USDA Natural Resources Conservation Service

Ecological site F006XY706OR
Cryic Coniferous Flood Plain

Last updated: 2/14/2025
Accessed: 05/14/2025

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): 006X–Cascade Mountains, Eastern Slope

Stretching from northern Washington to southern Oregon, the Cascade Mountains, Eastern Slope, spans the entirety of the mountain slopes, foothills, elevated plateaus and valleys on the eastern slopes of the Cascade mountains. This MLRA is a transitional area between the Cascade Mountains to the west and the lower lying Columbia Basalt Plateau to the east. Situated in the rainshadow of the Cascade Crest, this MLRA receives less precipitation than portions of the cascades further west and greater precipitation than the basalt plateaus to the east. Geologically, the majority of the MLRA is dominated by Miocene volcanic rocks while the northern portion is dominated by Pre-Cretaceaus metamorphic rocks and the southern portion is blanketed with a thick mantle of ash and pumice from Mount Mazama. The soils in the MLRA dominantly have a mesic, frigid, or cryic soil temperature regime, a xeric soil moisture regime, and mixed or glassy mineralogy. They generally are moderately deep to very deep, well drained, and loamy or ashy. Biologically, the MLRA is dominated by coniferous forest, large expanses of which are dominated by ponderosa pine, Douglas-fir or lodgepole pine. Areas experiencing cooler and moister conditions include grand fir, white fir, and western larch while the highest elevations include pacific silver fir, subalpine fir and whitebark pine. Economically, timber harvest and recreation are important land uses in these forests. Historically, many of these forests would have experienced relatively frequent, low and mixed severity fire favoring the development of mature forests dominated by ponderosa pine or Douglas-fir. In the southern pumice plateau forests, less frequent, higher severity fire was common and promoted the growth of large expanses of lodgepole pine forests.

LRU notes

This broad group of sites encompasses meadow and riparian sites that occur across the MLRA. These sites range across MLRA 6 and span broad gradients of plant community composition, physiography, geology, and climate. These sites share common influences of adjacent riparian areas or wetlands and moist to wet soils with udic or aquic soil moisture regimes.

Classification relationships

Related Plant associations:

Kovalchik 1987:
CEM211 - ENGELMANN SPRUCE/COMMON HORSETAIL-TWISTEDSTALK ASSOCIATION

Crowe et al. 2004:
CEGL000892 - Engelmann spruce/Mountain alder-Red-osier dogwood Association

Hopkins 1979:
CWM111 - White fir-Alder/Shrub meadow

Note: these associations may not be co-occurring but represent the range of potential plant communities represented by this site

Ecological site concept

This site represents a group of riparian communities dominated by an overstory of Engelmann spruce (Picea engelmanni) with mountain alder (*Alnus incana*) common. Botanically, shrub and herb species may be diverse and highly influenced by depth to water table, yet similar ecological dynamics drive ecosystem change. Present knowledge of these dynamics is incomplete for this site, but fire and alterations of adjacent stream channels will influence plant community composition, productivity and succession.

This is a provisional ecological site and is subject to extensive review and revision before final approval. All data herein should be considered provisional and contingent upon field validation prior to use in conservation planning.

Associated sites

R006XB102OR	**Cold Wet Meadow** Occupying adjacent low energy meadows rather than higher energy floodplains and low terraces along streams

Similar sites

R006XB102OR	**Cold Wet Meadow** Occupying low energy meadows rather than higher energy floodplains and low terraces along streams

Table 1. Dominant plant species

Tree	(1) *Picea engelmannii*
Shrub	(1) *Alnus incana*
Herbaceous	Not specified

Physiographic features

This site occurs on floodplains and low stream terraces along mountain streams. These are low gradient streams with slopes nearly level to three percent. Elevations range from 4,000 to 6,000 feet (1,200 to 1,850 meters). The site may experience spring flooding. A water table is present at or near the soil surface early in the growing season, dropping to within one to two feet by the end of summer and occurring within 60 inches of the soil surface throughout the year. This site does not experience ponding.

Table 2. Representative physiographic features

Landforms	(1) Stream terrace (2) Flood plain
Flooding duration	Extremely brief (0.1 to 4 hours) to very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	1,219–1,829 m
Slope	0–3%
Ponding depth	0 cm
Water table depth	0–152 cm
Aspect	Aspect is not a significant factor

Climatic features

Winters are long, cold and snowy. Snow makes up a large portion of the effective precipitation which averages 25 to 40 inches (625 to 1000 mm). Summers days are warm, and nights are cool. Summer precipitation comes as infrequent rain storms. Summer thunderstorms can drop moderately heavy amounts of rain, but only for a short period of time. Frost-free days range from 10 to 50 days. The soil temperature regime is cryic with a mean annual air temperature from 40 to 42 degrees Fahrenheit (4.5 to 5.5° C). and the soil moisture regime ranges from udic to aquic. The graphs below are populated from the closest available weather station to representative site locations and are provided to indicate general climate patterns.

