

# Ecological site F003XN924WA

## Low Cryic/Udic West Coniferous

Last updated: 1/30/2025  
Accessed: 09/24/2026

### 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.

### Classification relationships

Related National Park Service Plant Alliances: *Abies amabilis* - *Abies lasiocarpa* Forest and Woodland Alliance, *Abies amabilis* - *Tsuga heterophylla* - (*Pseudotsuga menziesii*) / (*Rhododendron albiflorum*) Cold Forest Alliance (Crawford 2009). This ecological site is related to the United States Forest Service Plant Association Groups: Mesic VAME and Moist VAAL 12 (Silver Fir Series). (Henderson 1992 p.83)

### Associated sites

|             |                                       |
|-------------|---------------------------------------|
| F003XN921WA | Frigid/Udic Coniferous                |
| F003XN925WA | High Cryic/Udic Coniferous            |
| F003XN926WA | Cryic/Udic Active Natural Disturbance |

Table 1. Dominant plant species

|            |                                                                      |
|------------|----------------------------------------------------------------------|
| Tree       | (1) <i>Abies amabilis</i><br>(2) <i>Tsuga heterophylla</i>           |
| Shrub      | (1) <i>Vaccinium membranaceum</i><br>(2) <i>Menziesia ferruginea</i> |
| Herbaceous | (1) <i>Gymnocarpium dryopteris</i><br>(2) <i>Clintonia uniflora</i>  |

### Physiographic features

This native plant community occurs across many landscape positions at middle elevations of the North Cascades. This site occupies the low cryic/udic soil temperature/moisture regime and extends across glacial valleys to mountain slopes and in some locations to the ridge lines above.

This ecological site has only been mapped within the boundary of the North Cascades National Park Complex. This site, where mapped, ranged from 1700 to 5200 feet in elevation. The table below refers to the representative elevations of this site.

Table 2. Representative physiographic features

|                    |                                                             |
|--------------------|-------------------------------------------------------------|
| Landforms          | (1) Mountain slope<br>(2) Valley side<br>(3) Stream terrace |
| Flooding duration  | Very brief (4 to 48 hours) to brief (2 to 7 days)           |
| Flooding frequency | None to occasional                                          |
| Ponding frequency  | None                                                        |
| Elevation          | 670 – 1,400 m                                               |
| Slope              | 10 – 100 %                                                  |
| Water table depth  | 50 cm                                                       |
| Aspect             | Aspect is not a significant factor                          |

### Climatic features

This ecological site receives most of its annual precipitation from October to April in the form of snow that will commonly persist into late spring and early summer. The mean annual precipitation ranges from 50 to 115 inches and the mean annual temperature ranges from 33 to 47 degrees Fahrenheit. Generally this site occupies areas with cool dry summers and cold wet winters.

Precipitation and temperature data in the tables below was extracted from: PRISM Climate Group, Oregon State University, <http://prism.oregonstate.edu>, created February 2004. Information from the Ross Dam weather station, was used by the PRISM Climate Group to generate climate data for the North Cascades region.

**Table 3 Representative climatic features**

|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 60 days  |
| Freeze-free period (average)  | 90 days  |
| Precipitation total (average) | 2,920 mm |

### Influencing water features

In general, this ecological site is not influenced by wetland or riparian water features but may be found on stream terraces or adjacent to wetland and riparian areas. Occasionally and for brief amounts of time, the site may be flooded by adjacent rivers and streams but overall this has an insignificant influence on the plant community. Typically the Kimtah or Terror soil series are present in the areas subject to flooding.

### Soil features

Applicable soils: Chilliwack, warm, Forbidden, Kimtah, Perfect, Spickard, Tepeh, moist, Terror and Yawning.

