

Ecological site F043AY517WA
Warm-Frigid, Xeric, Loamy Foothills/Mountainsides, ashy surface
(Douglas-Fir/Warm Dry Shrub)
Pseudotsuga menziesii / Physocarpus malvaceus - Symphoricarpos albus

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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

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

Most commonly found in LRU 43A02 (Western Selkirk Mountains). This LRU is composed predominantly of the slopes of foothills or mountains west of the main Selkirk Range and above the surrounding Columbia and Colville River valleys. These are primarily the Kettle and Huckleberry ranges. The LRU is in the portion of the Northern Rocky Mountains that was subjected to continental glaciation. The soils tend to be loamy andisols and inceptisols with volcanic ash surfaces. Material from metamorphic rocks, till and outwash are the dominant parent materials. Soil climate is a frigid or cryic temperature regime and xeric or udic moisture regime with average annual precipitation around 660 mm (26 inches) and an average annual air temperature around 6.2 degrees C (43 degrees F). Elevation ranges from about 645 to 1735 m (2,115 to 5,690 feet). Also found in adjacent areas of 43A01 and 43A03. 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) - A3392 Douglas fir- P. Pine / Shrub Understory Central Rocky Mt. Forest & Woodland Alliance Washington Natural Heritage Program. Ecosystems of Washington State, A Guide to Identification, Rocchio and Crawford, 2015 - Northern Rocky Mt. Dry-Mesic Montane Mixed Conifer Forest (D. Fir – Pine) 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 - 15x Okanogan Highland Dry Forest. 15w Western Selkirk Maritime Forest. 15r Okanogan – Colville Xeric Valleys & Foothills. This ecological site includes the following USDA Forest Service Plant Associations: PSME/PHMA, PSME/PHMA-LIBOL and PSME/SYAL (Douglas-fir Series). (Williams et. al. 1995)

Ecological site concept

This site consists of hillslopes and mountain slopes with the following characteristics: loamy soil materials; a water table (perched or apparent) more than 75 cm (30 in) below the soil surface during the April to October period; a volcanic ash mantle more than 18cm (7 inches) thick; cumulative available water capacity to 100 cm (40 inches) of more than 7.5 cm (3 inches); PSME/PHMA or PSME/SYAL habitat type.

Table 1. Dominant plant species

Tree	(1) <i>Pseudotsuga menziesii</i> var. <i>glauca</i> (2) <i>Pinus ponderosa</i>
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Shrub	(1) <i>Physocarpus malvaceus</i> (2) <i>Symphoricarpos albus</i>
Herbaceous	(1) <i>Calamagrostis rubescens</i> (2) <i>Bromus vulgaris</i>

Physiographic features

Physiographic Features

Landscapes: Mountains, Foothills

Landform: sideslopes, foot slopes, lake terraces, outwash terraces

Elevation (m): Total range = 395 to 1680 m

(1,290 to 5,510 feet)

Central tendency = 875 to 1195 m

(2,870 to 3,920 feet)

Slope (percent): Total range = 0 to 85 percent

Central tendency = 15 to 45 percent

Aspect:

290-30-160

Table 2. Representative physiographic features

Geomorphic position, terraces	(1) Tread
Landforms	(1) Mountains > Mountain slope (2) Foothills > Hillslope (3) Mountains > Outwash terrace (4) Mountains > Lake terrace
Flooding frequency	None
Ponding frequency	None
Elevation	880 – 1,200 m
Slope	20 – 50 %
Water table depth	200 cm
Aspect	W, NW, N, NE, E, SE

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	390 – 1,680 m
Slope	0 – 90 %
Water table depth	70 – 200 cm

Climatic features

Climatic Features

Frost-free period (days): Total range = 75 to 130 days

Central tendency = 95 to 110 days

Mean annual precipitation (cm): Total range = 265 to 985 mm

(10 to 39 inches)

Central tendency = 445 to 665 mm

(17 to 26 inches)

MAAT (C): Total range = 3.3 to 9.8

(38 to 50 F)

Central tendency = 5.7 to 7.3

(42 to 45 F)

