

Ecological site R240XY732AK

Subalpine Tall Scrub Gravelly Slopes

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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): 240X–Nulato Hills-Southern Seward Peninsula Highlands

The Nulato Hills-Southern Seward Peninsula Highlands (MLRA 240X) is in Western Alaska, which describes the mostly treeless zone of discontinuous permafrost in the arctic. This MLRA is approximately 18,500 square miles in size. The terrain is defined by rolling hills, low mountains and river valleys. Flood plains systems are common but generally narrow. This watershed drains into Norton Sound and Bering Sea. Major rivers include the Unalakleet, Koyuk, and Fish Rivers. The area is mostly undeveloped wild land that is sparsely populated. Residents use this remote area primarily for subsistence hunting, fishing, and gathering. Villages are primarily located along the coast and include the two larger municipalities of Nome and Unalakleet, and various other villages such as Koyuk and Saint Michael. **Geology and Soils** This MLRA was mostly unglaciated during the late Pleistocene. Glaciers were limited to upper elevations on the Seward Peninsula. Coastal lowlands are filled with Holocene deposits. Silty eolian deposits mantle coastal areas and the slopes of lower elevation hills and mountains. Flood plains and terraces are built on fluvial deposits. Modified glacial moraines are evident in areas of past glacial activity. Bedrock material is primarily a mix of sedimentary and volcanic rock (USDA, 2022). This MLRA is in the zone of discontinuous permafrost. Shallow permafrost is most common on coastal plains, gentle footslopes, and organic swales. Permafrost constitutes a root- restrictive layer that perches water and creates poorly drained or poorly drained soils. Common soil orders include Gelisols that support permafrost and Entisols and Inceptisols which are marked by little to no development. The Gelisols are typically shallow or moderately deep to permafrost, occur on finer to gravelly textured sediments, and are poorly or very poorly drained. Common Gelisol suborders are Histels, Orthels, and Turbels. The Histels have thick accumulations of surface organic material and commonly occur on mounds of plains. The Orthels and Turbels have comparably thinner surface organic material. Turbels show signs of cryoturbation while Orthels do not. Entisols and Inceptisols are common on shallow rocky soils of the alpine and subalpine, as well as scoured flood plain soils. Non-soil areas (rock outcrop, rubble land and beaches) make up approximately five percent of the MLRA surface. **Climate** The climate is a mix of maritime in the summer and continental in the winter, which is a result of sea ice in Norton Sound. Summers are brief and cool summers and winters are long and cold. Mean annual precipitation is 15 to 20 inches at lower elevations, increasing to 20 to 40 inches at higher elevations (USDA, 2022). Mean annual temperatures ranges from 23 to 31 degrees F (SNAP, 2014a). **Vegetation** Vegetation is mainly influenced by site and soil characteristics such as temperature-degree days, exposure to wind, soil depth, and soil hydrology. Dwarf scrublands are present across much of the uplands. Lower elevations generally support more developed soils. Well drained soils support tall shrubs. Organic soils support mosses, graminoids and low shrubs. Forests occur on some low mountain slopes and river valleys but are associated with the Yukon-Kuskokwim Highlands (MLRA 230X). Tussock tundra is ubiquitous across much of the poorly drained, low gradient slopes and coastal plains (USDA, 2022).

LRU notes

There are two life zones delineated by plant communities along a temperature gradient driven by elevation. The predominant climate across MLRA 240X is arctic lowlands. Low mean annual air temperatures and a short growing season shape the vegetation across the landscape. The alpine climate zone is generally reserved for elevations above 1,200 feet. Decreased mean annual temperatures at these higher elevations support unique soils and vegetation.

Classification relationships

Alaska Vegetation Classification: Open tall scrubland (II.B.2 - level III) / Alder scrubland (II.B.2.b - level IV) (Viereck et al., 1992)
BioPhysical Settings: 6816380 – Alaska Arctic Mesic Alder Shrubland (Landfire, 2009) Circumpolar Arctic Vegetation Map: S2.1 – Closed alder (community 51) (CAVM Team, 2003)

Ecological site concept

• Occurs on strongly sloping to steep mountain and hill slopes • Generally, occurs between 1,000 and 1,200 feet above sea level but may extend to much higher and lower slopes as local annual temperature allows • Soils are gravelly and well drained, lacking permafrost • Fire is the major disturbance on this site and results in one distinct post-fire community • The reference plant community is an open tall alder scrubland with low and medium shrubs in open areas

Associated sites

R240XY730AK	Alpine Dwarf Scrub Gravelly Slopes R240XY730AK describes the alpine dwarf scrub-lichen community. It is located on shallow, less developed soils on exposed landforms. It is upslope of this ecological site.
R240XY710AK	Arctic Scrub Wet Drainages R240XY710AK describes scrub wet drainages. These mountain drainages bisect the ecological site where they are found together in the subalpine.
R240XY731AK	Subalpine Ericaceous Scrub Loamy Slopes R240XY731AK describes an ericaceous and willow scrubland found at similar elevations. Associated soils are cold, wet, and are more poorly drained than those associated with this ecological site.

Similar sites

R240XY710AK	Arctic Scrub Wet Drainages R240XY710AK describes scrub wet drainages. Presence of a flooding regime and differences in soil characteristics support unique vegetation and different ecological sites.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Alnus</i> (2) <i>Spiraea stevenii</i>
Herbaceous	(1) <i>Calamagrostis canadensis</i> (2) <i>Dryopteris expansa</i>

Physiographic features

This ecological site occurs on non-alpine arctic mountain and hill slopes. Elevation generally ranges from 1,000 to 1,200 feet above sea level but can extend much lower and higher in elevation as temperature conditions allow. This ecological site is restricted to the subalpine in areas where trees have colonized from neighboring MLRAs. Slope gradients are strongly sloping to steep (8 to 45 percent). This ecological site occurs on all aspects. A water table is absent from this ecological site. Flooding and ponding do not occur.

Table 2. Representative physiographic features

Slope shape across	(1) Linear
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Slope shape up-down	(1) Linear (2) Convex
Hillslope profile	(1) Backslope (2) Shoulder (3) Footslope
Landforms	(1) Mountains > Mountain (2) Mountains > Mountain (3) Hills > Hill
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	310 – 370 m
Slope	10 – 50 %
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	150 – 910 m
Slope	0 – 70 %

Climatic features

The mixed maritime/continental climate in MLRA 240X includes short, cool summers and long, cold winters. Mean annual temperature ranges from 23 to 31 degrees Fahrenheit, with temperatures typically below freezing from November through March. Approximately 40

percent of total precipitation occurs during the June – August growing season (PRISM, 2018; SNAP, 2014a; SNAP, 2014b). Across the MLRA, snowfall ranges from 40 to 100 inches (USDA-NRCS, 2022).

Table 4 Representative climatic features

Frost-free period (characteristic range)	60-80 days
Freeze-free period (characteristic range)	80-100 days
Precipitation total (characteristic range)	330-510 mm
Frost-free period (actual range)	20-100 days
Freeze-free period (actual range)	70-110 days
Precipitation total (actual range)	250-580 mm
Frost-free period (average)	70 days
Freeze-free period (average)	90 days
Precipitation total (average)	360 mm

Influencing water features

Precipitation and throughflow are the main source of water for this ecological site. Surface runoff and throughflow contribute water to downslope ecological sites.

Wetland description

This ecological site is not associated with wetlands.

Soil features

Soils are dry and cold Inceptisols (Gelepts and Cryepts) formed in gravelly colluvium, sometimes atop residuum (Soil Survey Staff, 2013). Rock fragments are mostly absent on the soil surface. When present, the organic cap is thin. Soils are very deep but can have a moderate to deep lithic or paralithic bedrock layer. Subsurface rock fragment volume ranges from 15 to 40 percent. Soil pH is extremely to slightly acidic. Soils are well drained and dry during the growing season.

Table 5. Representative soil features

Parent material	(1) Colluvium
Surface texture	(1) Silt loam (2) Highly organic silt loam

Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	90 – 150 cm
Soil depth	120 – 150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	3.56 – 12.19 cm
Soil reaction (1:1 water) (0-25.4cm)	4.2 – 6.5
Subsurface fragment volume <=3" (0-152.4cm)	20 – 40 %
Subsurface fragment volume >3" (0-152.4cm)	0 – 30 %

Ecological dynamics

The Nulato Hills-Southern Seward Peninsula Highlands MLRA (MLRA 240X) occurs in Western Alaska with arctic vegetation and has a harsh climate that limits the composition and structure of plant communities. This area has cool, short summers and long, cold winters. Trees are restricted to warmer slopes in mountain valleys and flood plains. The expansive tundra is comprised of a mosaic of shrubs, sedges, moss, and lichen.

This ecological site describes tall shrub slopes. Site and soil conditions support a community that is relatively stable, changing little over time (Landfire, 2009). Air and soil temperatures are warm enough during the growing season to support taller shrubs in the arctic climate.

Fire is the major disturbance on this ecological site. It is responsible for one unique post-disturbance community. Post-fire community composition depends on fire factors such as frequency and severity. Low-severity fires may only burn surface vegetation, leaving extant species to resprout immediately from seed source and surviving root stock. A severe fire burns the organic layer and destroys part or all of the root stock. In this instance, post-fire vegetation consists of fast-growing herbaceous species.

There is no alternate state in this ecological site. Of note, increased annual temperatures during the growing season facilitate the spread of alder into other ecological sites that have not historically supported alder (Lara et al., 2018; Salmon et al., 2019). The causes and effects of this "greening" are still being studied and are not represented by any ecological site descriptions in MLRA 240X.

The information in this Ecological Dynamics section, including the state-and-transition model (STM), was developed based on 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.

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

Vegetative communities and transitions are described using existing models and expert knowledge. There are no vegetation inventory data points in NASIS associated with this ecological site. External model data sources: The Alaska-Yukon Region of the Circumboreal Vegetation Map (CBVM) (Jorgensen and Meidinger, 2015) Circumpolar Arctic Vegetation Mapping Project (CAVM, 2003). LANDFIRE Biophysical Settings Models (Landfire, 2009) The Alaska Vegetation Classification (Viereck et al., 1992)

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Approval

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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)	
Contact for lead author	
Date	10/05/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. Number and extent of rills:

2. Presence of water flow patterns:

3. Number and height of erosional pedestals or terracettes:

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

5. Number of gullies and erosion associated with gullies:

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

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

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

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

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

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

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:

17. Perennial plant reproductive capability:
