

**Ecological site F043AY532WA**  
**Cool-Frigid, Moist-Xeric, Loamy Terraces, ashy surface**  
**(Douglas-fir-Grand Fir Cool Shrub)**  
**Douglas-fir-grand fir/low huckleberry-big huckleberry-dwarf huckleberry**

Last updated: 10/14/2020

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 43A01 (Okanogan Plateau) and 43A02. 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) – 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 – 15r Okanogan-Colville Xeric Valleys and Foothills, 15w Western Selkirk Maritime Forest, 15x Okanogan Highland Dry Forest, 15y Selkirk Mountains. This ecological site includes the following USDA Forest Service Plant Association: PSME/VACA, and ABGR/VACA (Williams et. al. 1995)

**Ecological site concept**

The Ecological site occurs on loamy mountainsides with >7 inches of volcanic ash on the surface. A water table is at >30 inches depth and available water capacity is moderate to high. Plant communities are dominated by Douglas-fir and/or grand fir with an understory composed chiefly of huckleberry (*Vaccinium*) species. They occur at the elevations that mark the colder end of the frigid temperature regime or in lower positions effected by cold air drainage.

Table 1. Dominant plant species

Tree	(1) <i>Pseudotsuga menziesii</i> var. <i>glauca</i> (2) <i>Abies grandis</i>
Shrub	(1) <i>Vaccinium cespitosum</i> (2) <i>Vaccinium membranaceum</i>
Herbaceous	(1) <i>Calamagrostis rubescens</i>

## Physiographic features

### Physiographic Features

These data describe the Mountain Phase of the Ecological Site see ESD F043AY532WA for a description of the terrace phase:

Landscapes: Mountains

Landform: mountain slopes, outwash terraces, till plains

Elevation (m): Total range = 775 to 1770 m

(2,540 to 5,800 feet)

Central tendency = 1150 to 1415 m

(3,770 to 4,640 feet)

Slope (percent): Total range = 0 to 55 percent

Central tendency = 12 to 30 percent

Water Table Depth (cm): (where present water tables are perched)

70 to >200 cm

(28 to >80 inches)

Flooding:

Frequency: None

Duration: None

Ponding:

Frequency: None

Duration: None

Aspect: (central tendency)

335-15-160

**Table 2. Representative physiographic features**

Landforms	(1) Mountains > Mountain slope (2) Mountains > Outwash terrace (3) Mountains > Till plain
Flooding frequency	None
Ponding frequency	None
Elevation	1,150 – 1,410 m
Slope	10 – 30 %
Water table depth	0 cm
Aspect	NW, N, NE, E, SE

**Table 3. Representative physiographic features (actual ranges)**

Flooding frequency	None
Ponding frequency	None
Elevation	770 – 1,770 m
Slope	0 – 60 %
Water table depth	70 – 200 cm

### Climatic features

#### Climatic Features

Frost-free period (days): Total range = 80 to 115 days  
 Central tendency = 95 to 105 days

Mean annual precipitation (cm): Total range = 375 to 775 mm  
 (15 to 30 inches)  
 Central tendency = 525 to 630 mm  
 (21 to 25 inches)

MAAT (C): Total range = 2.8 to 7.8  
 (37 to 46 F)  
 Central tendency = 4.7 to 6.0  
 (40 to 43 F)

Climate Stations: AENEAS LOOKOUT, IRENE MTN WAUCONDA, KETTLE FALLS, QUARTZ LOOKOUT, Lost Lake

### Influencing water features

Water Table Depth (cm): (where present water tables are perched)  
 70 to >200 cm  
 (28 to >80 inches)

### Soil features

#### Representative Soil Features

This ecological subsite is associated with several soil components (e.g. Goddard, Louploup, Manley, Martella, Nevine, Newhorn, Parmenter, Rathdrum, Scar, and Stepstone). The soil components can be grouped into: Andic Haploxerepts, Andic Haploxeralfs, Typic Udivitrands, Xeric Vitricryands and Typic Vitrixerands. These soils have developed in Mazama tephra deposits over till, outwash and glaciolacustrine material from mixed sources. 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: Mixed

Surface Texture: (2mm fraction)  
 (1) Ashy Fine Sandy Loam

(2) Ashy Silt Loam

Fragment content of surface: 1 to 6 percent (median = 2%)

Subsurface Texture Group: Loamy

Fragment content of subsurface (25 to 100cm): 1 to 60 percent (median = 10%)

Most components lack surface fragments

Drainage Class: Well drained or Moderately well drained (15%)

Saturated Hydraulic conductivity: Moderately high to Very High

Soil Depth: 59% of components have no restriction within 150 cm

Densic contacts when present are at 50 to 130cm (median = 96cm)

Calcium Carbonate Equivalent (percent): 0 to 24 percent (median = 0)

Soil Reaction (1:1 Water): 5.1 to 8.0 (median = 6.7)

Available Water Capacity (total in 100cm): 9.15-20.65cm (median = 17.70 cm)

**Table 4. Representative soil features**

Parent material	(1) Volcanic ash (2) Till (3) Outwash (4) Residuum – granite and gneiss (5) Colluvium – granite and gneiss
Surface texture	(1) Ashy sandy loam (2) Ashy silt loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	Not specified
Available water capacity (0-101.6cm)	17.78 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Soil reaction (1:1 water) (0-152.4cm)	6.7
Subsurface fragment volume <=3" (25.4-101.6cm)	10 %

**Table 5. Representative soil features (actual values)**

Drainage class	Moderately well drained to well drained
Permeability class	Moderate to rapid
Depth to restrictive layer	50 – 0 cm
Available water capacity (0-101.6cm)	9.14 – 20.57 cm
Calcium carbonate equivalent (0-152.4cm)	0 %
Soil reaction (1:1 water) (0-152.4cm)	5.1 – 10
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 EX043AESG10

**State and transition model**

**Figure 1. Ecological Site Cold-Frigid, Moist- Xeric Loamy Mountainsides and Terraces (Grand fir – Douglas-fir / Cool Shrub)**

**Additional community tables**

**Wood products**

Forest Site Productivity Douglas-fir / Dwarf Huckleberry Species Average Site Index Culmination Mean Annual Increment (CMAI) SI Reference Ponderosa Pine 81 63 600 (Meyer, 100 yr TA) Douglas-fir 67 70 765 (Cochran, 50 yr BH) Western Larch 54 56 261 (Cochran, 50 yr BH) Lodgepole Pine 69 70 520 (Alexander, 100 yr TA) Grand fir / Dwarf Huckleberry and Grand fir / Huckelberry Grand fir 80 57 031 (Cochran, 50 yr BH) Western Larch 73 86 261 (Cochran, 50 yr BH) Ponderosa pine 112 100 600 (Meyer, 100 yr TA) Douglas-fir 78 76 765 (Cochran, 50 yr BH) Douglas-fir 70 79 771 (Monserud, 50 yr BH)

**References**

Zack, A. 1997. Biophysical Classification- Habitat Groups and Description of Northern Idaho and Northwestern Montana, Lower Clarkfork and Adjacent Areas..

Smith and Fischer. 1997. Fire Ecology of the Forest Habitat Types of Northern Idaho.

. 1998. NRCS National Forestry Manual.

. 2017. NRCS Soil and Site Index data for NE WA and N. Idaho.

Williams, C.K., B.F. Kelley, B.G. Smith, and T.R. Lillybridge. October, 1995. Forested Plant Associations of the Colville National Forest.

Williams, C.K. and T.R. Lillybridge. 1983. Forested Plant Associations of the Okanogan National Forest  
R6-Ecol-132b-1983.

## 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)	
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:**

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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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