

Ecological site AX001X03X201

Cryic Udic Meadow

Last updated: 5/07/2024
Accessed: 11/04/2024

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): 001X–Northern Pacific Coast Range, Foothills, and Valleys

This long and narrow resource area stretches along the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. The area is bounded by the Olympic Mountains on the north and the Klamath Mountains on the south. Most of the area consists of hills and low mountains with gentle to steep slopes. The parent materials are composed primarily of young Tertiary sedimentary rocks with some minor volcanic rocks. Glacial till and outwash deposits are found in the northern half of the area within Washington. In the far southern portion of the area, near the Klamath Mountains, the sedimentary rocks are older and some have been metamorphosed. The average annual precipitation ranges from 60 to 200 inches, increasing with elevation.

The dominant soil orders in this MLRA are Andisols, Inceptisols, and Ultisols. Soil depth ranges from shallow to very deep. While most soils in the area are well drained and occur on foothills, mountain slopes and ridges, floodplain and depressional soils can range from well drained to very poorly drained. Soil textures are typically medial, loamy, or clayey. The dominant soils in the area have a mesic or frigid soil temperature regime and a udic soil moisture regime; however, soils with an aquic soil moisture regime or cryic soil temperature regime do occur.

LRU notes

The Central Pacific Coast Range land resource unit (LRU 3) of MLRA 1 ranges from the Olympic Peninsula south into northern Oregon. LRU 3 is located south of the Olympic National Forest and extends to the Siletz River in Oregon. LRU 3 is bounded on the west by MLRA 4a Sitka Spruce Belt and MLRA 2 Willamette and Puget Sound Valleys to the east. Several major rivers have headwaters in this LRU or carved valleys through the landscape depositing more recent alluvium. These include the Chehalis, Columbia, Grays, Humptulips, Klaskanine, Nehalem, Satsop, Siletz, Willapa, Wilson, Wynoochee, and Yamhill Rivers.

Ecological site concept

This ecological site is found on the western Coast Range in the Pacific Northwest from southern Washington to northern Oregon. It is located in open meadows on mountain shoulder slopes, back slopes, and summits. Elevations are greater than 2,500 feet with slopes ranging from 3 to 60 percent.

The climate has cool, moist summers and cold, wet winters. Mean annual precipitation ranges from 120 to 150 inches. Average annual temperatures range from 39 to 45 degrees F. Soils that support this ecological site occur in the cryic soil temperature regime and the udic soil moisture regime.

The site is predominantly comprised of low growing shrubs, forbs, and grass species. The meadows are adapted to harsh environmental conditions and short growing seasons. They endure strong winds, heavy snowpack, intense solar radiation, and freezing conditions. Plant production is directly related to the snow release date which can be highly variable from year to year. Additionally, drying winds on exposed slopes and ridges add to a moisture deficit through increased evapotranspiration during the growing season (Kuramoto, 1970). These effects are most pronounced on the exposed south and west slopes and ridgetops. As a result, plants are more sparsely located on the landscape and primarily drought tolerant species.

Snowpack is the primary abiotic driver that affects the length of the growing season, soil moisture availability, and

susceptibility to wildfire. Historically, fire (anthropogenic and natural) was an important disturbance factor, suppressing the growth of encroaching conifers and retaining a forb, grass, and grass-like dominated parkland ecosystem (Hemstrom, 1982). This site is highly sensitive to small disturbances from soil compaction and damage to vegetation which may have significant impacts to the ecological integrity and resilience of the site. If there is a long period without disturbance, the site is subject to conifer encroachment including noble fir (*Abies procera*) and Pacific silver fir (*Abies amabilis*) creating tree islands.

The reference community may be most common, but it is likely that all community phases occur as a matrix across the landscape. Common plants include Cascade desertparsley (*Lomatium martindalei*), Pacific lupine (*Lupinus lepidus*), sulfur-flowered buckwheat (*Erigeron umbellatum*), toughleaf iris (*Iris tenax*), annual agoseris (*Agoseris heterophylla*), arrowleaf ragwort (*Senecio triangularis*), Columbia lily (*Lilium columbianum*), hookedspur violet (*Viola adunca*), Roemer's fescue (*Festuca roemeri*), seashore bentgrass (*Agrostis pallens*), and California sedge (*Carex californica*).