The soils that support this native plant community occur in the low cryic west soil temperature regime and udic soil moisture regime (the rooting zone is usually moist throughout the winter and the majority of summer). For the purposes of the soil inventory, the cryic zone (average annual temperature less than 8 degrees C, with less than 5 degrees C difference from winter to summer) was divided into several zones to distinguish soil and/or climatic differences between the lower elevation west side zone (low cryic/udic west), the higher elevation crest zone (high cryic/udic), and lower elevation east side zone (low cryic/udic east). These soils are moderately well to well drained and soil depth ranges from deep to very deep. Generally these soils have a mantle of material with significant volcanic ash influence overlying glacial till or colluvium. The upper mantle is characterized by a low bulk density and high water holding capacity. Soil moisture is not a limiting factor to forest growth on these soils owing to abundance of precipitation and the inherent water holding properties of soils influenced by volcanic ash. Typically under a coniferous overstory, as the amount of precipitation increases the degree of pedogenic weathering increases. In soils with significant volcanic ash influence and landscape stability (i.e. geologic time), pedogenic weathering produces Spodosols such as the Chilliwack, Kimtah, and Yawning soil series. Some soil properties of these Spodosols are similar to the other soils found under this native plant community, but morphologically Spodosols are visually distinct because of the typically bright albic and spodic horizon sequence in the upper soil profile. Weak expression of this morphology may be visible in the Andisols and Inceptisols of this grouping but generally these soils exhibit an ochric epipedon and cambic subsurface diagnostic horizon.

A blank entry under soil depth column indicates no depth restriction within the soil profile.

For more information on soils and their terminology, please refer to Soil taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys (Soil Survey Staff, 1999; <http://soils.usda.gov/technical/classification/taxonomy/>).

**Table 4. Representative soil features**

|                                          |                                                 |
|------------------------------------------|-------------------------------------------------|
| Surface texture                          | (1) Ashy fine sandy loam<br>(2) Ashy sandy loam |
| Family particle size                     | (1) Loamy                                       |
| Drainage class                           | Moderately well drained to well drained         |
| Permeability class                       | Moderate to very rapid                          |
| Soil depth                               | 150 cm                                          |
| Surface fragment cover <=3"              | 0 – 10 %                                        |
| Surface fragment cover >3"               | 0 – 10 %                                        |
| Available water capacity<br>(0-101.6cm)  | 10.67 – 40.61 cm                                |
| Soil reaction (1:1 water)<br>(0-101.6cm) | 0 – 10                                          |

|                                                          |           |
|----------------------------------------------------------|-----------|
| Subsurface fragment volume <=3"<br>(Depth not specified) | 10 – 80 % |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 10 – 50 % |

## Ecological dynamics

This site is found in the cold, moist, mid-elevations on the west side of the Cascade Crest. Pacific silver fir (*Abies amabilis*) and western hemlock (*Tsuga heterophylla*) are the dominant species with western redcedar (*Thuja plicata*) and Douglas-fir (*Pseudotsuga menziesii*) occasionally present. The most common disturbance for this site is windthrow to which both Pacific silver fir and western hemlock are susceptible. The resulting canopy openings allow more sunlight to reach the forest floor. The historic fire regime is one of low frequency (300+ years) and high intensity and results in a stand replacing event. Common understory shrubs include black huckleberry (*Vaccinium membranaceum*), rusty menziesia (*Menziesia ferruginea*), devilsclub (*Oplopanax horridus*), five-leaved bramble (*Rubus pedatus*), Cascade azalea (*Rhododendron albiflorum*) and vine maple (*Acer circinatum*). Common forbs include western oakfern (*Gymnocarpium dryopteris*), queencup bead lily (*Clintonia uniflora*), fringe cup (*Tellima grandiflora*), common ladyfern (*Athyrium filix-femina*) and starry false lily of the valley (*Maianthemum stellatum*).

## State and transition model

Figure 3. 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 1.1 forest overstory composition

| Common Name        | Symbol | Scientific Name              | Nativity | Height M | Canopy Cover (%) | Diameter Cm | Basal Area (square M/hectare) |
|--------------------|--------|------------------------------|----------|----------|------------------|-------------|-------------------------------|
| <b>Tree</b>        |        |                              |          |          |                  |             |                               |
| Pacific silver fir | ABAM   | <i>Abies amabilis</i>        | Native   | –        | –                | –           | –                             |
| western hemlock    | TSHE   | <i>Tsuga heterophylla</i>    | Native   | –        | –                | –           | –                             |
| western redcedar   | THPL   | <i>Thuja plicata</i>         | Native   | –        | –                | –           | –                             |
| Douglas-fir        | PSME   | <i>Pseudotsuga menziesii</i> | Native   | –        | –                | –           | –                             |

Table 7. Community 1.1 forest understory composition

| Common Name                     | Symbol | Scientific Name                | Nativity | Height (m) | Canopy Cover (%) |
|---------------------------------|--------|--------------------------------|----------|------------|------------------|
| <b>Forb/Herb</b>                |        |                                |          |            |                  |
| bride's bonnet                  | CLUN2  | <i>Clintonia uniflora</i>      | Native   | 0.2-0.3    | 1-40             |
| bigflower tellima               | TEGR2  | <i>Tellima grandiflora</i>     | Native   | 0.2-0.3    | 1-25             |
| starry false lily of the valley | MAST4  | <i>Maianthemum stellatum</i>   | Native   | 0.3-0.6    | 0-20             |
| <b>Fern/fern ally</b>           |        |                                |          |            |                  |
| western oakfern                 | GYDR   | <i>Gymnocarpium dryopteris</i> | Native   | 0.2-0.3    | 1-25             |
| common ladyfern                 | ATFI   | <i>Athyrium filix-femina</i>   | Native   | 0.3-0.9    | 0-20             |
| <b>Shrub/Subshrub</b>           |        |                                |          |            |                  |
| thinleaf huckleberry            | VAME   | <i>Vaccinium membranaceum</i>  | Native   | 0.3-1.2    | 5-50             |
| vine maple                      | ACCI   | <i>Acer circinatum</i>         | Native   | 0.6-4.6    | 1-40             |
| rusty menziesia                 | MEFE   | <i>Menziesia ferruginea</i>    | Native   | 0.6-1.5    | 5-30             |
| devilsclub                      | OPHO   | <i>Oplopanax horridus</i>      | Native   | 0.3-1.8    | 5-30             |

|                          |       |                                |        |         |      |
|--------------------------|-------|--------------------------------|--------|---------|------|
| Cascade azalea           | RHAL2 | <i>Rhododendron albiflorum</i> | Native | 0.6-1.8 | 5-30 |
| salmonberry              | RUSP  | <i>Rubus spectabilis</i>       | Native | 0.6-1.8 | 0-20 |
| strawberryleaf raspberry | RUPE  | <i>Rubus pedatus</i>           | Native | 0.1-0.2 | 0-15 |
| red huckleberry          | VAPA  | <i>Vaccinium parvifolium</i>   | Native | 0.3-1.8 | 0-10 |

Table 8. Community 1.2 plant community composition

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

Table 9. Community 1.3 plant community composition

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

Table 10. Community 1.4 plant community composition

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

Table 11. Community 1.5 plant community composition

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

Table 12. Representative site productivity

| Common Name        | Symbol      | Site Index Low | Site Index High | CMAI Low | CMAI High | Age Of CMAI | Site Index Curve Code | Site Index Curve Basis | Citation |
|--------------------|-------------|----------------|-----------------|----------|-----------|-------------|-----------------------|------------------------|----------|
| western hemlock    | <i>TSHE</i> | 80             | 110             | 197      | 250       | 90          | –                     | –                      |          |
| Pacific silver fir | <i>ABAM</i> | 75             | 115             | 0        | 0         | 0           | –                     | –                      |          |

Inventory data references

Type Locality Plot ID: 09-PHR-055

Type locality

|                                |              |
|--------------------------------|--------------|
| Location 1: Whatcom County, WA |              |
| Township/Range/Section         | T40N R11E S5 |
| UTM zone                       | N            |
| UTM northing                   | 5427362      |
| UTM easting                    | 616983       |
| Latitude                       | 48° 59′17″   |
| Longitude                      | 121° 24′3″   |

Other references

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Henderson, J., R. Leshner, D. Peter, and D. Shaw. 1992. Field guide to the forested plant associations of the Mt. Baker-Snoqualmie National Forest. Technical paper R6-Ecol-TP-028-91.

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## Contributors

Kathryn Smith

## Approval

Kirt Walstad, 1/30/2025

## 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                                        | 01/30/2025        |
| Approved by                                 |                   |
| 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:

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