

Ecological site F043AY589WA

Cryic, Aquic, Loamy, Flood Plains

(Engelmann spruce/ladyfern)(PIEN/COSE/ATFI)

Last updated: 10/23/2020
Accessed: 09/03/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 043A–Northern Rocky Mountains

Major Land Resource Area (MLRA): 043A–Northern Rocky Mountains Description of MLRAs can be found in: United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

LRU notes

Major land resource area (MLRA): 043A-Northern Rocky Mountains Modal LRU – 43A01 - Okanogan Plateau This LRU is composed predominantly of glaciated mountains and foothills. The soils tend to be loamy to sandy andisols, inceptisols, and mollisols with mixed or distinct ash surfaces. Recent alluvium, till, outwash and residuum from granitic or metamorphic rock are the dominant parent materials. Soil climate is a frigid or cryic temperature regime and xeric moisture regime with average annual precipitation around 450 mm (18 inches).

Classification relationships

This ES fits into the National Vegetation Standard's Rocky Mountain & Great Basin Montane Riparian Forest Group and is most closely related to Washington State's Natural Heritage Program's Rocky Mountain Subalpine-Montane Riparian Woodland.

Ecological site concept

Ecological Site Concept: This ES is found on poorly to somewhat poorly drained valley floors and drainageways. The sites are often affected by cold air drainage from the surrounding mountains. A water table is between the surface and 30 inches depth for much of the Mar-Jul period. They have cryic temperatures and a plant community dominated by subalpine fir, Engelmann spruce, ladyfern, horsetail, firethread sedge, and other forbs and shrubs. They have surface horizons developed from volcanic ash.

Figure 1.

Table 2. Dominant plant species

Tree	(1) <i>Picea engelmannii</i> (2) <i>Abies lasiocarpa</i>
Shrub	(1) <i>Cornus sericea</i> ssp. <i>sericea</i> (2) <i>Alnus viridis</i>
Herbaceous	(1) <i>Athyrium filix-femina</i> (2) <i>Senecio triangularis</i>

Physiographic features

Physiographic Features

This ecological site occurs mainly on valley floors in mountains. Parent materials are volcanic ash over mixed alluvium or till.

Landscapes: Mountains

Landforms: mountain valleys, valley floors, drainageways, depressions

Elevation:

Total range = 680 to 1555 m

(2,235 to 5,095 feet)

Central tendency = 860 to 1160 m

(2,815 to 3,800 feet)

Slope (percent):

Total range = 0 to 15 percent

Central tendency = 2 to 5 percent

Water Table Depth:

0 to 75 cm; median = 45 cm

(0 to 30 inches; median = 18 inches)

Flooding:

Frequency: none to occasional

Duration: none to brief

Ponding:

Frequency: none to rare

Duration: none to brief

Aspect: NA

Table 3. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Mountains > Valley (3) Mountains > Drainageway
Flooding duration	Not specified
Flooding frequency	Not specified
Ponding duration	Not specified
Ponding frequency	Not specified
Elevation	860 – 1,160 m
Slope	0 – 10 %
Water table depth	50 cm

Aspect	Aspect is not a significant factor
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Table 4. Representative physiographic features (actual ranges)

Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	680 – 1,550 m
Slope	0 – 20 %
Water table depth	0 – 80 cm

Climatic features

Climatic Features

During the spring and summer, a circulation of air around a high-pressure center brings a prevailing westerly and northwesterly flow of comparatively dry, cool and stable air into the region. As the air moves inland, it becomes warmer and drier which results in a dry season beginning in the late spring and reaching a peak in mid-summer. In the fall and winter, a circulation of air around two pressure centers over the ocean brings a prevailing southwesterly and westerly flow of air into the Pacific Northwest. This air from over the ocean is moist and near the temperature of the water. Condensation occurs as the air moves inland over the cooler land and rises along the windward slopes of the mountains or highlands. This results in a wet season beginning in October, reaching a peak in winter, then gradually decreasing in the spring.