Associated sites

AX001X03X401	<p>Cryic Udic Forest Cryic Udic Forest is located along the edges of Cryic Udic Meadow. The site is forested and located on mountain shoulders and summits. The most common overstory species include Pacific silver fir, noble fir, and western hemlock. The most common understory species include red huckleberry, salal, Oregon oxalis, and western swordfern.</p>
--------------	---

Similar sites

AX001X03X201	<p>Cryic Udic Meadow Cryic Udic Meadow is unique and does not share similar characteristics to other ecological sites.</p>
--------------	---

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Lomatium martindalei</i> (2) <i>Senecio triangularis</i>

Legacy ID

R001XC201OR

Physiographic features

This ecological site is located in open meadows on mountain shoulder slopes, back slopes, and summits. Elevations are greater than 2,500 feet with slopes ranging from 3 to 60 percent.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2)
Flooding frequency	None
Ponding frequency	None
Elevation	2,500–4,700 ft
Slope	3–60%
Water table depth	20–40 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The climate has cool, moist summers and cold, wet winters. Mean annual precipitation ranges from 120 to 150 inches. Average annual temperatures range from 39 to 45 degrees F. Microclimate may vary depending on soil temperature and site specific features.

Table 3. Representative climatic features

Frost-free period (characteristic range)	40-100 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	120-150 in

Influencing water features

This site does not experience ponding or flooding. The water table will typically rise during the spring and summer months and recede in the fall. Seasonal snowpack melts earlier on these sites and the lack of saturation in the soil profile allows soil to warm quickly with rising seasonal air temperature.

Soil features

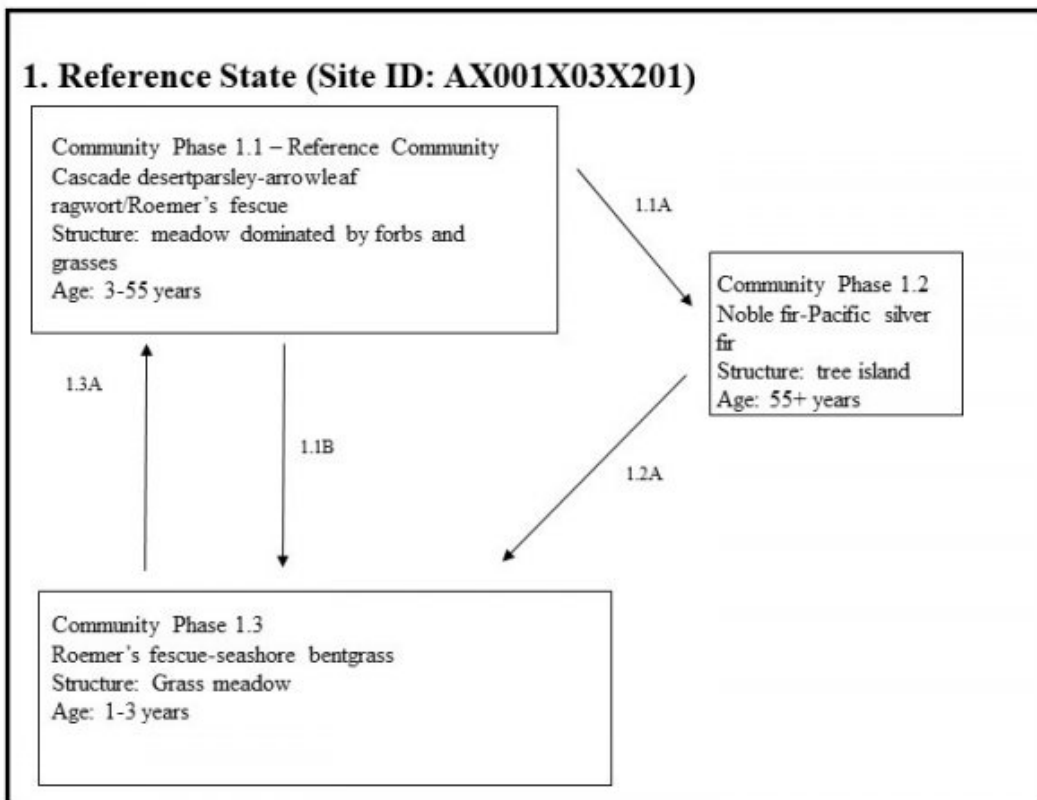
Soils that support this ecological site occur in the cryic soil temperature regime and the udic soil moisture regime. The soil is usually moist but is dry for a short period of less than 45 consecutive days between depths of 4 to 12 inches in the four month period following the summer solstice in moist years.

