# Ecological site group P220X100(18570) Lowlands Northern Extent

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#### **Key Characteristics**

None specified

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

#### Physiography

The Lowland Grouping occurs from the high floodplains occurring above the river valleys down to the coastal plains. The grouping is associated with river and stream channels. These flood plains are rarely to frequently flooded, and may include some closed depressions where water ponds on the surface for long durations. The water table is usually more than 72 inches below the soil surface, but can rise to within 18 inches of the surface during wet periods. In ponded depressions, the water table is at or above the soil surface for long periods. Slopes range from 0-15% with elevations as high as 1850 feet.

Runoff Class - Low to Medium Flooding Duration - Very brief (4 to 48 hrs) to Brief (2 to 7 days) Flooding Frequency - Very Rare to Frequent Ponding Duration - Long (7 to 30 days) Ponding Frequency - None to Frequent Elevation - 0 to 450 ft (modal) Slope - 0-15% Water Table Depth - Greater than 18 inches Aspect is not a factor.

The hydrology of this site is characterized by rare to frequent freshwater flooding during spring runoff and other large storm events. In the event that high-intensity flooding removes vegetation on this site, which occurs less frequently than on the adjacent low flood plain site, the result is several years to decades of alder and willow cover followed by a gradual increase in tree cover. Closed depressions on the flood plain are frequently ponded for long durations.

#### Climate

The climate varies widely across this MLRA. Climate summaries are currently limited and not representative for this Ecological Site. Further investigation is in process.

#### **Soil features**

The soils of this site formed in deep alluvial deposits on high flood plains by freshwater rivers and streams. Soil textures are stratified silt loams to loamy sands, often with lenses of gravel and sandier textures in deeper soil horizons. A thin organic layer is common on the soil surface. Relatively small, closed depressions occur on these high flood plains, and often have very deep peat deposits as a result of long duration ponding. These soils are typically moderately well- and well-drained, with very poor drainage in closed depressions. The soil moisture regime of this site is udic or oxyaquic udic except in depressions, which are aquic.

Parent Material - Alluvium and Organic material

Surface Textures - Gravelly sand to Silt loam (Loamy sand, Sandy Loam) and peat

Drainage Class - Moderately well to well drained Permeability Class - Moderately rapid to Rapid Soil Depth - Very deep (greater than 60 inches) AWC (0 to 10 inches in depth) - 0.2 to 2.7 AWC (10 to 40 inches in depth - 0.5 - 8.3 pH - 4.5 to 7.3 Subsurface Fragments - 0 to 70%, generally small to coarse gravels, few cobbles and stones.

#### **Vegetation dynamics**

This site is associated with flood plains of large rivers and tributaries along the Gulf of Alaska. Until about 10,000 years ago, this area had many continental-scale ice sheets that advanced and retreated many times over millennia (Chapin 1994). The final advance of these glaciers occurred during the Little Ice Age, which peaked about 1750 AD. Since then, many glaciers have thinned and retreated inland, while numerous tidewater glaciers still exist in the area (Lawson 2015). The 250-year glacial retreat is attributed to less regional snowfall in the mountains, rising winter temperatures, and decreased cloud cover and lower precipitation during the growing season in summer (Hall et al. 2003).

During the past 250 years of glacial retreat, meltwater transported and deposited a large amount of silt and sediment via numerous short, high-gradient rivers. Alluvial and colluvial fans and long foot slopes are common in the valleys along the base of the mountains. The flood plain catena generally occurs across broad and braided channels with a high gradient, and feed into the tidally influenced estuarine areas.

This site supports a reference state composed of three community phases that reflect a disturbance regime of flooding intensity. A tall shrub community with abundant herbaceous understory plants is typical following severe flood events. In the absence of severe flooding, the abundance of balsam poplar trees increases, and the community resembles an open forest. If flooding becomes even less frequent, Sitka spruce becomes dominant, and understory shrubs and forbs are largely displaced by moss species.

Browsing by moose on willow species was observed on this ecological site, but it does not appear to affect the ecological processes enough to alter the communities.

Chapin 1994:

https://www.researchgate.net/publication/216810560\_Mechanisms\_of\_Primary\_Succession\_Following\_Deglaciation\_n\_at\_Glacier\_Bay\_Alaska

Lawson 2015:

https://www.researchgate.net/publication/276471458\_Glaciological\_and\_marine\_geological\_controls\_on\_terminus\_ dynamics\_of\_Hubbard\_Glacier\_southeast\_Alaska

Hall et al 2003: 053[0131:mcigci]2.0.co;2

#### **Major Land Resource Area**

MLRA 220X Alexander Archipelago-Gulf of Alaska Coast

#### Subclasses

- R220XY362AK–Subalpine Sedge Wet Flood Plain
- R220XY426AK–Maritime Shrub Low Flood Plain
- R220XY434AK–Maritime Scrubland Peat Plain Depression
- R220XY436AK–Maritime Graminoid Loamy Wet Plain
- F220XY325AK–Maritime Forest Gravelly Floodplains, High Gradient Occasionally Flooded
- F220XY333AK–Maritime Forest Gravelly Floodplains, Occasionally Flooded
- F220XY334AK–Maritime Forest Gravelly Floodplain, Rarely Flooded
- F220XY427AK–Maritime Forest Gravelly High Floodplain

- F220XY440AK–Maritime Forest Loamy Plains
- F220XY460AK–Maritime Forest Gravelly Alluvial Plains
- F220XY466AK–Maritime Forest Sandy Plains Eolian
- R220XY306AK–Maritime River Wash, Bouldery
- R220XY307AK–Maritime Gravelly Floodplains
- R220XY324AK–Maritime Scrub Gravelly Floodplain, Mountain Confined
- R220XY328AK–Maritime Scrub/ Herb Mosaic Organic Floodplain
- R220XY330AK–Estuarine Graminoid Loamy Floodplain, Depression
- R220XY331AK–Maritime Scrub Gravelly Floodplain, Depression
- R220XY332AK–Maritime Scrub Gravelly Floodplains, Frequently Flooded
- R220XY361AK–Subalpine Shrub Dry Flood Plain

## **Correlated Map Unit Components**

25074010, 25074011, 25074013, 25074014

### Stage

Provisional

# Contributors

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# State and transition model

#### Ecosystem states



#### State 1 submodel, plant communities



- 1.1a High-intensity flood events remove vegetation
- 1.2a Lack of high-intensity flood events leading to secondary succession.
- 1.2b High-intensity flood events remove vegetation
- 1.3a Lack of high-intensity flood events leading to secondary succession.

#### State 1 Reference State



Figure . Landscape photo of community 1.3 on the high flood plain (right), with evidence of very large flood event scouring low flood plain site (left, R220XY426AK).

The reference state has three community phases that transition along reversible pathways related to flooding frequency and intensity.

**Resilience management.** This state has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

#### **Dominant plant species**

- Sitka spruce (Picea sitchensis), tree
- balsam poplar (*Populus balsamifera*), tree
- Sitka alder (Alnus viridis ssp. sinuata), shrub
- Sitka willow (Salix sitchensis), shrub
- splendid feather moss (*Hylocomium splendens*), other herbaceous
- Schreber's big red stem moss (Pleurozium schreberi), other herbaceous
- field horsetail (Equisetum arvense), other herbaceous
- largeleaf avens (Geum macrophyllum), other herbaceous

### Community 1.1 Sitka spruce/oval-leaf blueberry/splendid feathermoss-Schreber's big red stem moss



Figure 1. Typical plant community associated with community 1.1.

Community 1.1 is characterized as an open needleleaf forest. Sitka spruce is the most common overstory species. Western hemlock and mountain hemlock in the tall tree stratum may be present but not dominant. The understory consists of high moss cover and low shrub and forb cover. Common shrubs include oval-leaf blueberry and Sitka

alder and common forbs include sidebells wintergreen, clubmoss, and claspleaf twistedstalk. The soil surface is primarily covered in Schreber's big red stem moss, splendid feathermoss, and Dicranum moss.

**Resilience management.** This phase has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

#### **Dominant plant species**

- Sitka spruce (Picea sitchensis), tree
- western hemlock (Tsuga heterophylla), tree
- oval-leaf blueberry (Vaccinium ovalifolium), shrub
- Sitka alder (Alnus viridis ssp. sinuata), shrub
- splendid feather moss (Hylocomium splendens), other herbaceous
- Schreber's big red stem moss (Pleurozium schreberi), other herbaceous
- sidebells wintergreen (Orthilia secunda), other herbaceous
- claspleaf twistedstalk (Streptopus amplexifolius), other herbaceous

#### Community 1.2 Balsam poplar/Sitka alder



Figure 2. Typical plant community associated with community 1.2.

Community 1.2 is an open broadleaf forest community dominated by balsam poplar and Sitka alder. Diverse shrubs and forbs are common in the understory. Common shrubs include Sitka willow and common forbs include bride's feathers, wintergreen, field horsetail, fragrant bedstraw, and common cowparsnip. The ground cover is mostly herbaceous litter and woody debris.

**Resilience management.** This phase has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

#### **Dominant plant species**

- balsam poplar (Populus balsamifera), tree
- Sitka alder (Alnus viridis ssp. sinuata), shrub
- bride's feathers (Aruncus dioicus), other herbaceous
- wintergreen (Pyrola), other herbaceous
- field horsetail (Equisetum arvense), other herbaceous
- fragrant bedstraw (Galium triflorum), other herbaceous
- largeleaf avens (Geum macrophyllum), other herbaceous
- common cowparsnip (Heracleum maximum), other herbaceous
- red baneberry (Actaea rubra), other herbaceous

#### Community 1.3 Sitka alder-Sitka willow/field horsetail-largeleaf avens



Figure 3. Community 1.3 dominated by Sitka alder with diverse herbaceous understory.

Community 1.3 is a closed tall scrub community dominated by Sitka alder and Sitka willow. Diverse herbaceous species are common in the understory, with the most common being field horsetail and largeleaf avens. The ground cover is mostly herbaceous litter and woody debris.

**Resilience management.** This phase has been observed to be resilient and/or resistant to current disturbance drivers, lacking alternative states and at-risk communities.

#### **Dominant plant species**

- Sitka alder (Alnus viridis ssp. sinuata), shrub
- Sitka willow (Salix sitchensis), shrub
- field horsetail (*Equisetum arvense*), other herbaceous
- largeleaf avens (Geum macrophyllum), other herbaceous
- liverleaf wintergreen (Pyrola asarifolia), other herbaceous
- common cowparsnip (Heracleum maximum), other herbaceous





Sitka spruce/oval-leaf blueberry/splendid feathermoss-Schreber's big red stem moss



Sitka alder-Sitka willow/field horsetail-largeleaf avens

Primary trigger: high-intensity flood event Ecological process: tall shrub cover is mechanically reduced by force of floodwaters, resulting in higher resource availability for herbaceous species, including light, heat, and space. Secondary trigger: N/A Indicators: flood indicators, such as lodged debris, soil scouring, fresh sediment deposits, and open plant community structure.

### Pathway 1.2a Community 1.2 to 1.1



Balsam poplar/Sitka alder



Sitka spruce/oval-leaf blueberry/splendid feathermoss-Schreber's big red stem moss

Ecological process: tree cover increases due to natural succession, such that strong competitors (Sitka spruce) reduce the availability of light, heat, and space for less competitive understory species. Primary trigger: none Secondary trigger: N/A Indicators: mature Sitka spruce and very high cover of moss on the soil surface.

### Pathway 1.2b Community 1.2 to 1.3



Balsam poplar/Sitka alder



horsetail-largeleaf avens

Primary trigger: high-intensity flood event Ecological process: Balsam poplar cover is mechanically reduced by force of floodwaters, resulting in higher resource availability for shrub and herbaceous species, including light, heat, and space. Secondary trigger: N/A Indicators: flood indicators, such as lodged debris, soil scouring, fresh sediment deposits, and open plant community structure.

### Pathway 1.3a Community 1.3 to 1.2





Sitka alder-Sitka willow/field horsetail-largeleaf avens

Balsam poplar/Sitka alder

Ecological process: cover increases due to natural succession, such that strong competitors (balsam poplar) reduce the availability of light, heat, and space for less competitive understory species. Primary trigger: none Secondary trigger: N/A Indicators: mature balsam poplar in the overstory and high diversity of understory shrubs and herbaceous species.

### State 2 Forage Suitability Grouping Dynamics

This State and additionally added States will be utilized to develop FSGs for this MLRA.

### Citations