

Ecological site F043AY556ID

Fragipan Foothills

30-45" PZ Frigid

Eastern Columbia Plateau Embayments

Last updated: 4/11/2025

Accessed: 09/26/2026

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. Available electronically at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook

LRU notes

Most commonly found in LRU 43A07 (Eastern Columbia Plateau Embayments). Also found in 43A09 (Western Bitterroot Foothills). Climate parameters were obtained from PRISM and other models for the area. Landscape descriptors are derived from USGS DEM products and their derivatives.

Classification relationships

Relationship to Other Established Classifications: United States National Vegetation Classification (2008), A3612 Western Hemlock – Western Redcedar Cool-Mesic Central Rocky Mountain Forest & Woodland Alliance. Washington Natural Heritage Program. Ecosystems of Washington State, A Guide to Identification, Rocchio and Crawford, 2015 - Northern Rocky Mt. Mesic Montane Mixed Conifer Forest (Cedar-Hemlock) Description of Ecoregions of the United States, USFS PN # 1391, 1995 - M333 Northern Rocky Mt. Forest-Steppe-Coniferous Forest-Alpine Meadow Province Level III and IV Ecoregions of WA, US EPA, June 2010 – 15y Selkirk Mountains, 15w Western Selkirk Maritime Forest. This ecological site includes the following USDA Forest Service Plant Associations Western Hemlock Series: TSHE/CLUN, TSHE/ASCA. (Williams et. al. 1995)

Ecological site concept

This ecological site is the most productive in terms of forest production and biodiversity. It can be highly dynamic in forest succession depending on seed source, degree of disturbance, and shrub completion. Western larch has taken over the role of early successor since the western white pine blister rust epidemic. A whole range of tree species can be found through forest succession. Eventually, without major disturbance stands of Douglas-fir, larch, grand fir and white pine are overtaken by western hemlock and western redcedar. These cedar-hemlock stands will perpetuate until a major stand replacing fire occurs. The soils have developed in thick (>7 inches) Mazama tephra deposits over loess and Tertiary age sediments. The soils are mostly very deep (moderately deep to a fragipan) and have adequate available water capacity to a depth of 40 inches. The soils are moderately well drained. They will have a perched water table present from Jan-May. All are dry from Jun-Dec.

Table 1. Dominant plant species

Tree	(1) <i>Tsuga heterophylla</i> (2) <i>Thuja plicata</i>
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Shrub	(1) <i>Lonicera utahensis</i> (2) <i>Rosa gymnocarpa</i>
Herbaceous	(1) <i>Clintonia uniflora</i> (2) <i>Asarum caudatum</i>

Physiographic features

Physiographic Features

Landscapes: Foothills, Valleys

Landform: Hillslopes, stream terraces, structural benches

Elevation (m): Total range = 705 to 1105 m

(2,310 to 3,625 feet)

Central tendency = 865 to 975m

(2,835 to 3,200 feet)

Slope (percent): Total range = 0 to 40 percent

Central tendency = 6 to 20 percent

Aspect: none dominant

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hillslope (2) Foothills > Structural bench
Flooding frequency	None
Ponding frequency	None
Elevation	860 – 980 m
Slope	10 – 20 %
Water table depth	200 cm
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	None
Ponding frequency	None
Elevation	700 – 1,110 m

Slope	0 – 40 %
Water table depth	30 – 200 cm

Climatic features

Climatic Features

Frost-free period (days): Total range = 95 to 125 days

Central tendency = 110 to 115 days

Mean annual precipitation (cm): Total range = 690 to 1120 mm

(27 to 44 inches)

Central tendency = 835 to 950 mm

(33 to 37 inches)

MAAT (C): Total range = 6.2 to 8.3

(43 to 47 F)

Central tendency = 6.8 to 7.4

(44 to 45 F)

Climate Stations: Calder, Clarkia, St Maries River

Influencing water features

Water Table Depth: perched water tables at 12-30 inches (median = 15 inches) from Jan-Apr

dry (>80 inches) from Jun-Dec

Flooding:

Frequency: None

Duration: None

Ponding:

Frequency: None

Duration: None

Soil features

Representative Soil Features

This ecological subsite is associated with two soil series (e.g. Threebear, and Kauder). The soils are Oxyaquic Udivitrands, and Andic Fragiudalfs. These soils have developed in thick (>7 inches) Mazama tephra deposits over loess and Tertiary age sediments. The soils are mostly very deep (moderately deep to a fragipan) and have adequate available water capacity to a depth of 40 inches. The soils are moderately well drained. They will have a perched water table present from Jan-May. All are dry from Jun-Dec.

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Loess (3) Alluvium
Surface texture	(1) Medium gravelly silt loam (2) Ashy silt loam

Drainage class	Moderately well drained
Permeability class	Very slow
Depth to restrictive layer	50 cm
Soil depth	200 cm
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	11.18 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Electrical conductivity (0-152.4cm)	Not specified
Soil reaction (1:1 water) (0-152.4cm)	6.3
Subsurface fragment volume <=3" (25.4-152.4cm)	Not specified
Subsurface fragment volume >3" (25.4-152.4cm)	Not specified

Table 5. Representative soil features (actual values)

Drainage class	Moderately well drained
Permeability class	Very slow to moderate
Depth to restrictive layer	50 – 100 cm
Soil depth	200 cm

Surface fragment cover >3"	0 %
Available water capacity (0-101.6cm)	11.18 – 19.3 cm
Calcium carbonate equivalent (0-152.4cm)	0 %
Electrical conductivity (0-152.4cm)	0 mmhos/cm
Soil reaction (1:1 water) (0-152.4cm)	10 – 7.3
Subsurface fragment volume <=3" (25.4-152.4cm)	0 %
Subsurface fragment volume >3" (25.4-152.4cm)	0 %

Ecological dynamics

Ecological Dynamics of the Site

This site occurs most commonly on north slopes, cool benches, and dissected drainages in Northern Idaho and NE Washington. The depth of volcanic ash in the soil along with high precipitation makes this site highly productive. It is recognized by USFS Forest Habitat Types of Northern Idaho as the Western hemlock / Queenscup beadlily and Western hemlock / Wild Ginger habitat types. The WH/beadlily habitat type is the most prolific and occurs on all aspects. The wild ginger type occurs on moister landscapes, usually on toe slopes or drainage areas. The cooler portions of this site occur at higher elevation lack western redcedar and have rusty menziesia as key shrub indicator.

This site has the highest ecological dynamics depending on type and degree of disturbance, and tree species seed source. Western hemlock and western redcedar will eventually dominate the overstory without major fire disturbance. Grand fir, Douglas-fir, western white pine, and western larch could be present in varying amounts. Understory reproduction and 2nd level overstory will be dominated by western hemlock and western redcedar due to their high degree of shade tolerance. There will be a large component of downed wood caused by windthrow, seral species die-out, and insect and disease mortality. Paper birch is a key deciduous tree species in this hemlock-cedar ecological site. It can be a prominent understory component in early to mature stands and eventually dies out in the late climax forest.

Fire frequency in these stands occurs in long intervals of 150+ years. Due to the large volume of wood, stand replacing fires were the norm leaving the site naturally reforested by western white pine. After the white pine blister rust epidemic western larch, Douglas-fir, and in drier areas ponderosa pine gets established depending on seed source and competing shrub species. Grand fir, western hemlock, and western redcedar will also reestablish on the site through time. Lodgepole pine can be present and prevalent on sites after fire.

Ceanothus, alder species, and Douglas maple can reestablish quickly on these burnt sites slowing down natural reforestation. Reoccurring severe fires causing soil degradation can keep the site in a shrub dominated condition for long periods. Western larch is not as hardy as western white pine in competing with the brush species through natural regeneration. Larch needs to immediately establish on bare soil without much competition. The loss of the dominant white pine component again has caused a higher occurrence of Douglas-fir, grand fir, western hemlock, and western redcedar in developing stands.

The understory vegetation can be very rich in areas receiving enough sunlight. Key species include Queenscup beadlily, hooker fairybells, starry Solomon seal, wintergreen, huckleberry spp., and sword fern.

State and transition model

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 4.1 plant community composition

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

sawtimber, pulp, cedar shakes and posts

Other products

Mushrooms, cedar boughs

Table 13. 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 white pine	PIMO3	60	93	118	180	100	—	—	
grand fir	ABGR	60	98	76	149	100	—	—	
western larch	LAOC	56	85	74	132	70	—	—	
Rocky Mountain Douglas-fir	PSMEG	72	85	83	116	110	—	—	
Rocky Mountain Douglas-fir	PSMEG	66	100	71	97	90	—	—	

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Approval

Kirt Walstad, 4/11/2025

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	12/18/2020
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:
