

Ecological site F043AY586WA

Frigid, Xeric, Sandy, Outwash Terraces (Douglas-fir-Grand Fir Cool Shrub)

Last updated: 10/14/2020

Accessed: 05/11/2025

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.

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

LRU notes

Modal LRU – 43A01 Okanogan Plateau

This LRU is composed predominantly of mid to low elevation mountain slopes, foothills, structural benches and valley walls. The soils tend to be loamy andisols, or inceptisols and mollisols with distinct ash surfaces. Till, outwash and residuum/colluvium 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 535 mm (21 inches).

Others where occurring – 43A02 – Western Selkirk Highlands

43A03 – Columbia-Colville Valleys

44A02 - Pend Oreille-Kootenai Valleys

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

Most commonly found in LRU 43A01 (Okanogan Plateau). This ecological subsite is associated with several soil

components (e.g. Granflat and Wapal). The soil components are Vitrandic Haploxerolls and Vitrandic Haploxerepts. These soils have developed in mixed Mazama tephra deposits over coarse textured glacial outwash. The soils are very deep and have limited available water capacity to a depth of 1 m. The soils are mostly somewhat excessively drained. Douglas-fir is the main tree component with western larch, lodgepole pine, and ponderosa pine (PIPO) (sporadic depending on frost). Grand fir will be minor component in the understory. Englemann spruce (PIEN) may be present on moist sites. Dwarf huckleberry is the key understory component along with bearberry, shiny-leaf spirea, serviceberry, twinflower, snowberry, pachistima, Utah honeysuckle, Oregon Grape, pinegrass, heartleaf arnica, feather solomonplume, and w. prince's pine. In the moister grand fir portions of this site bunchberry dogwood, queencup beadlily, baldhip rose, russet buffaloberry, and western fescue can be present.

Table 1. Dominant plant species

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

Physiographic features

Landscapes: Mountains, Valleys

Landform: outwash terraces, moraines

Elevation (m): Total range = 450 to 1460 m

(1,475 to 4,790 feet)

Central tendency = 815 to 1090 m

(2,675 to 3,575 feet)

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

Central tendency = 6 to 25 percent

Water Table Depth (cm):

>200 cm

(>80 inches)

Flooding:

Frequency: None

Duration: None

Ponding:

Frequency: None

Duration: None

Aspect: (central tendency)

115-170-240

Table 2. Representative physiographic features

Landforms	(1) Mountains > Moraine (2) Valley > Outwash terrace
Elevation	2,675–3,575 ft
Slope	6–25%
Water table depth	0 in
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Elevation	1,475–4,790 ft
Slope	0–55%
Water table depth	0 in

Climatic features

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

Central tendency = 105 to 115 days

Mean annual precipitation (cm): Total range = 370 to 675 mm

(15 to 27 inches)

Central tendency = 425 to 550 mm

(17 to 22 inches)

MAAT (C): Total range = 4.8 to 8.1

(41 to 47 F)

Central tendency = 6.1 to 7.0

(43 to 45 F)

Climate Stations: none

Influencing water features

Water Table Depth (cm):

>200 cm

(>80 inches)

Flooding:

Frequency: None

Duration: None

Ponding:

Frequency: None

Duration: None

Soil features

This ecological subsite is associated with several soil components (e.g. Granflat and Wapal). The soil components are Vitrandic Haploxerolls and Vitrandic Haploxerepts. These soils have developed in mixed Mazama tephra deposits over coarse textured glacial outwash. The soils are very deep and have limited available water capacity to a depth of 1 m. The soils are mostly somewhat excessively drained.

Parent Materials:

Kind: Tephra (volcanic ash)

Origin: mixed

Kind: outwash material

Origin: mixed

Surface Texture: (<2mm fraction)

(1) Ashy Sandy loam

(2) Ashy Coarse Sandy Loam

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Outwash
Surface texture	(1) Ashy sandy loam (2) Ashy coarse sandy loam
Drainage class	Somewhat excessively drained
Permeability class	Rapid
Depth to restrictive layer	0 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0 mmhos/cm
Sodium adsorption ratio (0-60in)	0
Soil reaction (1:1 water) (0-60in)	6.7
Subsurface fragment volume <=3" (10-60in)	68%
Subsurface fragment volume >3" (10-60in)	0%

Table 5. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Moderately rapid to rapid
Depth to restrictive layer	0 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	1.9–2.9 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0 mmhos/cm
Sodium adsorption ratio (0-60in)	0
Soil reaction (1:1 water) (0-60in)	6.1–7.3
Subsurface fragment volume <=3" (10-60in)	30–75%
Subsurface fragment volume >3" (10-60in)	0%

Ecological dynamics

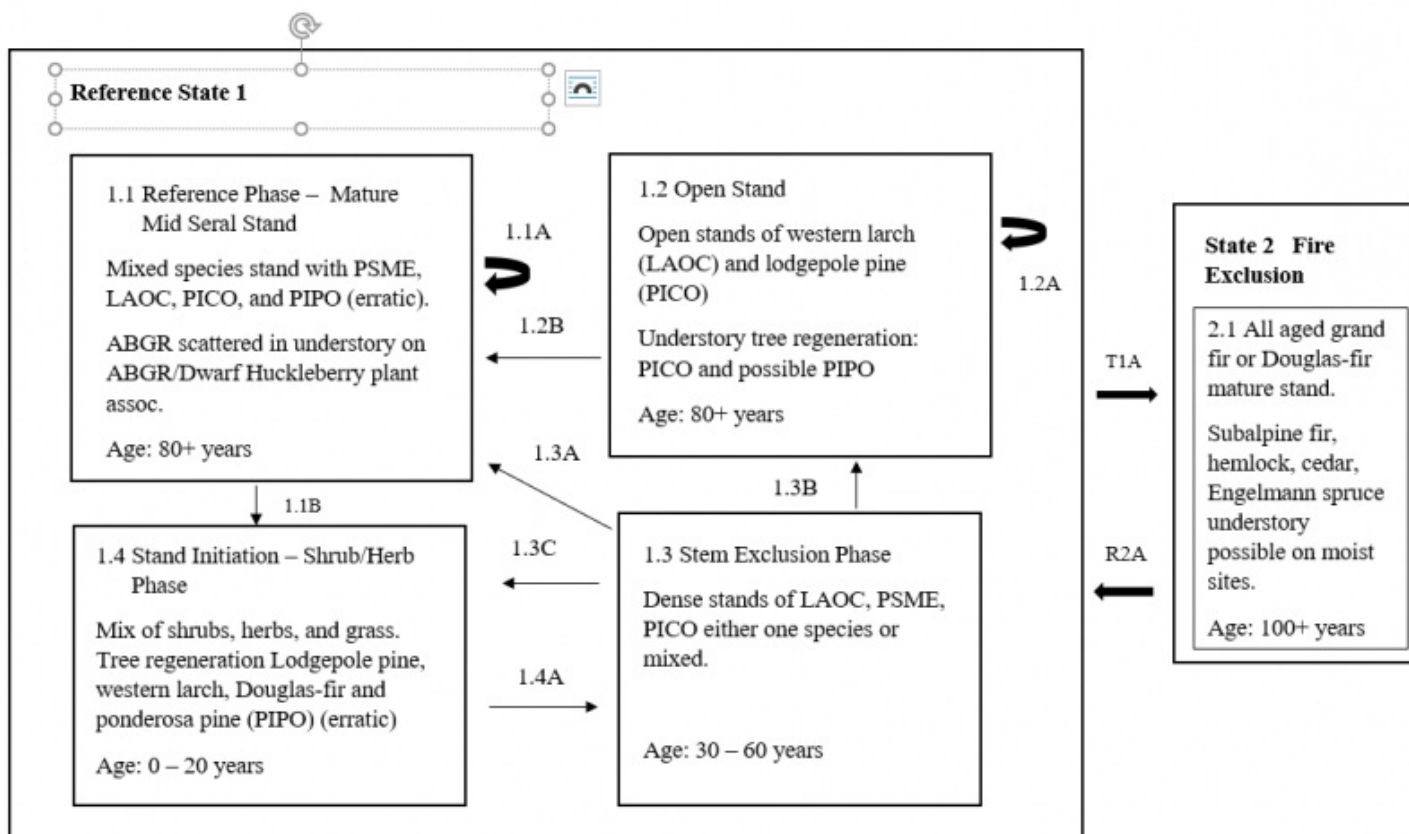
State and transition model

State and Transition Diagram

Ecological Site Frigid Xeric Loamy Mountainsides and Terraces

(Grand fir – Douglas-fir / Cool Shrub)

Abies grandis (ABGR)/Vaccinium caespitosum (Grand fir/Dwarf Huckleberry), Pseudotsuga menziesii (PSME)/Vaccinium caespitosum (Douglas-fir/Dwarf Huckleberry)



Plant Community and State Transition Pathways

1.1A – Frequent mixed severity fires maintain reference plant community in mixed species condition.

1.1B – Stand replacing fire revert to shrub/herb plant community. Tree regeneration mixed

1.2A – Severe fires maintain open stand condition with dense stands of regenerating lodgepole pine and possibly ponderosa pine.

1.2B – Time, lack of frequent fire causes PC 1.2 to transition to PC 1.1

1.3A—Mixed Severity fires or lack of sever fires promotes a diverse structure and mixed species.

1.3B – Severe fire opens up stand creating condition for lodgepole pine regeneration

1.3C – Stand replacing fire back to shrub/herb stage

1.4A – Time, tree regeneration grow into dense pole stands

T1A – Fire exclusion for long time period causing grand fir to dominate overstory

R2A – Overstory removal with prescribed fire to prepare site for seral species regeneration

References

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

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

. 1998. NRCS National Forestry Manual.

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

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	05/11/2025
Approved by	Curtis Talbot
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:**
