USDA Natural Resources Conservation Service

Ecological site F043AY522WA
Warm-Frigid, Moist- Xeric Loamy Foothills/Mountainsides, mixed ash surface (Grand Fir Warm Dry Shrub) Abies grandis - Pseudotsuga menziesii / Physocarpus malvaceus - Symphoricarpos albus

Last updated: 10/14/2020
Accessed: 05/20/2024

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

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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 43A04 (Selkirk Mountains). Also found in adjacent areas of 43A02, 43A03, 44A01 and 44A02. 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 – 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 less than 7 inches of volcanic ash deposition. 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) *Abies grandis* (2) *Pseudotsuga menziesii var. glauca*
Shrub	(1) *Physocarpus malvaceus* (2) *Symphoricarpos albus*
Herbaceous	(1) *Calamagrostis rubescens* (2) *Hieracium albiflorum*

Physiographic features

Physiographic Features
Landscapes: Mountains, Foothills, Valleys
Landform: sideslopes, foot slopes, outwash terraces, escarpments

Elevation (m): Total range = 435 to 1340 m
(1,425 to 4,400 feet)
Central tendency = 725 to 1090 m
(2,380 to 3,575 feet)

Slope (percent): Total range = 0 to 45 percent
Central tendency = 6 to 28 percent

Water Table Depth (cm):
90 cm to >200 cm (median = >200cm)
(35 to >80 inches; median = >80 inches)

Flooding:
Frequency: None
Duration: None

Ponding:
Frequency: None
Duration: None

Aspect: (central tendency)
105-197-255

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Foothills > Hillslope (3) Valley > Outwash terrace
Flooding frequency	None
Ponding frequency	None
Elevation	725–1,090 m
Slope	6–28%
Water table depth	203 cm
Aspect	W, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	None
Ponding frequency	None
Elevation	434–1,341 m
Slope	0–45%
Water table depth	89–203 cm

Climatic features

Climatic Features

During the spring and summer, a circulation of air around a high-pressure center brings a prevailing westerly and northwesterly flow of comparatively dry, cool and stable air into the region. As the air moves inland, it becomes warmer and drier which results in a dry season beginning in the late spring and reaching a peak in mid-summer. In the fall and winter, a circulation of air around two pressure centers over the ocean brings a prevailing southwesterly and westerly flow of air into the Pacific Northwest. This air from over the ocean is moist and near the temperature of the water. Condensation occurs as the air moves inland over the cooler land and rises along the windward slopes of the mountains or highlands. This results in a wet season beginning in October, reaching a peak in winter, then gradually decreasing in the spring.

The elevation within the LRU varies from approximately 1,500 feet in the lower river valleys to over 7,000 feet in the higher terrain. The annual precipitation increases from 20 inches in the valleys to over 52 inches over the higher mountains. Winter season snowfall varies from 30 to 50 inches. Both rainfall and snowfall increase in the higher elevations. Snow can be expected after the first of November and to remain on the ground from the first of December until March or April.

In January, the average maximum temperature is near 31° F and the minimum temperature is 18° F. Minimum temperatures from -10° to -20°F are recorded almost every winter and temperatures ranging to -30° F have been recorded. In July, the average maximum temperature is 85° to 90° and the minimum temperature 45° to 50° F. Maximum temperatures reach 100° F on a few afternoons each summer and temperatures between 105° to 110° F have been recorded. Temperatures in the mountains decrease three to five degrees Fahrenheit with each 1,000 feet increase in elevation. The average date of the last freezing temperatures can be expected by mid-May and before mid-October in the warmer areas.
(Compiled from WRCC: Climate of Washington and available station data)

Climatic Features
Frost-free period (days): Total range = 90 to 130 days
Central tendency = 105 to 120 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 = 3.3 to 9.3
(38 to 49 F)
Central tendency = 6.0 to 7.8
(43 to 46 F)

Climate Stations: none

Table 4. Representative climatic features

Frost-free period (average)	110 days

Freeze-free period (average)	
Precipitation total (average)	737 mm

Influencing water features

Soil features

Representative Soil Features

This ecological subsite is associated with several soil series (e.g. Merkel, Tamarack, Wilma, Chewelah, Clayton, Orwig, Quinnamose, Kruse). The soil components can be grouped into: Vitrandic Dystroxerepts, Lamellic Haploxeralfs, and Vitrandic Haploxerepts. These soils have developed in thin or mixed Mazama tephra deposits over till, glaciolacustrine, outwash and residuum and colluvium from granitic and metamorphic rock.. 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-Sandy Loam
(2) Ashy-Silt loam
(3) Ashy-Fine Sandy Loam

Fragment content of surface: 0 to 20 percent (median = 6%)

Subsurface Texture Group: Loamy
Fragment content of subsurface (25 to 100cm): 0 to 58 percent (median = 14%)
Most components lack surface fragments
Drainage Class: Well drained (6% Somewhat Poorly drained components)
Saturated Hydraulic conductivity: Moderately high to High (above restrictions)
Soil Depth: 79% of components have no restriction within 150 cm
Lithic contacts when present are at 48 to 110cm (median = 48cm)
Densic contacts when present are at 65 to 100cm (median = 99 cm)
Calcium Carbonate Equivalent (percent): 0 to 15 (median = 0)
Soil Reaction (1:1 Water): 5.6 to 8.0
Available Water Capacity (total in 100cm): 6.16-19.47cm (median = 11.75 cm)

Table 5. Representative soil features

Parent material	(1) Volcanic ash (2) Till (3) Outwash (4) Residuum–granite (5) Residuum–metamorphic rock
Surface texture	(1) Ashy sandy loam (2) Ashy silt loam (3) Ashy fine sandy loam
Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	203 cm

Soil depth	203 cm
Available water capacity (0-101.6cm)	11.68 cm
Calcium carbonate equivalent (63.5-254cm)	0%
Soil reaction (1:1 water) (63.5-254cm)	Not specified
Subsurface fragment volume <=3" (63.5-254cm)	14%

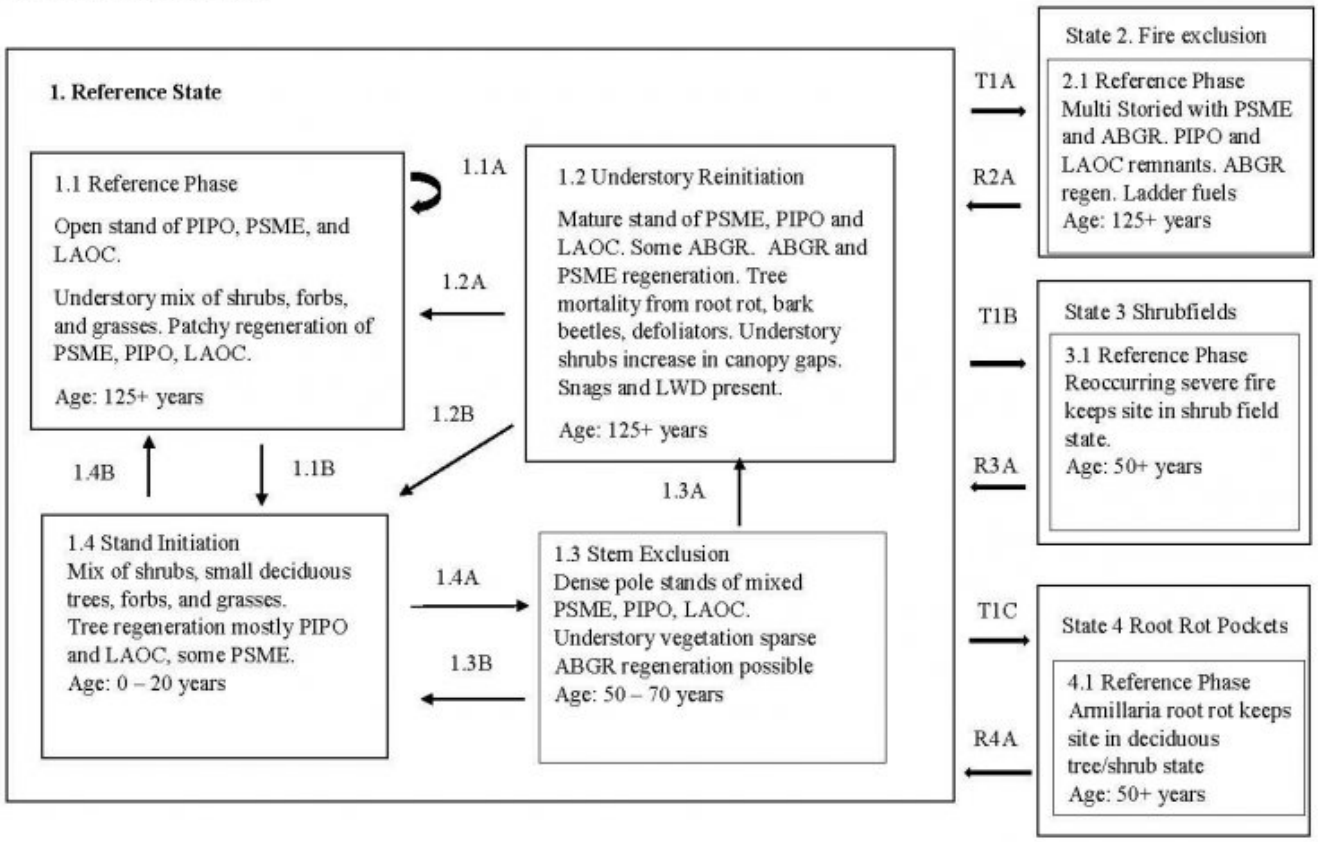
Table 6. Representative soil features (actual values)

Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	51–203 cm
Soil depth	51–203 cm
Available water capacity (0-101.6cm)	6.1–19.56 cm
Calcium carbonate equivalent (63.5-254cm)	0–15%
Soil reaction (1:1 water) (63.5-254cm)	5.6–8
Subsurface fragment volume <=3" (63.5-254cm)	0–58%

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



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	05/20/2024
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:**