The elevation within the LRU varies from approximately 1,000 feet in the lower river valleys to about 4,900 feet on low mountains and foothills. The annual precipitation increases from 9 inches in the valleys to over 38 inches in the higher terrain. Winter season snowfall averages about 43 inches. Both rainfall and snowfall increase with elevation. Snow can be expected after the first of November and to remain on the ground from the first of December until March or April.

In January, the average maximum temperature is near 29° F and the minimum temperature is 14° F. Minimum temperatures from -5° to -20°F are recorded almost every winter and temperatures ranging to -25° F have been recorded. In July, the average maximum temperature is 81° and the minimum temperature 47° F. Maximum temperatures reach 100° F on a few afternoons each summer and temperatures as high as 108° F have been recorded. The average date of the last freezing temperatures can be expected by early-June and after early-September in the warmer areas.

(Compiled from WRCC: Climate of Washington and available station data)

Frost-free period (days):

Total range = 85 to 115 days

Central tendency = 100 to 110 days

Mean annual precipitation (cm):

Total range = 440to 750 mm

(17 to 29 inches)

Central tendency = 500 to 625 mm

(20 to 25 inches)

MAAT (C)
Total range = 4.0 to 7.1
(39 to 45 F)
Central tendency = 5.2 to 6.3
(41 to 43 F)

Climate stations: none

Influencing water features

Water Table Depth:
0 to 75 cm; median = 45 cm
(0 to 30 inches; median = 18 inches)

Soil features

Representative Soil Features

This ecological site is associated with Aquandic Cryaquepts, Aquandic Dystricrypts, Aquic Dystricrypts, Cryaquolls, and Cryofluvents components. These soils have developed in volcanic ash over mixed alluvium or till.

Parent Materials:

Kind: volcanic ash

Origin:

Kind: alluvium, till

Origin: mixed

Surface Texture: (2mm fraction)

(1) Ashy-Fine sandy loam

(2) Loam

Surface Fragments

Table 5. Representative soil features

Parent material	(1) Volcanic ash (2) Alluvium (3) Till
Surface texture	(1) Ashy fine sandy loam (2) Loam
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Moderately slow to moderate
Depth to restrictive layer	150 – 0 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified

Available water capacity (0-101.6cm)	10.92 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Electrical conductivity (0-152.4cm)	Not specified
Sodium adsorption ratio (0-152.4cm)	Not specified
Soil reaction (1:1 water) (0-152.4cm)	6.7
Subsurface fragment volume ≤3" (25.4-152.4cm)	20 %
Subsurface fragment volume >3" (25.4-152.4cm)	Not specified

Table 6. Representative soil features (actual values)

Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Very slow to moderately rapid
Depth to restrictive layer	20 – 0 cm
Surface fragment cover ≤3"	0 %
Surface fragment cover >3"	0 %
Available water capacity (0-101.6cm)	8.89 – 12.7 cm

Calcium carbonate equivalent (0-152.4cm)	0 %
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Sodium adsorption ratio (0-152.4cm)	0
Soil reaction (1:1 water) (0-152.4cm)	5.6 – 7.3
Subsurface fragment volume <=3" (25.4-152.4cm)	10 – 40 %
Subsurface fragment volume >3" (25.4-152.4cm)	0 – 10 %

Ecological dynamics

State and transition model

Figure 1. STM

Figure 2. Narrative

Additional community tables

References

. (Date accessed). USNVC [United States National Vegetation Classification]. 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC.. USNVC: <http://usnvc.org/>.

Rocchio, J.F. and R.C. Crawford. 2015. Ecological systems of Washington State. A guide to identification. Washington Department of Natural Resources.. Natural Heritage Report.. Washington Department of Natural Resources, Natural Heritage Program, Olympia, WA. 1–397.

Contributors

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Approval

Curtis Talbot, 10/23/2020

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	09/03/2026
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):

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:
