are common. | This system occurs in the Alaska Range south and east throughout southeastern Alaska. |
| **CES204.318** | **Alaskan Pacific Maritime Alpine Sparse Shrub and Fell-field** | Upland Shrubland | This sparsely vegetated ecological system occurs on exposed summits, windswept ridges, and fell-fields. These sites are characterized by harsh environmental conditions. Slopes vary from moderately sloped to flat. Dominant species include Empetrum nigrum, Vaccinium uliginosum, Loiseleuria procumbens, Phyllodoce aleutica, Harrimanella stelleriana, and Luetkea pectinata. Lichens may be common. Total vegetation | This system occurs in the Alaska Range south and east throughout southeastern Alaska. |

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| | | | cover ranges from 10 to 25%. | |
| **CES204.837** | **North Pacific Maritime Mesic Subalpine Parkland** | Upland Forest and Woodland | This ecological system occurs throughout the mountains of the Pacific Northwest, from the southern Cascades of Oregon to the mountains of southeastern Alaska bordering British Columbia. It occurs at the transition zone of forest to alpine, forming a subalpine forest-meadow ecotone. Clumps of trees to small patches of forest interspersed with low shrublands and meadows characterize this system. Krummholz often occurs near the upper elevational limit of this system where it grades into alpine vegetation. Associations include woodlands, forested, and subalpine meadow types. It occurs on the west side of the Cascade Mountains where deep, late-lying snowpack is the primary environmental factor. Major tree species are Tsuga mertensiana, Abies amabilis, Chamaecyparis nootkatensis, and Abies lasiocarpa. This system includes British Columbia Hypermaritime and Maritime Parkland (Tsuga mertensiana). Dominant dwarf-shrubs include Phyllodoce empetriformis, Cassiope mertensiana, and Vaccinium deliciosum. Dominant herbaceous species include Lupinus arcticus ssp. subalpinus, Valeriana sitchensis, Carex spectabilis, and Polygonum bistortoides. There is very little disturbance, either windthrow or fire. The major process controlling vegetation is the very deep long-lasting snowpacks (deepest in the North Pacific region) limiting tree regeneration. Trees get established only in favorable microsites (mostly adjacent to existing trees) or during drought years with low snowpack. It is distinguished from more interior dry parkland primarily by the presence of Tsuga mertensiana or Abies amabilis and absence or paucity of Pinus albicaulis and Larix lyallii. | This system occurs throughout the mountains of the Pacific Northwest, from the central Oregon Cascades (Diamond Peak, 30 miles north of Crater Lake National Park), north to the mountains along the border of Alaska and British Columbia. |

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| **CES204.840** | **Alaskan Pacific Maritime Western Hemlock Forest** | Upland Forest and Woodland | This forested ecological system is the dominant Tsuga heterophylla forest system along the northern portions of the Pacific Northwest Coast. It occurs from coastal British Columbia (north of the northern limit of Pseudotsuga menziesii) through southeast Alaska to Prince William Sound (the northwest limit of Tsuga heterophylla). This system ranges from sea level to about 610 m (0-2000 feet) elevation. The climate is wet with heavy snow and rainfall, but sites occupied are typically well-drained. The dominant upper canopy species is Tsuga heterophylla or a mix of Picea sitchensis and Tsuga heterophylla. In the northern portion of the region (Yakutat through Prince William Sound), Tsuga mertensiana may also be present in the canopy. Chamaecyparis nootkatensis may be present in the canopy in southeastern Alaska (Glacier Bay to British Columbia?) but is rare in this system in Prince William Sound (the northwestern limit of Chamaecyparis nootkatensis). The shrub layer is often dominated by Vaccinium ovalifolium, with Menziesia ferruginea usually present; Rubus spectabilis and Oplopanax horridus are also common. Lysichiton americanus occurs in poorly drained depressions. Other common forbs include Rubus pedatus, Streptopus amplexifolius, Cornus canadensis, and Tiarella trifoliata. Dryopteris expansa is common in well-drained, relatively nutrient-rich sites. Other common ferns include Gymnocarpium dryopteris, Blechnum spicant, and Dryopteris expansa. Disturbed sites, such as V-notches, can have abundant Rubus spectabilis or Oplopanax horridus dominating the undergrowth. Sites may receive very infrequent catastrophic disturbance leading to large older trees and multiple canopy layers where western hemlock regeneration is favored. Diseases including dwarf mistletoe and heart rot fungi perpetuate the hemlock-dominated old-growth condition. On other sites, wind disturbance yields forests approaching an | This system is found along the Pacific Northwest Coast, occupying much of the elevations in the Coast and Cascade mountains of British Columbia and southeastern Alaska (south of Prince William Sound, the northwestern limit of Tsuga heterophylla), f |

