USDA Natural Resources Conservation Service

Ecological site R223XY203AK
Loamy Slopes, Wet Psuyaah

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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.

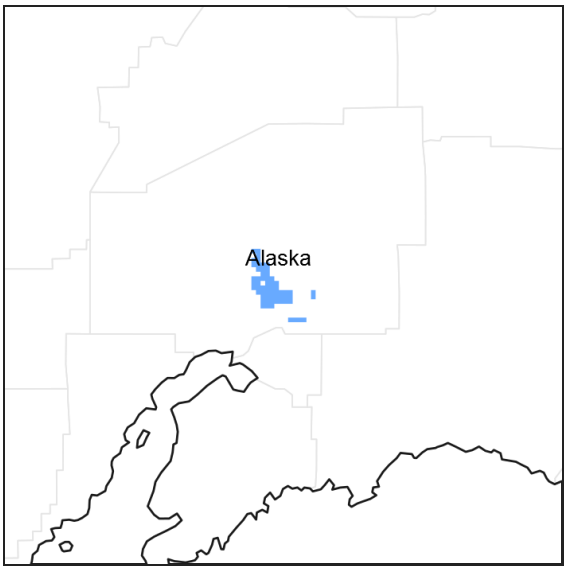


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Associated sites

R223XY102AK	**Alpine hummocks Cryods, Siwash, and Tsadaka**
R223XY106AK	**Mountain slopes, drainages Cryaquepts, cool; Snowdance**

Similar sites

R223XY201AK	**Loamy Slopes Cryods; Talkeetna**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Calamagrostis canadensis* (2) *Athyrium filix-femina*

Physiographic features

Includes poorly drained soils under grassland vegetation on slopes in the subalpine zone on Willow Mountain, and in scattered locations elsewhere in the southwest portion of the Talkeetna Mountains. Elevation ranges from 2100

to 3000 feet (640 to 914 m); slope ranges from 5 to 20 percent. Psuyaah soils are formed in a mantle of silty loess and volcanic ash 16 to 27 inches (41 to 69 cm) thick over gravelly and cobbly till. They are poorly drained, with a seasonally high water table at a depth of 0.5 to 2.0 feet (0.2 to 0.6 m) during the summer.

Table 2. Representative physiographic features

Landforms	(1) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	640–914 m
Slope	5–20%
Water table depth	15–61 cm
Aspect	W

Climatic features

The climate of the Matanuska and Susitna Valleys is transitional maritime-continental, characterized by long cool winters and short warm summers. Long term climatic data for two stations in the area, Palmer and Talkeetna, are provided in Tables 1, 2, 3, and 4 in the MatSu Soil Survey Manuscript. At Palmer, which is near the Knik Arm of the Cook Inlet, maritime influences are more evident and winter temperatures are relatively moderate. At Talkeetna, approximately 100 miles (160 km) inland, continental influences are stronger, and temperatures are more extreme in both winter and summer.

The Chugach Mountains and Cook Inlet have substantial influence on the climate of the Matanuska-Susitna Valley Area. The Chugach Mountains form a partial barrier against moist oceanic air moving in from the Gulf of Alaska and Prince William Sound. Most of the precipitation carried by weather systems originating in the Gulf falls on the windward slopes of the Chugach Mountains. The Matanuska Valley lies in the rain shadow created by the Chugach Mountains. However, the Susitna Valley is directly exposed to moist oceanic air moving up Cook Inlet from the southwest. This air backs up against the Talkeetna Mountains, producing higher precipitation in the Susitna Valley and Talkeetna Mountains compared to the Matanuska Valley.

Long term temperature and precipitation data have been recorded at the Agricultural and Forestry Experiment Station in Palmer (NOAA recording station Palmer AAES, 6870) and at the airport in Talkeetna (Talkeetna WSCMO AP, 8976).

Temperature. Average monthly temperatures during summer are similar for Palmer and Talkeetna (Tables 1 and 2). For July, the average is 57.4 °F (14.1 °C) at Palmer and 58.2 °F (14.6 °C) at Talkeetna. Daily high temperatures in summer occasionally exceed 80 °F (26.7 °C). Daily minimum temperatures in summer are generally between 44 and 47 °F (6.7 and 8.3 °C) at both locations. Freezing temperatures have been recorded as late as June 5 and as early as August 22 at Palmer (Table 3). The frost-free period is usually greater at Talkeetna (Table 4).

Average monthly temperatures during winter are significantly higher at Palmer compared to Talkeetna. For January, the average is 12.8 °F (-10.7 °C) at Palmer and 9.7 °F (-12.4 °C) at Talkeetna. Persistent high pressure may dominate the region for several days or weeks during winter, bringing relatively cold temperatures to the Area. Persistent low temperatures of -20 °F (-28.9 °C) or less at Palmer and -30 °F (-34.4 °C) or less at Talkeetna occur during most winters. In the Susitna Valley, high pressure coupled with the lack of significant air circulation allows heat to radiate to space, further lowering winter temperatures. In the Matanuska Valley, high pressure gradients between the coastal lowlands and Copper River Basin to the east generate strong winter winds along the Matanuska River, which moderate the temperature but escalate the wind chill factor.

