Ecological site AX001X01X414
High Cryic Udic Moist Forest

Last updated: 5/15/2025
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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): 001X–Northern Pacific Coast Range, Foothills, and Valleys

This area consists of a long and narrow range of mountains with associated foothills and valleys that parallels the Pacific Ocean. This area is entirely within the Pacific Border Province of the Pacific Mountain System in Oregon and Washington. MLRA 1 is bounded on the north by the highest elevations of the Olympic Mountains and the strait of Juan de Fuca, and by the Klamath Mountains on the south. The Washington portion of this MLRA is primarily composed of young Tertiary sedimentary rocks (siltstone and sandstone) mixed with some volcanic rocks of the same age. Glacial till and outwash deposits are also found in the northern half of this area in Washington. Much of this area is accreted terrane formed by tectonic processes. The average annual precipitation ranges from 60 to 200 inches (1,525 to 5,580 millimeters), increasing with elevation. Most of the precipitation in this area occurs during low-intensity, Pacific frontal storms and is evenly distributed throughout fall, winter, and spring. The dominant soil orders in this MLRA are Andisols, Inceptisols, and Ultisols. Soil depths broadly range from shallow to very deep. Soils are primarily well drained, however poorly drained soils may be found in depressional areas and on alluvial floodplains. Surface textures are typically medial and loamy or clayey. Soils in this area dominantly have a mesic or frigid temperature regime and a udic moisture regime. Soils with aquic moisture regimes and cryic temperature regimes also occur.

Ecological site concept

High Cryic Udic Moist Forest sites occur on stable landscape positions primarily on glacial valley walls in high elevation areas within the cryic temperature zone. These sites are typically located on both the windward and leeward sides of the Olympic Mountains. These sites often receive additional moisture via run-on from less stable adjacent sites. High Cryic Udic Moist Forest sites are characterized by an overstory of subalpine fir (Abies lasiocarpa) and Pacific silver fir (Abies amabilis), accompanied by an understory shrub community of thinleaf huckleberry (Vaccinium membranaceum), locally known as black huckleberry, Sitka mountain ash (Sorbus sitchensis), Cascade bilberry (Vaccinium deliciosum). The most common herbaceous layer species are roughfruit berry (Rubus lasiococcus), Sitka valerian (Valeriana sitchensis), and western moss heather (Cassiope mertensiana). High Cryic Udic Moist Forest sites are readily differentiated from Low Cryic Udic Moist Forest sites by presence of subalpine fir (Abies lasiocarpa).

Associated sites

AX001X01X413	**High Cryic Udic Forest** High Cryic Udic Forest sites may be found upslope of High Cryic Udic Moist Forest sites and frequently generate run-off moisture that is captured by High Cryic Udic Moist Forest sites.
AX001X01X415	**High Cryic Udic Dry Forest** High Cryic Udic Dry Forest sites may be found upslope of High Cryic Udic Moist Forest sites and frequently generate run-off moisture that is captured by High Cryic Udic Moist Forest sites.

AX001X01X306	**Cryic Aquic Subalpine Wet Meadow** Cryic Aquic Subalpine Meadows may be found in depressions and seeps adjacent to or surrounded by High Cryic Udic Moist Forest sites. Cryic Aquic Subalpine Meadow sites are frequently ponded and lack tree cover.

Similar sites

AX001X01X411	**Low Cryic Udic Moist Forest** Low Cryic Udic Moist Forest sites occur at lower elevations and are distinguished by their lack of subalpine fir (Abies lasiocarpa).

Table 1. Dominant plant species

Tree	(1) *Abies lasiocarpa* (2) *Abies amabilis*
Shrub	(1) *Vaccinium membranaceum* (2) *Sorbus sitchensis*
Herbaceous	(1) *Rubus lasiococcus* (2) *Valeriana sitchensis*

Legacy ID

F001XA414WA

Physiographic features

This site primarily occurs on valley walls, bedrock benches, bedrock knobs, fluve basins, and slides on mountains. High Cryic Udic Moist Forest sites are typically found on intermediate slopes between less stable High Cryic Udic Forest or High Cryic Udic Dry Forest sites and more stable Cryic Udic Wet Subalpine Meadow or Cryic Aquic Subalpine Wet Meadow sites. High Cryic Udic Moist Forest sites receive a moderate amount of additional moisture via run-on.

Table 2. Representative physiographic features

Landforms	(1) Mountains (2) Glacial-valley wall (3) Bench (4) Knob (5) Slide
Flooding frequency	None
Ponding frequency	None
Elevation	1,300 – 1,800 m

Slope	0 – 100 %
Water table depth	150 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

This site occurs in a cryic temperature and udic moisture regime. Precipitation arrives mostly via low-intensity, Pacific frontal storms. Precipitation is unevenly distributed, with the lowest amounts on the leeward side of the Coast Range mountains. Precipitation falls largely as snow in higher elevations. Precipitation is evenly distributed throughout the fall, winter, and spring, while summers are dry. Air temperatures vary significantly along the elevation gradient.

Table 3 Representative climatic features

Frost-free period (characteristic range)	30-60 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	3,000-3,990 mm

Influencing water features

There are no dominant water features influencing plant community dynamics on site.

Soil features

The soils that support this map unit occur in the cryic soil temperature regime and the udic soil moisture regime. Nonamecreek soils are very deep, well-drained, formed from colluvium from metasedimentary rock, and occur on colluvial aprons and glacial valley walls. They are subject to intense weathering and therefore are strongly developed. Saturated hydraulic conductivity is high or very high throughout. These soils have a rock fragment content of 35 percent or greater in the control section. Most soils contain a thin organic layer that protects the soil from wind and water erosion. These soils have no major limiting factors to plant growth. Although representative of this site, these soils may exist across multiple ecological sites because of naturally variable slope, texture, rock fragments, and pH. An on-site soil pit and the most current ecological site key are necessary to classify a site.

Table 4. Representative soil features

Parent material	(1) Colluvium – metasedimentary rock
Surface texture	(1) Loam (2) Gravelly silt loam (3) Gravelly sandy loam
Drainage class	Well drained
Soil depth	150 cm

Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	9.65 – 13.72 cm
Soil reaction (1:1 water) (0-25.4cm)	3.5 – 5.5
Subsurface fragment volume <=3" (0-50.8cm)	0 – 60 %
Subsurface fragment volume >3" (0-50.8cm)	0 – 20 %

Ecological dynamics

Frequent, small-scale disturbances from windthrow events create a mosaic fabric of early-seral patches within late-seral communities. Windthrow events create small canopy gaps that provide favorable conditions for limited Douglas-fir regeneration and increased understory productivity. Eventually, Pacific silver fir (Abies amabilis) and subalpine fir (Abies lasiocarpa) will regenerate and become dominant.

Infrequent, large-scale disturbances may occur in the form of stand-replacing wildfires, cataclysmic wind events, or large mass movement events. The fire regime of the western half of the Olympic Peninsula is characterized by high-intensity, stand-replacing fires with a long return interval of greater than 100 years (Agee, 1987). Strong coastal winds produce intense blow-down disturbance events more frequently than fires occur. Wildfires and severe blowdown create conditions favorable for the establishment of early seral tree species. Douglas-fir (Pseudotsuga menziesii) regeneration is favored by stand-replacing disturbance. In the absence of large-scale disturbance, more slow-growing and shade-tolerant subalpine fir and Pacific silver fir will regenerate successfully and gradually succeed Douglas-fir. The longevity of Douglas-fir may preserve evidence of historical high-intensity disturbance events.

Large mass-movement events also provide conditions for the initiation of primary succession. Landslides are a significant source of disturbance, owing to the steep terrain and sedimentary geology of the park. (Gavin, 2014). As with stand-replacing wildfires, bare patches created by landslides favor establishment of shade-intolerant Douglas-fir recruits (Geertsema & Pojar, 2007).

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 1.4 plant community composition

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

Table 9. Community 1.5 plant community composition

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

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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	09/25/2026
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):**

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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:**