Climate Stations: Boundary Dam, Chewelah

Table 4 Representative climatic features

Frost-free period (characteristic range)	100-110 days
Freeze-free period (characteristic range)	130-150 days
Precipitation total (characteristic range)	430-660 mm
Frost-free period (actual range)	80-130 days
Freeze-free period (actual range)	130-150 days
Precipitation total (actual range)	250-990 mm
Frost-free period (average)	100 days
Freeze-free period (average)	140 days

Precipitation total (average)	610 mm
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- (1) BOUNDARY DAM [USC00450844], Metaline Falls, WA
- (2) CHEWELAH [USC00451395], Chewelah, WA

Influencing water features

Water Table Depth (cm):
66 cm to >200 cm (median = >200cm)
(26 to >80 inches; median = >80 inches)

Flooding:
Frequency: None
Duration: None

Ponding:
Frequency: None
Duration: None

Soil features

Representative Soil Features

This ecological subsite is associated with several soil series (e.g. Inkler, Nevine, Oxerine, Scrabblers and Eloika). The soil components can be grouped into: Typic Vitrixerands, and Andic Haploxerepts. These soils have developed in Mazama tephra deposits over till, glaciolacustrine material, outwash and residuum and colluvium from granitic and metasedimentary rock. The tephra layers are important for forest productivity in that they retain large amounts of water compared to other parent materials, have high cation exchange capacity and high availability of organically bound plant nutrients. The soils range from moderately deep to very deep and have adequate available water capacity to a depth of 1 m. The soils are mostly well-drained.

Parent Materials:

Kind: Tephra (volcanic ash)

Origin: mixed

Kind: till, residuum and colluvium, outwash and glaciolacustrine material

Origin: Granite, Metasedimentary rock

Surface Texture:

(1) Ashy Fine sandy loam

(2) Ashy Silt loam

(3) Ashy Loam

Fragment content of surface: 0 to 16 percent (median = 0%)

Subsurface Texture Group: Loamy

Fragment content of subsurface (25 to 100cm): 0 to 60 percent (median = 38%)

Most components lack surface fragments

Drainage Class: Well drained (2% Moderately Well drained components)

Saturated Hydraulic conductivity: Moderately high to High

Soil Depth: 96% of components have no restriction within 150 cm

Lithic contacts when present are at 60 to 145cm (median = 75cm)

Paralithic contacts when present are at 65 to 115cm (median = 65 cm)

Densic contacts when present are at 50 to 180cm (median = 95 cm)

Calcium Carbonate Equivalent (percent): 0

Soil Reaction (1:1 Water): 6.1 to 7.3

Available Water Capacity (total in 100cm): 8.15-19.88cm (median = 11.98cm)

Table 5. Representative soil features

Parent material	(1) Volcanic ash (2) Till (3) Glaciolacustrine deposits (4) Colluvium – granite and gneiss (5) Residuum – granite and gneiss
Surface texture	(1) Ashy fine sandy loam (2) Ashy silt loam (3) Ashy loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	200 cm
Soil depth	200 cm
Available water capacity (0-101.6cm)	11.94 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Soil reaction (1:1 water) (0-152.4cm)	Not specified
Subsurface fragment volume <=3" (25.4-101.6cm)	40 %

Table 6. Representative soil features (actual values)

Drainage class	Moderately well drained to well drained
Permeability class	Moderate to rapid

Depth to restrictive layer	50 – 200 cm
Soil depth	60 – 200 cm
Available water capacity (0-101.6cm)	8.13 – 19.81 cm
Calcium carbonate equivalent (0-152.4cm)	0 %
Soil reaction (1:1 water) (0-152.4cm)	6.1 – 7.3
Subsurface fragment volume <=3" (25.4-101.6cm)	0 – 60 %

Ecological dynamics

A description of vegetation dynamics and a state and transition model can be found in Ecological Site Group EX043AESG05

State and transition model

Additional community tables

Table 7. 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
ponderosa pine	<i>PIPO</i>	90	114	85	130	40	–	–	
Rocky Mountain Douglas-fir	<i>PSMEG</i>	61	76	58	93	120	–	–	
Rocky Mountain Douglas-fir	<i>PSMEG</i>	70	85	61	92	100	–	–	
western larch	<i>LAOC</i>	65	75	64	83	50	–	–	

Approval

Curtis Talbot, 10/14/2020

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)	
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Contact for lead author	
Date	04/21/2026
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:
