Ecological site R220XY362AK
Subalpine Sedge Wet Flood Plain

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General information

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.

MLRA notes

Major Land Resource Area (MLRA): 220X–Alexander Archipelago-Gulf of Alaska Coast

The Alexander Archipelago-Gulf of Alaska Coast area consists of a narrow arc of islands and lower elevation coastal mountains in the Southern Alaska Region. This area spans from the Alexander Archipelago in southeastern Alaska, north and west along the coast of the Gulf of Alaska and Prince William Sound, and further west to the southern tip of the Kenai Peninsula and the northeastern islands of the Kodiak Archipelago. The area makes up about 27,435 square miles (USDA 2006). The terrain primarily consists of low to moderate relief mountains that are deeply incised. Throughout the area glaciers, rivers, and streams have cut deep, narrow to broad valleys. The broader valleys have nearly level to strongly sloping flood plains and stream terraces. Alluvial and colluvial fans and short footslopes are common in the valleys along the base of the mountains. Rocky headlands, sea cliffs, estuaries, and beaches are common along the coast.

During the late Pleistocene epoch, the entire area was covered with glacial ice. The numerous fjords of the Alexander Archipelago and Prince William Sound were formed chiefly as a result of glacial scouring and deepening of preglacial river valleys. Most glacial deposits have been eroded away or buried by mountain colluvium and alluvium, which cover about 90 percent of the present landscape. The remaining glacial and glaciofluvial deposits are generally restricted to coastal areas. During the Holocene epoch, volcanic activity within and adjacent to this area deposited a layer of volcanic ash of varying thickness on much of the landscape in the southeastern and northwestern parts of the area. Paleozoic, Mesozoic, and Lower Tertiary stratified sedimentary rocks and Cretaceous and Tertiary intrusive rocks underlie much of the area and are exposed on steep mountain slopes and ridges (USDA 2006).

The dominant soil orders in this MLRA are Spodosols, Histosols, and Entisols. Soils in the area typically have a cryic soil temperature regime, an udic moisture regime, and have mixed minerology. Spodosols are common on mountains and hills having been formed in gravelly or cobbly colluvium, glacial till, and varying amounts of silty volcanic ash. These Spodosols commonly range from shallow to deep, are well to somewhat poorly drained, and typically classify as Humicryods or Haplocryods. Histosols that are poorly to very poorly drained occur on footslopes, discharge slopes, and valley floors. These wet histosols commonly classify as Cryosaprists, Cryohemists, and Cryofibrists. Histosols that are well drained occur on steep mountainsides. These dry Histosols commonly classify as Cryofolists. Entisols are common on flood plains, stream terraces, and outwash plains having been formed in silty, sandy, and gravelly to cobbly alluvium. These Entisols are generally deep, range from well to somewhat poorly drained, and commonly classify as Cryaquents and Cryofluvents. Miscellaneous (nonsoil) areas make up about 23 percent of this MLRA. The most common miscellaneous areas are chutes, rock outcrop, rubble land, beaches, riverwash, and water.

This area represents the Northern extent of the Pacific temperature rainforest and is characterized by productive stands of conifers. Western hemlock and Sitka spruce are the dominant trees on mountains and hills at lower elevations. Due to warmer temperatures, western red cedar and Alaska cedar are more prevalent in the southern portion of this area. Black cottonwood and mixed forest types occur on flood plains. Areas of peat and other sites that are too wet for forest growth support sedge-grass meadows and low scrub. As elevation increases, mountain

hemlock becomes the dominant tree in forested stands, which marks the transition to subalpine vegetation. The subalpine life zone typically occurs at elevations between 1500 to 3000 feet (Boggs et al. 2010, Carstensen 2007, Martin et al. 1995). Other common subalpine plant communities include tall alder scrub and bluejoint-forb meadows. Alpine vegetation occurs at even higher elevations, which marks the transition to the Southern Alaska Coastal Mountains Area (MLRA 222).

This area includes the Municipality of Juneau, Alaska's capital, and a number of smaller coastal towns and villages. Federally administered lands within this MLRA include Admiralty Island National Monument and part of Misty Fjords National Monument, Tongass National Forest, Chugach National Forest, and Glacier Bay, Wrangell-St. Elias, and Kenai Fjords National Parks and Preserves. The southern terminus of the Trans-Alaska Pipeline is in Valdez.

For many decades, logging, commercial fishing, and mining have been the primary industrial land uses throughout much of the area. In recent years, changes in public interests, land use policies, and timber economics have contributed to a significant decline in the timber industry. Commercial fishing continues to be an important industry and most communities support a fleet of boats and fishing related facilities. A number of mines operate in the area and others have been prospected and proposed. Tourism and wildland recreation are becoming increasingly important within the area. Subsistence hunting, fishing, and gathering provide food and a variety of other resources to local residents and remain the principal economy for residents of remote villages.

Classification relationships

Biophysical Settings: Alaskan Pacific Maritime Alpine Floodplain (BpS 7716760) (LANDFIRE 2009)

Biophysical Settings: Alaskan Pacific Maritime Alpine Wet Meadow (BpS 7816730) (LANDFIRE 2009)

Ecological site concept

This subalpine site occurs on protected portions of low-order, glacially fed streams where soils are organic-rich and saturated for most of the growing season. Protected portions of a flood plain include abandoned channels. While flooding frequently occurs, flood events have limited energy. As a result, the potential for erosive or depositional flood events that destroys vegetative communities is minimal.

The reference community is a sedgeland meadow. Common understory species include a variety of sedges, cottongrass, and other wetland indicator species.

Associated sites

R220XY361AK	**Subalpine Shrub Dry Flood Plain** Occurs on similar flood plains but on drier soils and slightly elevated fluvial surfaces.

Similar sites

R220XY361AK	**Subalpine Shrub Dry Flood Plain** Both ecological sites occur on subalpine flood plain, however R220XY362AK occurs on wetter soils that have more wetland indicator species and fewer shrubs.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Carex* (2) *Eriophorum*

Physiographic features

This site occurs on the flood plain of mountains or the flood plain of alluvial fans in the subalpine, which typically occurs at 1500 to 3000 feet. These wet, organic-rich soils form in protected portions of these flood plain such as

abandoned channels. Alluvial fan flood plains are much steeper (15-25 percent slope) when compared to mountain flood plains (5-15 percent slope). The water table commonly reaches the soil surface and ponding can occur occasionally. Flooding frequency ranges from frequent to occasional and flood duration is brief to long.

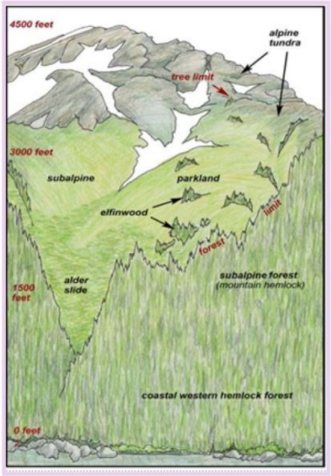

Figure 1.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Alluvial fan (2) Mountains > Flood plain (3) Mountains > Abandoned channel
Runoff class	High to very high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Frequent to occasional
Ponding duration	Long (7 to 30 days)
Ponding frequency	None to occasional
Elevation	1,500–3,000 ft
Slope	5–25%
Ponding depth	0 in
Water table depth	0–12 in
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	None to occasional
Elevation	0–3,500 ft
Slope	0–35%
Ponding depth	Not specified
Water table depth	Not specified

Climatic features

Cloudy skies, moderate temperatures, and abundant rainfall characterize the temperate maritime climate of this

area. Winter storms, accompanied by heavy rainfall at lower elevations and snow at higher elevations, are frequent. Moderate to strong, south and southeast winds are common before and during storms. The average annual precipitation is approximately 60 to 140 inches. The average annual snowfall ranges from about 30 to 70 inches along the coast, to as much as 200 inches at higher elevations (USDA 2006). Average annual temperatures are considerably warmer in the Southern portion of this area. The average annual temperature at lower elevations ranges from about 37 degrees F (2.7 degrees C) in the northwest, to 46 degrees F (7.7 degrees C) in the southeast (USDA 2006). The average annual temperatures associated with lower elevation maritime vegetation is considerably warmer compared to higher elevation subalpine vegetation. The average frost-free period is about 105 to 140 days.