Table 3. Representative climatic features

Frost-free period (characteristic range)	10-50 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	635-1,016 mm
Frost-free period (average)	30 days
Freeze-free period (average)	
Precipitation total (average)	813 mm

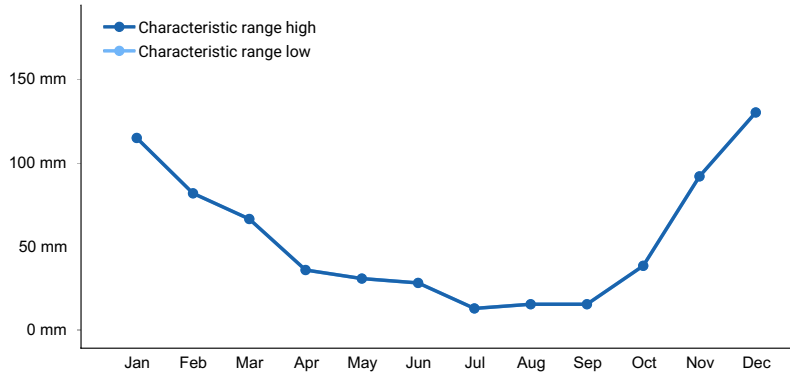


Figure 1. Monthly precipitation range

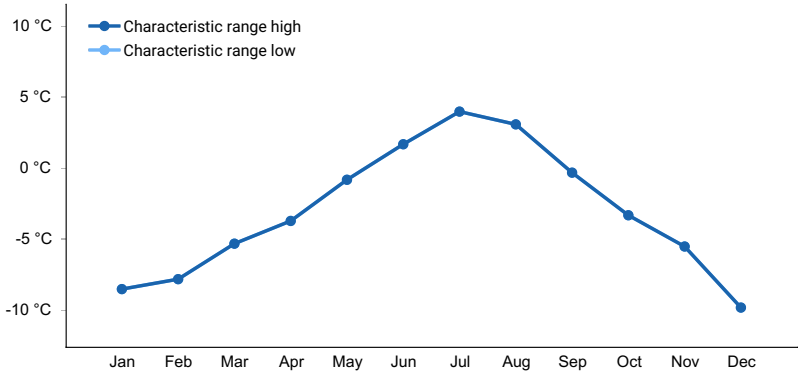


Figure 2. Monthly minimum temperature range

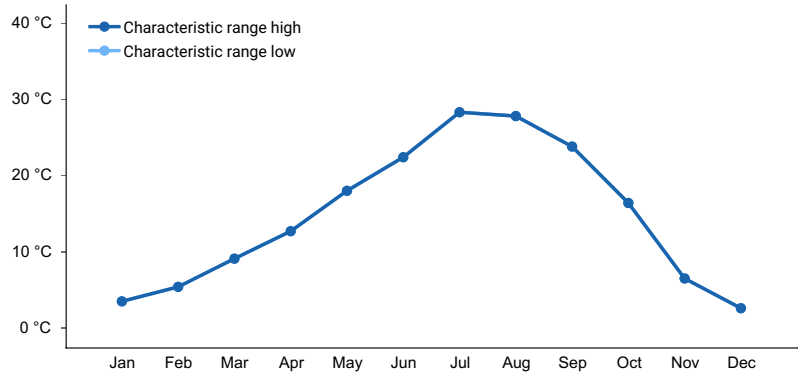


Figure 3. Monthly maximum temperature range

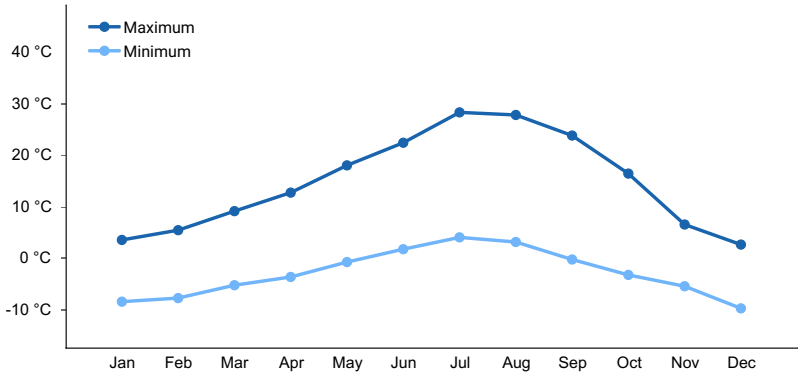


Figure 4. Monthly average minimum and maximum temperature

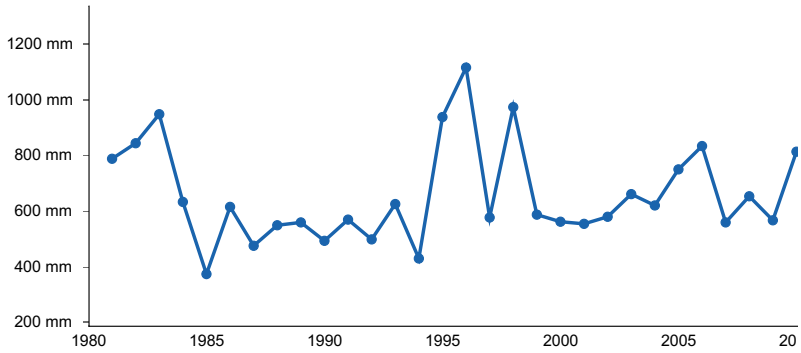


Figure 5. Annual precipitation pattern

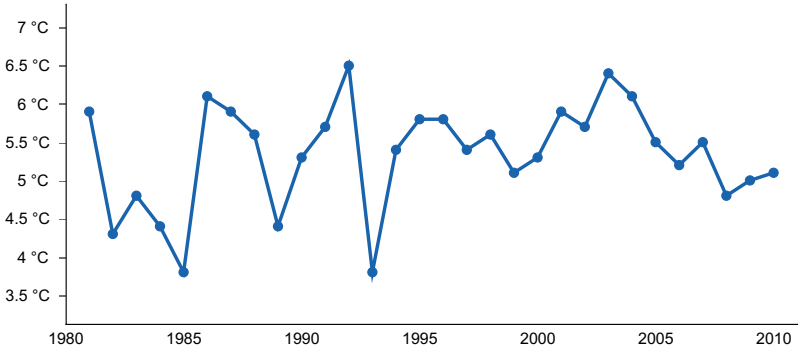


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CHEMULT [USC00351546], Chemult, OR

Influencing water features

These soils range from udic to aquic and are influenced by subsurface flow from adjacent stream courses. Stream discharge and flooding regime will be closely related to watershed snowpack both in the current year and within a few years preceding the current year. Variation in water table depth across the range of this site will greatly influence plant community composition.

Wetland description

Sub surface flow influence and snow pack drive the hydrology. The depth of water table and extent of water fluctuation potentially create areas of potential wetland classifications.

Soil features

Soils that typify this site concept are very deep and formed in alluvium derived from volcanic material. These are often somewhat poorly drained soils with rapid permeability. Redox features are common. Family particle size is typically sandy. Surface textures are typically ashy fine sandy loams.