Data for the last date in spring and the first date in fall when air temperature drops below certain threshold temperatures are given in Table 3 for Palmer and Table 4 for Talkeetna. The number of continuous days during which the temperature does not drop below the threshold is given in Tables 5 and 6. The threshold temperatures are 32 °F (0 °C), 28 °F (-2.2 °C), and 24 °F (-4.4 °C). The data in these tables are based on records from 1950 through 1993 for both the Palmer and Talkeetna recording stations.

The probability of certain last and first dates, and the number of days, is expressed as the number of years in ten. For example, at Palmer one can expect that the temperature will not drop below 32 °F (0 °C) after May 15 or before September 14 in five years out of ten (Table 3), or for a period of 119 days (Table 5). On the other hand, a frost-free season, above 32 °F (0 °C), of 142 days can be expected in one year out of ten (Table 5).

Precipitation. Average annual precipitation is about 15 inches (38 cm) at Palmer and about 28 inches (71 cm) at Talkeetna (Tables 1 and 2). Precipitation is usually light in spring; average precipitation during May and June is 0.68

and 1.35 inches (1.7 and 3.4 cm) at Palmer and 1.47 and 2.37 inches (3.7 and 6.0 cm) at Talkeetna. Precipitation increases in summer and early autumn to a maximum of 2.47 inches (6.3 cm) during September at Palmer and to 4.6 inches (11.7 cm) during August at Talkeetna. Average annual snowfall is about 45 inches (114 cm) at Palmer and about 115 inches (292 cm) at Talkeetna.
Soil moisture balance, and to a degree ground water recharge and surface water storage, are determined in part by evapotranspiration. Patric and Black (1968) compared annual precipitation and potential evapotranspiration for the Area to determine regional soil water deficits or surpluses. Potential evapotranspiration, which is defined as water losses (to the atmosphere) from fully vegetated land surfaces abundantly supplied with water, was calculated from available temperature and precipitation data from various weather reporting stations. Data indicated that, on the average, an annual moisture deficit exists for the Matanuska and southern Susitna Valleys and a moisture surplus exists for the northern Susitna Valley.
Wind. The proximity of the Gulf of Alaska to the south, and the effects of the rugged terrain surrounding the Matanuska Valley, contribute to strong seasonal winds in the Matanuska-Susitna Valley Area, particularly in the vicinity of Palmer. The "Matanuska" winds blowing down the Matanuska River canyon in winter and "Knik" winds down the Knik River floodplain in spring and summer (and occasionally winter) are well known to local residents and pilots. In spring, when the "Knik" winds, and sometimes "Matanuska" winds, are strong, blowing dust up to 3000 feet (914 m) or higher (Plate 1) darkens the air. The best agricultural soils in the Matanuska Valley are formed in this wind blown dust called loess. The blowing snow and extreme chill factors associated with winter winds impact recreational activities, transportation, and other land use activities throughout the Area.

Table 3. Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	0 days
Precipitation total (average)	0 mm

Influencing water features

Soil features

Psuyaah soils are formed in a mantle of silty loess and volcanic ash 16 to 27 inches (41 to 69 cm) thick over gravelly and cobbly till. They are poorly drained, with a seasonally high water table at a depth of 0.5 to 2.0 feet (0.2 to 0.6 m) during the summer. Psuyaah component:
This component is on a mountain. The parent material consists of silty volcanic ash and/or silty loess over gravelly lodgement till. The runoff class is very high. The depth to restrictive layer is inches densic material. It is poorly drained. The slowest permeability of the soil material is moderately slow. Available water capacity is moderate and shrink swell potential is low. This soil is not flooded and is not ponded. The top of the seasonal high water table is at 15 inches. There are no saline horizons within 30 inches of the soil surface. There are no sodic horizons within 30 inches of the soil surface. It is in nonirrigated land capability class 6w.