Table 4. Representative climatic features

Frost-free period (characteristic range)	95-142 days
Freeze-free period (characteristic range)	147-183 days
Precipitation total (characteristic range)	55-145 in
Frost-free period (actual range)	84-170 days
Freeze-free period (actual range)	119-218 days
Precipitation total (actual range)	35-172 in
Frost-free period (average)	120 days
Freeze-free period (average)	168 days
Precipitation total (average)	97 in

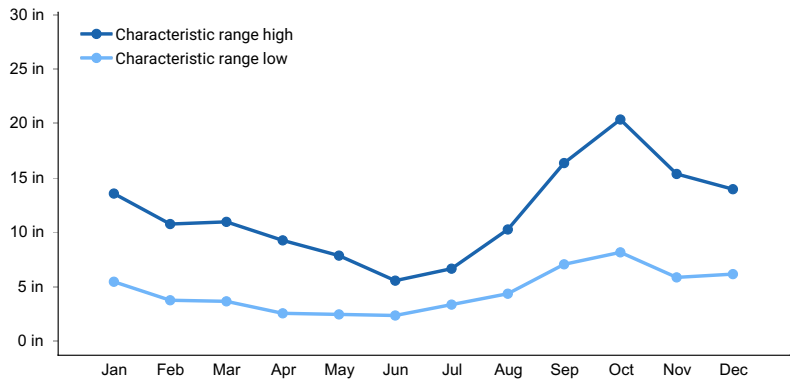

Figure 2. Monthly precipitation range

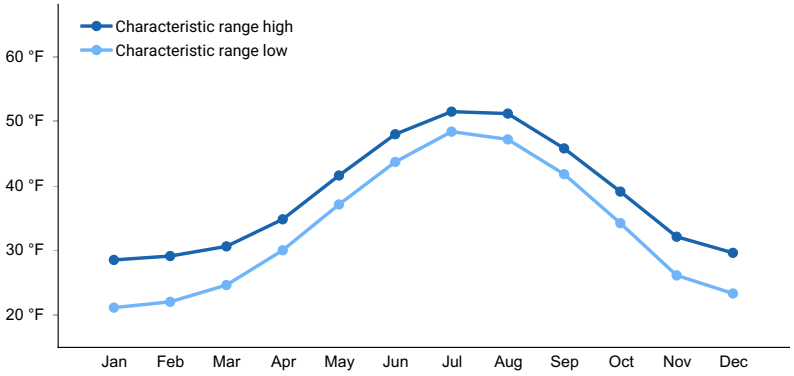

Figure 3. Monthly minimum temperature range

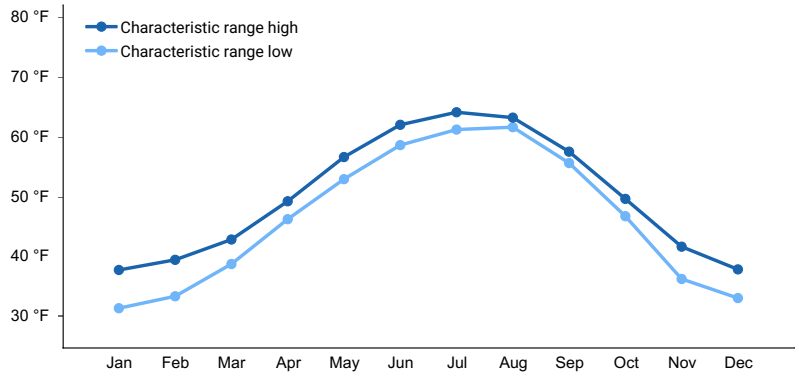

Figure 4. Monthly maximum temperature range

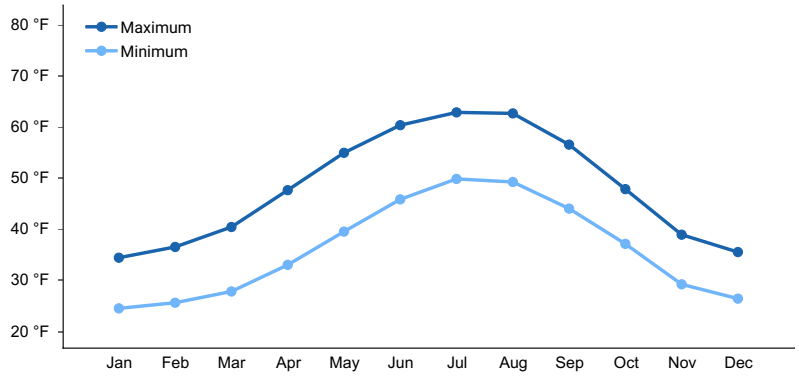

Figure 5. Monthly average minimum and maximum temperature

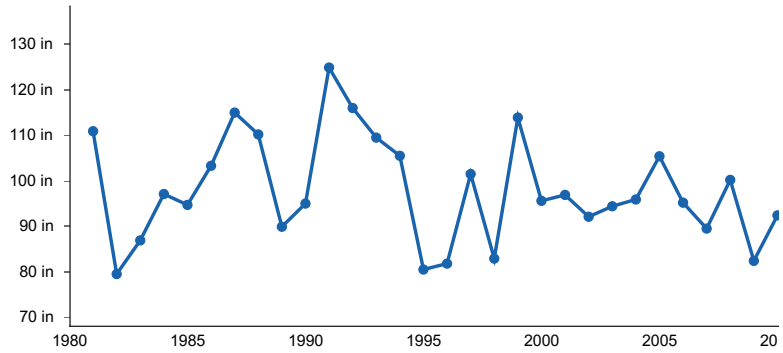

Figure 6. Annual precipitation pattern

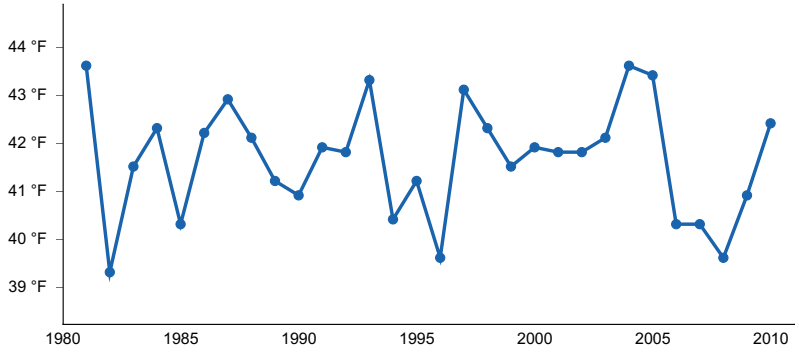

Figure 7. Annual average temperature pattern

Climate stations used

- (1) ANNETTE ISLAND AP [USW00025308], Metlakatla, AK
- (2) KETCHIKAN INTL AP [USW00025325], Ketchikan, AK
- (3) PETERSBURG 1 [USW00025329], Petersburg, AK

