

**Ecological site F043AY521WA**  
**Warm-Frigid, Moist- Xeric Loamy Foothills/Mountainsides, ashy surface**  
**(Grand Fir Warm Dry Shrub)**  
***Abies grandis* - *Pseudotsuga menziesii* / *Physocarpus malvaceus* -**  
***Symphoricarpos albus***

Last updated: 5/15/2025

Accessed: 04/21/2026

**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](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_053624#handbook)

**LRU notes**

Most commonly found in LRU 43A04 (Selkirk Mountains). Also found in adjacent areas of 43A02, 43A03 and 44A02.

**Classification relationships**

Relationship to Other Established Classifications: United States National Vegetation Classification (2008) – A3362 *Abies grandis* – *Pseudotsuga menziesii* Central Rocky Mountain Forest & Woodland Alliance Washington Natural Heritage Program. Ecosystems of Washington State, A Guide to Identification, Rocchio and Crawford, 2015 – Northern Rocky Mountain Mesic Montane Mixed Conifer Forest 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, 15y Selkirk Mountains, 15v Northern Idaho Hills and Low Relief Mountains. This ecological site includes the following USDA Forest Service Plant Association: ABRG/PHMA, (Williams et. al. 1995)

**Ecological site concept**

This ES group is distinguished by an overstory of grand fir and Douglas-fir and an understory shrub component of ninebark, oceanspray, snowberry and /or twinflower. It occurs on loamy foothills, mountainsides, and terraces that have > 7 inches of volcanic ash on the surface. This ES group fits into the National Vegetation Standard's Grand Fir - Douglas-fir Central Rocky Mountain Forest & Woodland Alliance and Washington State's Natural Heritage Program's Northern Rocky Mt. Mesic Montane Mixed Conifer Forest.

**Table 1. Dominant plant species**

Tree	(1) <i>Abies grandis</i> (2) <i>Pseudotsuga menziesii</i> var. <i>glauca</i>
Shrub	(1) <i>Physocarpus malvaceus</i> (2) <i>Symphoricarpos albus</i>

Herbaceous	(1) <i>Calamagrostis rubescens</i> (2) <i>Hieracium albiflorum</i>
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### Physiographic features

This ecological site occurs mainly on forested backslopes of mountains and hills, and summits and treads of outwash terraces. Parent materials are till derived from mixed origins, outwash, and residuum and colluvium derived from igneous (granitic) and metamorphic rock thinly mantled by volcanic ash and loess.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Foothills > Hillslope (3) Valley > Outwash terrace
Flooding frequency	None
Ponding frequency	None
Elevation	740 – 1,130 m
Slope	10 – 30 %
Aspect	N, NE, E, SE

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	None
Ponding frequency	None
Elevation	390 – 1,700 m
Slope	0 – 70 %

### Climatic features

Climatic Features

Frost-free period (days): Total range = 85 to 135 days

Central tendency = 105 to 115 days

Mean annual precipitation (cm): Total range = 320 to 1165 mm

(13 to 46 inches)

Central tendency = 595 to 825 mm

(23 to 32 inches)

MAAT (C): Total range = 3.2 to 9.5  
 (38 to 49 F)  
 Central tendency = 5.8 to 7.5  
 (42 to 46 F)

Climate Stations: CHEWELAH 4 SW, LOCKE, METALINE FALLS, QUARTZ LOOKOUT, SPIRIT, Cliff Ridge, Flowery Trail, Tacoma Creek

### Climate stations used

- (1) CHEWELAH [USC00451395], Chewelah, WA

### Influencing water features

### Soil features

#### Representative Soil Features

This ecological subsite is associated with several soil series (e.g. Dufort, Manley, Kiehl, Scar, Aits, Wilmont, Ohscow, Hartill, Canteen, Renha, Elbowlake, Henneway, Anglen, Brusher, Rathdrum, Typic Vitrixerands, Courville, Kellerbutte). The soil components can be grouped into: Typic Vitrixerands, Andic Haploxerepts, Andic Haploxeralfs, Alfic Vitrixerands, and Typic Udivitrands. These soils have developed in Mazama tephra deposits over till, outwash and residuum and colluvium from granitic and metamorphic 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, and outwash material

Origin: Granite, Metamorphic rock

Surface Texture: (2mm fraction)

(1) Ashy Silt loam

Fragment content of surface: 1 to 30 percent (median = 5%)

Subsurface Texture Group: Loamy

Fragment content of subsurface (25 to 100cm): 1 to 75 percent (median = 30%)

Most components lack surface fragments

Drainage Class: Well drained (3% Moderately Well drained components)

Saturated Hydraulic conductivity: Moderately high to High

Soil Depth: 78% of components have no restriction within 150 cm

Lithic contacts when present are at 70 to 150cm (median = 99cm)

Paralithic contacts when present are at 65 to 115cm (median = 85 cm)

Densic contacts when present are at 50 to 70cm (median = 69 cm)

Calcium Carbonate Equivalent (percent): 0

Soil Reaction (1:1 Water): 5.0 to 7.2

Available Water Capacity (total in 100cm): 8.12-19.71cm (median = 11.5 cm)

Table 4. Representative soil features

Parent material	<ul style="list-style-type: none"> <li>(1) Volcanic ash</li> <li>(2) Till</li> <li>(3) Outwash</li> <li>(4) Residuum – granite and gneiss</li> <li>(5) Colluvium – granite and gneiss</li> </ul>
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Surface texture	(1) Ashy silt loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	Not specified
Available water capacity (0-101.6cm)	11.43 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	Not specified
Subsurface fragment volume $\leq 3$ " (25.4-101.6cm)	30 %

Table 5. Representative soil features (actual values)

Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	50 – 0 cm
Available water capacity (0-101.6cm)	8.13 – 19.81 cm
Calcium carbonate equivalent (0-101.6cm)	0 %
Soil reaction (1:1 water) (0-101.6cm)	10 – 7.2

Subsurface fragment volume <=3" (25.4-101.6cm)	0 – 80 %
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### Ecological dynamics

A description of vegetation dynamics and a state and transition model can be found in Ecological Site Group EX043AESG06

### State and transition model

### Additional community tables

### Approval

Grant Petersen, 5/15/2025

### 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:**

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**2. Presence of water flow patterns:**

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3. Number and height of erosional pedestals or terracettes:

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4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):

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5. Number of gullies and erosion associated with gullies:

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6. Extent of wind scoured, blowouts and/or depositional areas:

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7. Amount of litter movement (describe size and distance expected to travel):

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8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

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9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

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11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

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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:

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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

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14. Average percent litter cover (%) and depth ( in):

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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

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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:

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17. Perennial plant reproductive capability:

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