Table 4. Representative soil features

Parent material	(1) Alluvium–volcanic rock
Surface texture	(1) Ashy fine sandy loam
Family particle size	(1) Sandy
Drainage class	Somewhat poorly drained
Permeability class	Rapid
Depth to restrictive layer	152–203 cm
Soil depth	152–203 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	9.4–16 cm
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3
Subsurface fragment volume <=3" (10.2-152.4cm)	10–35%
Subsurface fragment volume >3" (10.2-152.4cm)	0–5%

Ecological dynamics

Ecological dynamics and disturbance:

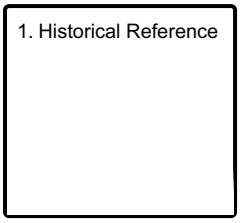
Present knowledge of these dynamics is incomplete for this site, but fire and alterations of adjacent stream channels will influence plant community composition, productivity and succession. Natural transitions from alluvial bars to floodplains will decrease mountain alder and favor the development of Engelmann spruce overtime. This occurs with the aggradation of fine-textured soil surface layers over coarse-textured materials thereby promoting the establishment of forested floodplains (Crowe et al. 2004). Fire was likely an infrequent form of disturbance on this site. Following severe fire, shrub cover may increase along with herbaceous species. Water tables may also raise following fire yet site transitions following this process are likely ephemeral (Kovalchik 1987). Timber harvest is uncommon on these sites due to proximity to stream channels and wet soils. Livestock grazing is sometimes present on this site, yet resulting alterations in vegetative composition are unclear. Care should be taken to avoid livestock grazing when soils are wet.

Emerging evidence is suggesting that climate change is leading to hotter and drier conditions in western forests that will increase fire frequency and extent and lengthen fire seasons (Halofsky et al. 2020). When combined with the

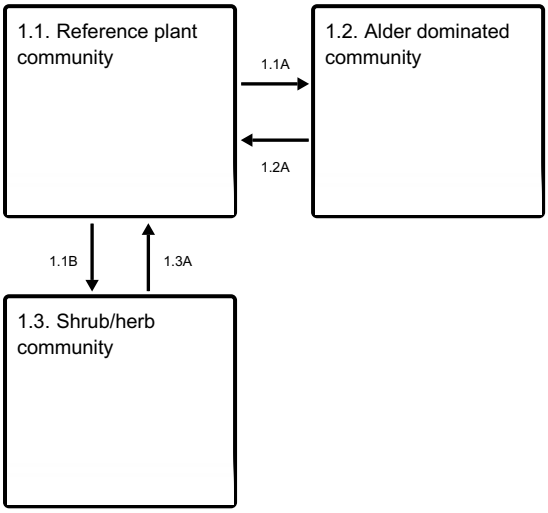
interacting impacts of fire suppression, drought, and insect outbreaks, it is possible that this ecological system will experience unpredictable ecosystem shifts and additional alternative states.

State and transition model

Ecosystem states



State 1 submodel, plant communities



1.1A - Floodplain degradation, soil loss

1.1B - Severe fire removing overstory canopy

1.2A - Extended time in the presence of sufficient sediment loads upstream and channel and vegetation structure that permits aggradation

1.3A - Time will allow Engelman spruce to recolonize the site

State 1
Historical Reference

The reference plant community for this site is defined by the overstory dominance of Engelmann spruce (Picea englemannii) in association with mountain alder (*Alnus incana*). Understory herb and shrub species will depend on water table depth and seasonality. A diverse, herbaceous understory may often include common horsetail (*Equisetum arvense*), twistedstalk (*Streptopus amplexifolius*), monkshood (Aconitum sp.), wintergreen (Pyrola sp.), sedges (Carex sp.), prince's pine (*Chimaphila umbellata*), queencup beadlilly (*Clintonia uniflora*), starry solomonplume (*Maianthemum stellatum*) and bedstraw (Galium sp.). White fir (*Abies concolor*) and grand fir (*Abies grandis*) may be subdominant in the canopy and may increase within dry microsites along with lodgepole pine (*Pinus contorta*). Mountain alder may grow as a shrub or a tree. Other shrub species may include currants (Ribes spp.), and red-osier dogwood (*Cornus sericea*). Adjacent streambanks and meadows may host additional shrubs that may include snowberry (Symphoricarpos spp.), rose (Rosa spp.), spiraea (Spiraea sp.) and gooseberry (Ribes spp.).

Dominant plant species

- Engelmann spruce (*Picea engelmannii*), tree
- gray alder (*Alnus incana*), shrub

Community 1.1
Reference plant community

Forested overstory dominated by Engelmann spruce

Community 1.2
Alder dominated community

Following degradation and erosion of fine textured soils, mountain alder may become dominant.

Community 1.3
Shrub/herb community

Following severe fire, shrub and herb species will dominate the site.

Pathway 1.1A
Community 1.1 to 1.2

Floodplain degradation, soil loss

Pathway 1.1B
Community 1.1 to 1.3

Severe fire removing overstory canopy

Pathway 1.2A
Community 1.2 to 1.1

Extended time in the presence of sufficient sediment loads upstream and channel and vegetation structure that permits aggradation

Pathway 1.3A
Community 1.3 to 1.1

Time will allow Engelman spruce to recolonize the site

Additional community tables

Inventory data references

Information presented here has been derived from NRCS data. Field observations from range trained personnel were also used. Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

References

. 2021 (Date accessed). USDA PLANTS Database. http://plants.usda.gov.

Other references

Crowe, E.A., B.L. Kovalchik, and M.J. Kerr. 2004. Riparian and Wetland Vegetation of Central and Eastern Oregon. Oregon State University, Portland, OR. 473 pp.

Halofsky, J.E., Peterson, D.L. & Harvey, B.J. Changing wildfire, changing forests: the effects of climate change on fire regimes and vegetation in the Pacific Northwest, USA. fire ecol 16, 4 (2020). https://doi.org/10.1186/s42408-019-0062-8

Hopkins, W. 1979. Plant associations of the Fremont National Forest. Portland, Or. U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Region.

Kovalchik, B.L. 1987. Riparian zone associations: Deschutes, Ochoco, Fremont, and Winema National Forests.

Contributors

Andrew Neary - 2020/2021 PES update of draft site
Craig Ziegler

Approval

Kirt Walstad, 2/14/2025

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	02/14/2025
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:**