Table 4. Representative soil features

Parent material	(1) Colluvium–igneous rock (2) Residuum–igneous rock
Surface texture	(1) Loam (2) Medial loam
Drainage class	Well drained
Depth to restrictive layer	20–40 in
Surface fragment cover <=3"	3–5%
Surface fragment cover >3"	3%
Clay content (0-10in)	13–15%
Subsurface fragment volume <=3" (1-40in)	7–11%
Subsurface fragment volume >3" (1-40in)	3–11%

Ecological dynamics

State and transition model



Lomatium martindalei-*Senecio triangularis*/*Festuca roemerii*
 Cascade desertparsley-arrowleaf ragwort/Roemer's fescue

→ Community Phase Pathway 1.X = Community Phase X#Y = Transition Pathway
 1.XY = Pathway (ecological response to natural processes)

State 1 Reference State

Community 1.1 Cascade desertparsley-arrowleaf ragwort/Roemer's fescue

Cascade desertparsley-arrowleaf ragwort/Roemer's fescue Structure: meadow dominated by forbs and grasses
 The reference community is a floristically rich mosaic of low-growing shrubs, forbs, and grass species that have been relatively undisturbed by natural and human influences. These subalpine ecosystems are located on aspects where snowmelt occurs in spring and early summer, providing for a longer growing season. Plant percent cover is variable, but the reference community plants are common throughout the entire ecological site. Common plants include Cascade desertparsley, Pacific lupine, sulfur-flowered buckwheat, toughleaf iris, annual agoseris, arrowleaf ragwort, Columbia lily, hookedspur violet, Roemer's fescue, seashore bentgrass, and California sedge. Dwarfed species of noble fir and possibly Pacific silver fir are scattered throughout the ecosystem, forming tree islands in places. Small natural disturbances such as frost heaving, wind blasting, and variation in snowpack can have small scale, but significant impacts on subalpine vegetation. Soil compaction and damage to vegetation may have significant impacts on the ecological site integrity. Herbivores such as elk (*Cervus canadensis roosevelti*), Columbian white and blacktail deer (*Odocoileus hemionus columbianus* and *Odocoileus virginianus leucurus*), and migratory birds will forage on the vegetation which may create patches of open ground (Martin, 2001).

Dominant plant species

- cascade desertparsley (*Lomatium martindalei*), other herbaceous
- Pacific lupine (*Lupinus lepidus*), other herbaceous
- sulphur-flower buckwheat (*Eriogonum umbellatum*), other herbaceous
- toughleaf iris (*Iris tenax*), other herbaceous

- annual agoseris (*Agoseris heterophylla*), other herbaceous
- arrowleaf ragwort (*Senecio triangularis*), other herbaceous
- Columbia lily (*Lilium columbianum*), other herbaceous
- hookedspur violet (*Viola adunca*), other herbaceous
- fescue (*Festuca*), other herbaceous
- seashore bentgrass (*Agrostis pallens*), other herbaceous
- California sedge (*Carex californica*), other herbaceous

Community 1.2

Noble fir-Pacific silver fir

Noble fir-Pacific silver fir Structure: tree islands Community phase 1.2 represents a community stage of tree islands that developed over long periods of time without disturbance. The establishment of conifers such as noble fir and Pacific silver fir is successful and has developed pockets of mature trees.

Dominant plant species

- Pacific silver fir (*Abies amabilis*), tree
- noble fir (*Abies procera*), tree

Community 1.3

Roemer's fescue-seashore bentgrass

Roemer's fescue-seashore bentgrass Structure: Grass meadow Early seral species of grasses and forbs will inhabit the landscape following disturbance. This phase is sparsely vegetated by emerging grasses and herbaceous cover is patchy. It is possible in some sites that forbs may develop in advance of grasses. The site is highly susceptible to disturbance impacts such as wind erosion, trampling, and drought. Minimizing human caused disturbance is important to the vegetative recovery of the site. Common plants such as Pacific lupine, Roemer's fescue, and seashore bentgrass begin to dominate.

Dominant plant species

- fescue (*Festuca*), other herbaceous
- seashore bentgrass (*Agrostis pallens*), other herbaceous
- Pacific lupine (*Lupinus lepidus*), other herbaceous

Pathway 1.1A

Community 1.1 to 1.2

This pathway represents an ongoing lack of disturbance which favors the establishment of pockets of trees over time.

Pathway 1.1B

Community 1.1 to 1.3

This pathway represents an extreme disturbance. The most typical disturbance is wildfire, however other extreme disturbances may include avalanche, landslide, or other slower forms of mass movement that remove the majority of the vegetation. Wildfire intensity will be elevation driven, and it is expected that lower elevations will be more devastated by higher intensity wildfires and the recovery time will be longer as a result.

Pathway 1.2A

Community 1.2 to 1.3

This pathway represents an extreme disturbance. The most typical disturbance is wildfire. Other extreme disturbances may include avalanche, landslide, or slower form of mass movement that removes the majority of the vegetation. Wildfire intensity will be elevation driven, and it is expected that lower elevations will be more devastated by higher intensity wildfires and the recovery time will be longer as a result.

Pathway 1.3A

Community 1.3 to 1.1

This pathway represents no further major disturbance and maturation of present species. Re-establishment and diversification of forbs occur.

Additional community tables

Inventory data references

Other Established Classifications for Ecological Site

National Vegetation Classification: A1647 Lomatium martindalei Meadow Alliance

Non-forest Plant Communities of the Northern Oregon Coast Range and Vicinity: *Festuca roemerii* [high elevation Coast Range]

Other references

- Atzet, T., White, D., McCrimmon, L., Martinez, P., Fong, P., Randall, V. Field Guide to the Forested Plant Associations of Southwestern Oregon. United States Department of Agriculture Forest Service, Pacific Northwest Region. Technical Paper R6-NR-ECOL-TP-17-96
- Canaday, B.B., Fonda, R.W. 1974. The Influence of Subalpine Snowbanks on Vegetation Pattern, Production, and Phenology. Bulletin for Torrey Botanic Club, Vol 101 pp 340-350.
- Douglas, G.W., and Bliss, L.C. 1972. Alpine and high subalpine plant communities of the western north cascades, Washington. Arctic and Alpine Research, Vol 4, No. 2, pp 147-166.
- Evans, R., Fonda, R. 1990. The influence of snow on subalpine meadow community pattern, North Cascades, Washington. Canadian Journal of Botany 68: 212-220.
- Franklin, J., Dyrness, C. 1973. Natural vegetation of Oregon and Washington. Oregon State University Press, USA. 452 p.
- Glavich, D. 2017. Non-forest Plant Communities of the Northern Oregon Coast Range and Vicinity. USDA Forest Service, Pacific Northwest Region Draft Technical Report.
- Hays, P., Frenkel, R., McEvoy, E. 2012. Marys Peak Scenic Botanical Area. Kalmiopsis. Volume 19. Pp 21-35.
- Hemstrom, M., Franklin, J. 1982. Fire and Other Disturbances of the Forests in Mount Rainier National Park. Quaternary Research, Vol 18 pp 32-61.
- Hemstrom, M., Logan, S. 1986. Plant Association and Management Guide: Siuslaw National Forest. United States Department of Agriculture Forest Service, Pacific Northwest Region. Technical Paper R6-Ecol 220-1986a
- Martin, K. 2001. Wildlife in Alpine and Sub-alpine Habitats. Wildlife-Habitat Relationships in Oregon and Washington. Oregon State University Press. pp 285-310
- Pojar J., and MacKinnon. 1994. Plants of the Pacific Northwest Coast. Lone Pine, Vancouver, British Columbia. 528 pages.
- PRISM Climate Group, Oregon State University, <http://prism.oregonstate.edu>, visited Feb., 2015.
- Rocheftort, R., Little, R., Woodward, A., Peterson, D. 1993. Changes in sub-alpine tree distribution in western North American: a review of climatic and other causal factors. The Holocene 4 No. 1: 89-100.
- Rocheftort, R.M. and Peterson, D.L. 1996. Temporal and Spatial Distribution of Trees in Subalpine Meadows of Mount Rainier National Park. Arctic and Alpine Research, Vol. 28, No. 1 pp 52-59.
- Seastedt, T.R., Adams, G.A. 2001. Effects of Mobile Tree Islands on Alpine Tundra Soils. Ecology, Vol 82 pp 8-17.
- Soil Survey Staff. 2014. Keys to Soil Taxonomy, 12th ed. USDA-Natural Resources Conservation Service, Washington, DC.
- Soil Survey Staff. 1999. Soil Taxonomy: A Basic System of Soil classification for Making and Interpreting Soil Surveys. 2nd ed. USDA-Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.
- United States National Vegetation Classification. 2016. United States National Vegetation Classification Database, V2.0. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. (accessed 28, November, 2016.)
- Washington Department of Natural Resources, Natural Heritage Program. 2015. Ecological Systems of Washington State. A Guide to Identification.

Contributors

Erin Kreuz
Erik Dahlke

Approval

Kirt Walstad, 5/07/2024

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	05/07/2024
Approved by	Kirt Walstad
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:**