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| | | | even-aged condition dominated by Tsuga heterophylla but with a component of Picea sitchensis. | |

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| **CES204.842** | **North Pacific Hypermaritime Western Red-cedar-Western Hemlock Forest** | Upland Forest and Woodland | These forests occupy the outer coastal portions of British Columbia, southeastern Alaska, and northwestern Washington. Their center of distribution is the northern coast of British Columbia, as Thuja plicata approaches its northernmost limit in the southern half of southeastern Alaska. These forests occur mainly on islands but also fringe the mainland. They are never more than 25 km from saltwater; elevation ranges from 0 to 600 m, and below 245 m in Alaska (above 200 m, Chamaecyparis nootkatensis replaces Thuja plicata). The climate is hypermaritime, with cool summers, very wet winters, abundant fog, and without a major snowpack . Fire is absent from this system in Alaska and rare throughout the rest of the range. These forests are more influenced by gap disturbance processes and intense windstorms than by fire. The terrain is mostly gentle to rolling, of low topographic relief, and often rocky. Soils typically have a distinct humus layer overlying mineral horizons or bedrock; where the system is best developed in central British Columbia, the humus layers are very thick (mean 17-35 cm). Soils are often imperfectly drained, but this is not a wetland system. Thuja plicata and Tsuga heterophylla are the dominant tree species throughout, and Chamaecyparis nootkatensis joins them from northern Vancouver Island north. Canopy cover of trees is typically over 60%. Pinus contorta and Tsuga mertensiana can be present in some locations in the central and northern portion of the range. Abies amabilis occurs in British Columbia and northern Washington stands but is not typically found in southeastern Alaska. In Washington, nearly pure stands of Tsuga heterophylla are common and seem to be associated with microsites most exposed to intense windstorms. A shrub layer of Gaultheria shallon, Vaccinium ovalifolium, and Menziesia ferruginea is usually well-developed. The fern Blechnum spicant in great abundance is typical of hypermaritime | This system is found in the outer coastal portions of British Columbia and southern southeast Alaska, as well as northwestern Washington. |

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| | | | conditions. Oxalis oregana (absent in Alaska) is important in the understory of moist sites in Washington. Polystichum munitum occurs at the northern end of its range in southeastern Alaska on well-drained sites. The abundance of Thuja plicata in relation to other conifers is one of the diagnostic characters of these forests; the other is the low abundance of Pseudotsuga menziesii (absent in Alaska) and Picea sitchensis. Where these forests are best developed, they occur in a mosaic with forested wetlands, bogs, and Sitka spruce forests (the latter in riparian areas and on steep, more productive soils). | |

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| **CES204.843** | **North Pacific Mesic Western Hemlock-Yellow-cedar Forest** | Upland Forest and Woodland | This system occurs throughout southeastern Alaska but appears to be more common in central southeastern Alaska. It is more common on the islands than on the mainland and is less common on northern Chichagof Island than on southern Chichagof and Baranof islands. It occurs at all elevations below the Mountain Hemlock Zone and is most abundant on somewhat poorly to moderately drained slopes. In the southern part of southeastern Alaska, this system generally occupies the upper edge of the Western Hemlock Zone, from 305-610 m (1000-2000 feet) elevation. On non-alluvial low-elevation sites, Chamaecyparis nootkatensis abundance increases as soil drainage becomes poorer. Poor drainage results in fewer trees and, therefore, more understory light, allowing yellow-cedar to survive and reproduce despite competition from western hemlock. Chamaecyparis nootkatensis is more tolerant of poor soil drainage than Tsuga heterophylla. Chamaecyparis nootkatensis is a codominant with Tsuga heterophylla in stands with moderately open (50-70%) canopies. Yellow-cedar cover typically ranges from 5-50% and rarely dominates the overstory. Picea sitchensis may be an overstory component. The canopy is typically multilayered, with Tsuga heterophylla dominating the lower layers. This system intergrades with Tsuga mertensiana forests, and Tsuga mertensiana may occur in transitional stands. The shrub layer is relatively well-developed (>50%) in late-seral stands and includes Vaccinium ovalifolium and Menziesia ferruginea, with Lysichiton americanus and Coptis spp. as consistently present herbaceous species. Blechnum spicant is the most common fern, while Dryopteris expansa is nearly absent from this type. This system is distinguished by the codominance of Chamaecyparis nootkatensis and Tsuga heterophylla and the absence or rarity of Thuja plicata, Picea sitchensis, and Abies | This system occurs throughout southeastern Alaska. |

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| | | | amabilis. | |
| **CES204.853** | **North Pacific Alpine and Subalpine Bedrock and Scree** | Barren/Sparsely Vegetated | This ecological system includes all the exposed rock and rubble above the forest line (subalpine parkland and above) in the North Pacific mountain ranges and is restricted to the highest elevations in the Cascade Range, from southwestern British Columbia south into northern California, and also north into southeastern Alaska. It is composed of barren and sparsely vegetated alpine substrates, typically including both bedrock outcrops and scree slopes, upper mountain slopes, summits and nunataks. Nonvascular- (lichen-) dominated communities are common. Exposure to desiccating winds, rocky and sometimes unstable substrates, and a short growing season limit plant growth. In Alaska, this system usually occurs above alpine dwarf-shrub, herbaceous meadow, and dwarf-shrub-herbaceous systems typically at elevations higher than 915 m (3000 feet) (possibly higher in southeastern Alaska). There can be sparse cover of forbs, grasses, lichens, shrubs and small trees, but the total vascular plant cover is typically less than 25% due to the high cover of exposed rock. Species composition is variable and may include Artemisia arctica, | This ecological system is restricted to the highest elevations in the Cascade Range, from southwestern British Columbia south into northern California. |

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| | | | Astragalus alpinus, Carex microchaeta, Minuartia arctica, Salix rotundifolia, Saxifraga bracteata, Saxifraga bronchialis, Sibbaldia procumbens, and Silene acaulis. Common nonvascular genera include Racomitrium and Stereocaulon. | |
| **CES204.865** | **North Pacific Shrub Swamp** | Woody Wetlands and Riparian | Swamps vegetated by shrublands occur throughout the Pacific Northwest Coast, from Cook Inlet and Prince William Sound, Alaska, to the southern coast of Oregon. These are deciduous broadleaf tall shrublands that are located in depressions, around lakes or ponds, or river terraces where water tables fluctuate seasonally (mostly seasonally flooded regime), in areas that receive nutrient-rich waters. These depressions are poorly drained with fine-textured organic, muck or mineral soils and standing water common throughout the growing season. Alnus viridis ssp. sinuata often dominates the shrub layer, but many Salix species may also occur. The shrub layer can have many dead stems. However, various species of Salix, Spiraea douglasii, Malus fusca, Cornus sericea, Alnus incana ssp. tenuifolia (= Alnus tenuifolia), Alnus viridis ssp. crispa (= Alnus crispa), and/or Alnus viridis ssp. sinuata (= Alnus sinuata) can be the major dominants. They may occur in mosaics with marshes or forested swamps, being on average more wet than forested swamps and more dry than marshes. However, it is also frequent for them to dominate entire wetland systems. Hardwood-dominated stands (especially Fraxinus latifolia) may be considered a shrub swamp when they are not surrounded | This system occurs throughout the Pacific Northwest Coast, from Cook Inlet Basin and Prince William Sound, Alaska, to the southern coast of Oregon. |

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| | | | by conifer forests but do not occur in Alaska. Typical landscape for the Fraxinus latifolia stands were very often formerly dominated by prairies and now by agriculture. Wetland species, including Carex aquatilis var. dives (= Carex sitchensis), Carex utriculata, Equisetum fluviatile, and Lysichiton americanus, dominate the understory. On some sites, Sphagnum spp. are common in the understory (Stikine, Yakutat Forelands, Copper River Delta). | |
| **CES204.879** | **Temperate Pacific Intertidal Flat** | Barren/Sparsely Vegetated | Coastal flats are found along the north Pacific Coast from Kodiak Island and Cook Inlet, Alaska, south to central California. Tidal flats form a narrow band along oceanic inlets and are more extensive at the mouths of larger rivers. Algae are the dominant vegetation on mud or gravel flats where little vascular vegetation is present due to the daily (in some cases twice daily) tidal flooding of salt or brackish water. Characteristic species include Vaucheria longicaulis and Enteromorpha spp. Vascular species are sparse, if present, and may include salt-tolerant species such as Eleocharis palustris, Salicornia spp., Plantago maritima, Glaux maritima, and other plants common to lower salt marshes; cover is less than 10%. The dominant processes are tectonic uplift or subsidence, isostatic rebound, and sediment deposition. | Along the north Pacific Coast from Kodiak Island and Cook Inlet, Alaska, south to central California. |
| **CES3.1** | **Snow/Ice** | Unvegetated | | |

| ES_Code | Ecological System | General Landcover Type | Description | Range Comments |
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| **CES3.2** | **Open Water** | Water | | |