- (4) SITKA AIRPORT [USW00025333], Sitka, AK
- (5) JUNEAU INTL AP [USW00025309], Juneau, AK
- (6) PELICAN [USC00507141], Hoonah, AK
- (7) GUSTAVUS [USW00025322], Gustavus, AK
- (8) GLACIER BAY [USC00503294], Gustavus, AK
- (9) HAINES AP [USW00025323], Haines, AK
- (10) SKAGWAY AP [USW00025335], Skagway, AK
- (11) YAKUTAT STATE AP [USW00025339], Yakutat, AK
- (12) CORDOVA M K SMITH AP [USW00026410], Cordova, AK
- (13) MAIN BAY [USC00505604], Valdez, AK
- (14) SELDOVIA AP [USW00025516], Homer, AK

Influencing water features

This site is classified as a RIVERINE wetland under the Hydrogeomorphic (HGM) classification system (Smith et al. 1995; USDA-NRCS 2008). Channel overbank flow and subsurface hydraulic connections are the main sources of water for this ecological site (Smith et al. 1995).

This site is very poorly to poorly drained because a water table persists in the soil profile for an extended period of the growing season. This water table commonly occurs at 0 to 10 inches. Soils may pond occasionally. Depth to the water table may decrease following summer storm events or spring snowmelt and increase during extended dry periods.

Due to the perceived depth and persistence of a water table, wetland indicator plants are thought to be common in the reference state.

Soil features

These organic-rich soils are formed in alluvium, which is a mixture of silt, sand, gravel, and cobbles. The soil surface may be capped with an organic layer of peat usually 0 to 10 inches thick, and sometimes thicker. Soil texture is often mucky very fine sandy loam with lenses of coarser, rockier material deposited by flowing water. These soils are wet for much of the growing season and are classified as very poorly to poorly drained. Rock fragments on the soil surface do not occur. Rock fragments in the soil subsurface are highly variable, ranging between 5 and 40 percent of the soil profile by volume. Soils are very deep with no restrictive layers.

The soil moisture regime for these wet soils is aquic. The temperature regime for this site is cryic, where the mean annual soil temperature is between 32°F and 46°F (USDA-NRCS 2006).

Table 5. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Very fine sand
Family particle size	(1) Sandy-skeletal
Drainage class	Very poorly drained to poorly drained
Permeability class	Moderately slow to rapid
Depth to restrictive layer	0 in
Soil depth	60–0 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1.1–5.6 in
Soil reaction (1:1 water) (0-10in)	3.6–6

Subsurface fragment volume <=3" (0-60in)	5–40%
Subsurface fragment volume >3" (0-60in)	0–2%

Table 6. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Not specified
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-40in)	0.9–6.5 in
Soil reaction (1:1 water) (0-10in)	Not specified
Subsurface fragment volume <=3" (0-60in)	3–40%
Subsurface fragment volume >3" (0-60in)	Not specified

Ecological dynamics

The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

This ecological site occurs on low order streams at high elevation. The primary disturbance for this site is flooding, which can either deposit sediment or erode surfaces within the flood plain. Flood plain positions closest to the active stream channel tend to get the most frequent and longest duration flood events. These proximal flood plain positions are commonly bare gravel bars and/or herbaceous communities. As height above and/or distance from the active stream channel increases, flood intensity and duration tend to decrease. These distal flood plain positions tend to be tall scrub dominant or wetland sedge meadows. This site occurs in protected positions of the floodplain that have very wet, organic-rich soils.

The state-and-transition model that follows provides a detailed description of each known state, community phase, pathway, and transition. This model is based on available experimental research, field observations, literature reviews, professional consensus, and interpretations.

State and transition model

Ecosystem states

1. Reference State

State 1 submodel, plant communities

1.1. sedge - cottongrass

State 1
Reference State

The reference plant community is a sedge meadow with various wetland indicator species.

Community 1.1
sedge - cottongrass

This plant community is characterized as wet graminoid herbaceous (Viereck et al., 1992). The dominant graminoids are sedges and cottongrass. While less dominant, various wetland shrubs and forbs are common.

Dominant plant species

- sedge (*Carex*), grass
- cottongrass (*Eriophorum*), grass

Additional community tables

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Approval

Marji Patz, 3/10/2025

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/10/2025
Approved by	Marji Patz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
