USDA Natural Resources
Conservation Service

Ecological site F003XN926WA
Cryic/Udic Active Natural Disturbance

Last updated: 5/10/2024
Accessed: 05/13/2024

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.

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.

Classification relationships

Related National Park Service Plant Alliances:
Alnus viridis ssp. sinuate Shrubland, *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: Cool VAME and Mesic VAME (Silver Fir Series). (Henderson 1992 p.83)

Associated sites

F003XN924WA	**Low Cryic/Udic West Coniferous**
F003XN925WA	**High Cryic/Udic Coniferous**
F003XN929WA	**Low Cryic/Udic East Coniferous**
R003XN512WA	**Subalpine Parkland - Active Natural Soil Disturbance**

Table 1. Dominant plant species

Tree	(1) *Alnus viridis ssp. sinuata*
Shrub	(1) *Sambucus racemosa*
Herbaceous	(1) *Veratrum viride* (2) *Athyrium filix-femina*

Physiographic features

This native plant community is of limited extent on mountain slope positions at higher elevations of the North Cascades. Typically this site is confined to avalanche paths and runout areas or similar areas with a higher frequency of disturbance such as talus slopes or debris torrent deposits.

This ecological site has only been mapped within the boundary of the North Cascades National Park Complex. This site, where mapped, ranged from 2000 to 7000 feet in elevation. The table below refers to the representative elevations of this site.

Table 2. Representative physiographic features

Landforms	(1) Avalanche chute (2) Valley side (3) Mountain slope
Flooding frequency	None
Ponding frequency	None
Elevation	914–1,829 m
Slope	15–65%
Water table depth	152 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 60 to 115 inches and the mean annual temperature ranges from 31 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)	2,921 mm

Influencing water features

This ecological site is not influenced by wetland or riparian water features.

Soil features

Applicable soils: Stetattle, deciduous, Triumph, deciduous.

The soils that support this native plant community occur in the cryic soil temperature regime (average annual

temperature less than 8 degrees C, with less than 5 degrees C difference from winter to summer) and udic soil moisture regime (the rooting zone is usually moist throughout the winter and the majority of summer). These soils are well drained and deep to very deep. Generally these soils have a mantle of material with significant volcanic ash influence overlying colluvium. The upper mantle is characterized by a low bulk density and high water holding capacity although an abundance of coarse fragments within the profile may limit the amount of moisture available. Soil profiles under this plant community will typically have a darker color than their coniferous forest counterparts owing to the abundance of deciduous forest litter and herbaceous root matter incorporated into the soil profile.

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) Medial fine sandy loam (2) Ashy sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately rapid to very rapid
Soil depth	102 cm
Surface fragment cover <=3"	5–25%
Surface fragment cover >3"	0–25%
Available water capacity (0-101.6cm)	10.67–40.61 cm
Soil reaction (1:1 water) (0-101.6cm)	4.3–6.5
Subsurface fragment volume <=3" (Depth not specified)	35–80%
Subsurface fragment volume >3" (Depth not specified)	35–60%

Ecological dynamics

This site is found on cold, moist, higher elevation active avalanche chutes. Sitka alder (*Alnus viridis* ssp. sinuata) is the dominant species and will grow almost prostrate in response to snow load and the force of avalanches. Repetitious disturbance by avalanches does not allow for the establishment of a forested overstory, but seedlings of tree species, such as subalpine fir (*Abies lasiocarpa*), mountain hemlock (*Tsuga mertensiana*) and Pacific silver fir (*Abies amabilis*) may encroach from the forest edges. Over time, the majority of these rigid-trunked species will be snapped off by the force of an avalanche. Common understory shrubs include red elderberry (*Sambucus racemosa*), salmonberry (*Rubus spectabilis*), Sitka mountain-ash (*Sorbus sitchensis*), prickly currant (*Ribes lacustre*); common forbs include false hellebore (*Veratrum viride*), common ladyfern (*Athyrium filix-femina*), fireweed (*Chamerion angustifolium*) and Sitka valerian (*Valeriana sitchensis*).

State and transition model

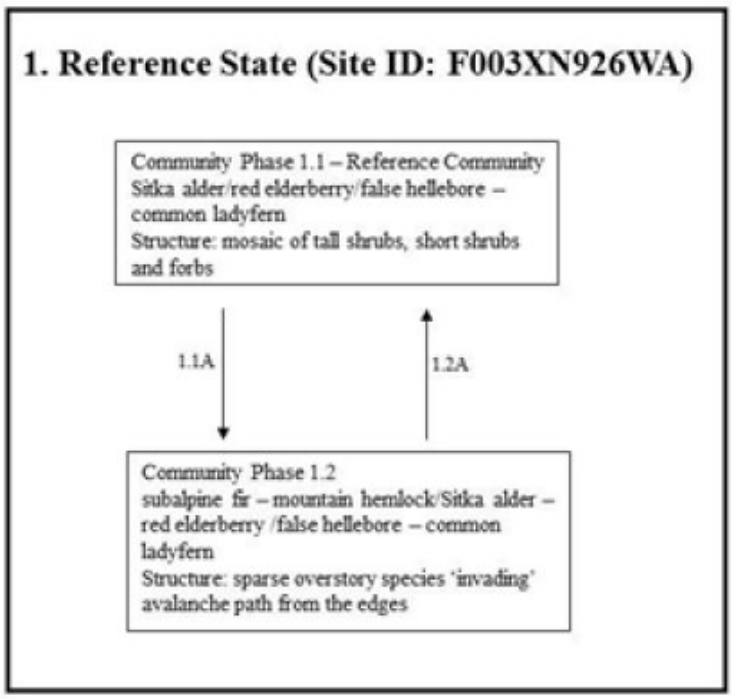

Figure 4. State and Transition Model

State 1
Reference State

Community 1.1
Sitka alder/red elderberry/false hellebore – common ladyfern

Figure 5. Reference Community (mid-ground on slope)

Structure: mosaic of tall shrubs, short shrubs and forbs. Sitka alder will form large areas of continuous canopy cover especially toward the lower end of avalanche chutes where the slope becomes less steep. These areas tend to have less varied shrub composition but higher amounts of forbs and ferns such as false hellebore, fireweed

(*Chamerion angustifolium*) and common ladyfern. Where Sitka alder becomes more patchy, other tall shrubs such as red elderberry, salmonberry, Sitka mountain-ash and prickly currant will be present. These species don't take on a prostrate form, instead they resprout basally, becoming stunted and multi-stemmed. All of these species (with the possible exception of prickly currant) can readily sprout from the root crown and are therefore able to persist in avalanche chutes.

Community 1.2
subalpine fir - mountain hemlock/Sitka alder – red elderberry /false hellebore – common ladyfern

Structure: sparse overstory species 'invading' avalanche path from the edges. The forest surrounding avalanche chutes provide a continual seed source for recruitment into the community. Typically these rigid-stemmed species will not survive repeated onslaughts from avalanches when they establish in the main snow path. They can, however, slowly encroach from the forest edges where mature trees offer some buffer against less forceful snow movements. Over time and in the right circumstances (less overall snowfall, more stable snowpack), this can lead to a narrowing of the original chute.

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents an extended time with minimal major avalanche disturbance.

Pathway 1.2A
Community 1.2 to 1.1

This pathway represents a particularly powerful avalanche or serious of avalanches which reclaim the original extent of the avalanche chute.

Additional community tables

Table 5. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Forb/Herb					
green false hellebore	VEVI	*Veratrum viride*	Native	0.3–0.9	1–40
Sitka valerian	VASI	*Valeriana sitchensis*	Native	0.2–0.6	1–20
fireweed	CHANA2	*Chamerion angustifolium ssp. angustifolium*	Native	0.3–0.9	1–15
Fern/fern ally					
common ladyfern	ATFI	*Athyrium filix-femina*	Native	0.3–0.9	1–40
Shrub/Subshrub					
Sitka alder	ALVIS	*Alnus viridis ssp. sinuata*	Native	0.9–4.6	30–80
salmonberry	RUSP	*Rubus spectabilis*	Native	0.6–1.8	5–40
Sitka mountain ash	SOSIS2	*Sorbus sitchensis var. sitchensis*	Native	0.6–3	5–40
red elderberry	SARA2	*Sambucus racemosa*	Native	0.6–3.7	5–30
prickly currant	RILA	*Ribes lacustre*	Native	0.3–1.2	1–15

Table 6. 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
subalpine fir	*ABLA*	50	70	39	63	120	–	–	

Inventory data references

Type Locality Plot ID: 07-PHR-054

Type locality

Location 1: Skagit County, WA	
Township/Range/Section	T35N R14E S16
UTM zone	N
UTM northing	5375979
UTM easting	648541
Latitude	48° 31′ 8″
Longitude	120° 59′ 19″

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Contributors

Kathryn Smith

Approval

Kirt Walstad, 5/10/2024

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	05/13/2024
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:**