Table 4. Representative soil features

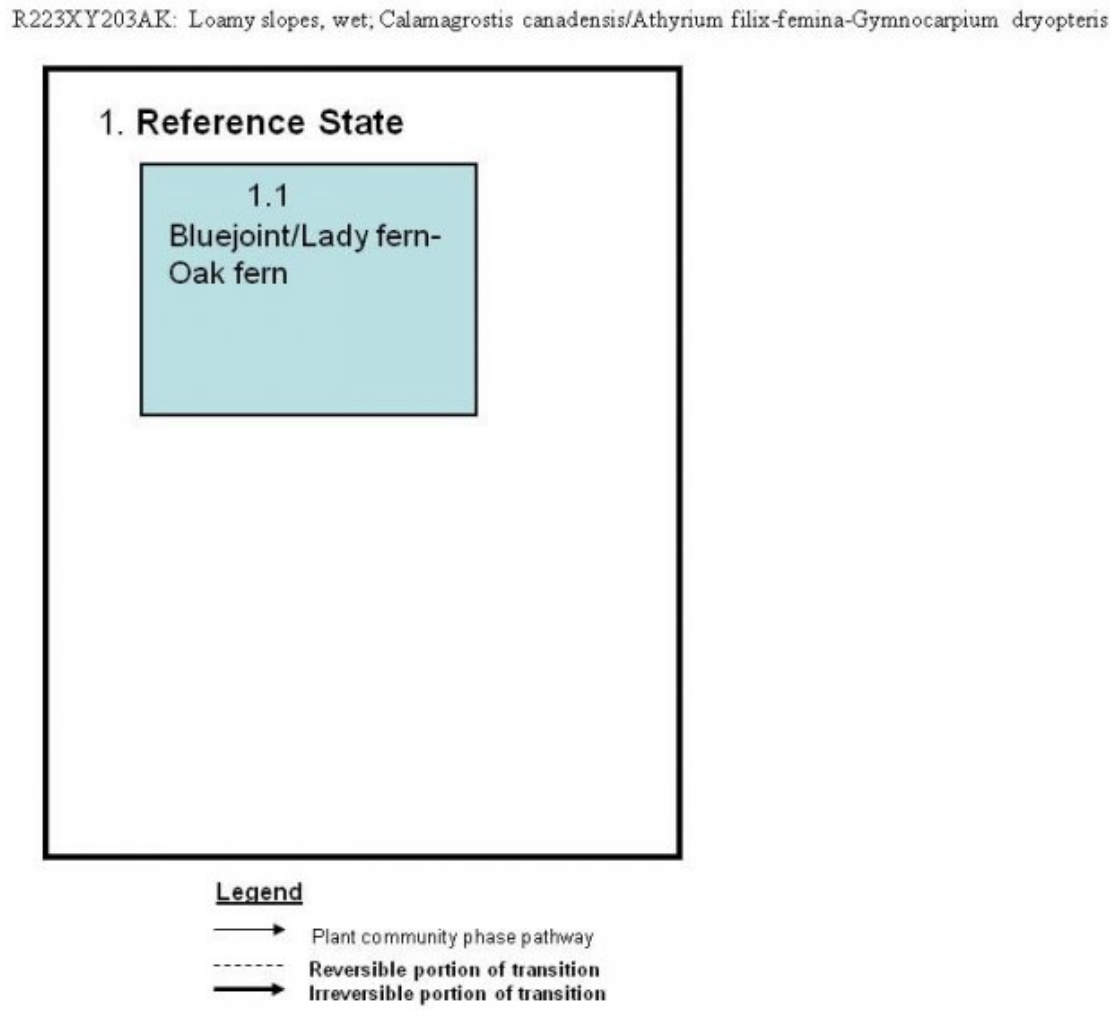
Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Slow
Soil depth	152 cm
Surface fragment cover <=3"	0–4%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0%

Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4–6.5
Subsurface fragment volume <=3" (Depth not specified)	17–31%
Subsurface fragment volume >3" (Depth not specified)	18–28%

Ecological dynamics

No observed disturbance or pathways for this site.

State and transition model



State 1
Reference

Community 1.1
Calamagrostis canadensis/Athyrium filix-femina-Gymnocarpium dryopteris

Vegetation consists of bluejoint reedgrass-forb grassland dominated by bluejoint reedgrass, common fireweed,

ferns, false hellebore, and a wide variety of medium and low growing herbs. This site is similar to ecological site Loamy slopes, cool, and usually occurs in complex with ecological site Mountain slopes, drainages and low willow scrub vegetation. Loamy slopes, wet is suited for livestock grazing; however, wet soils may limit use during much of the grazing season. This site provides excellent seasonal range for moose, particularly where found in association with ecological site Mountain slopes, drainages. Bears and other wildlife utilize this site as well.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	661	1681	2112
Forb	646	1133	1853
Total	**1307**	**2814**	**3965**

Table 6. Ground cover

Tree foliar cover	0%
Shrub/vine/liana foliar cover	0%
Grass/grasslike foliar cover	30-60%
Forb foliar cover	15-35%
Non-vascular plants	5-40%
Biological crusts	0%
Litter	50-90%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	0%

Table 7. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	–	1-5%
>0.15 <= 0.3	–	–	–	1-5%
>0.3 <= 0.6	–	–	30-60%	5-35%
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

Figure 4. Plant community growth curve (percent production by month). AK0022, Southern. 60-200 days.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	10	30	45	10	5	0	0	0

Additional community tables

Table 8. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
bluejoint	CACA4	*Calamagrostis canadensis*	Native	–	30–60
Fern/fern ally					
western oakfern	GYDR	*Gymnocarpium dryopteris*	Native	–	5–35
common ladyfern	ATFI	*Athyrium filix-femina*	Native	–	15–25

Inventory data references

Hatcher Pass Soil and Range Survey
MatSu Soil Survey

Contributors

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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)	Na
Contact for lead author	NA
Date	12/02/2010
Approved by	Michelle Schuman
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** none

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2. **Presence of water flow patterns:** none

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3. **Number and height of erosional pedestals or terracettes:** none

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** none

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5. **Number of gullies and erosion associated with gullies:** none

6. **Extent of wind scoured, blowouts and/or depositional areas:** none

7. **Amount of litter movement (describe size and distance expected to travel):** none

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

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

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

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

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:

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

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

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

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:**
