USDA Natural Resources
Conservation Service

Ecological site F043AY580ID
Warm-Cryic, Moist-Udic, Loamy, Avalanche Chutes and Drainages (Sitka alder-Miner's Lettuce)

Last updated: 10/14/2020
Accessed: 05/19/2024

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

Modal LRU – 43A10 - Clearwater Mountains

This LRU is composed predominantly of mid and high elevation valley walls, mountain slopes and ridges. The soils tend to be loamy andisols and inceptisols with ashy surfaces. Residuum and colluvium from metamorphics, and granitics are the dominant parent materials. Soil climate is a cryic or frigid temperature regime and udic moisture regime with average annual precipitation around 1300 mm (51 inches).

Others where occurring – 43A11 Bitterroot Metasedimentary Zone

Classification relationships

Relationship to Other Established Classifications:

United States National Vegetation Classification (2008) – A3371 Western Alder Wet Shrubland Alliance, CEGL001158 Alder Avalanche Chute Wet Shrubland.

Washington Natural Heritage Program. Ecosystems of Washington State, A Guide to Identification, Rocchio and Crawford, 2015 –
Northern Rocky Mountain Avalanche Chute Shrubland

Description of Ecoregions of the United States, USFS PN # 1391, 1995 - M333 Northern Rocky Mt. Forest-Steppe-Coniferous Forest-Alpine Meadow Province

This ecological site includes or occurs near the following USDA Forest Service Plant Associations: ALSI/MOCO (Forest Habitat Types of N. Idaho, A Second Approximation, USFS Revised 1991).

Ecological site concept

Ecological Site Concept:
These sites are generally steep, linear features in concave portions of the landscape. Pure stands of Alnus sinuata and mosaics of A. sinuata with conifers and other shrub species occur throughout northern Idaho. Shrub species associated with these communities are *Acer glabrum*, Ribes lacustre, Salix spp., Sambucus spp., Sorbus spp., and Menziesia ferruginea. Herbaceous species are usually shade tolerant and moisture requiring such as: Asarum caudatum, Athyrium filix-femina, Circaea alpina, Clintonia uniflora, Dryopteris austriaca, Montia cordifolia, Montia sibirica, *Pteridium aquilinum*, Senecio triangularis, Trautvetteria caroliniensis, Valeriana sitchensis, and Veratrum viride. The only tree species regularly associated with pure Alnus stands is Picea engelmannii, which seldom develops beyond the seedling or small sapling stage. Small islands of conifers do establish and grow exceptionally well inside some Alnus stands, but these are actually islands of different soil conditions in an otherwise homogeneous habitat. Soils are loamy to sandy with thick (>7 inches) volcanic ash mantles. Organic matter content of the surface is high and available water capacity is moderate to high. While water tables are usually > 30 inches below the surface, the sites are often moist due to run-in and slow snow melt. Soil pH is often 1 pH unit lower than surrounding forested sites. While A. sinuata has been considered a seral species, these sites appear to be an edaphic climax similar to the bracken fern glades of the Grand Fir Mosaic.

Table 1. Dominant plant species

Tree	(1) *Picea engelmannii*
Shrub	(1) *Alnus viridis ssp. sinuata* (2) *Menziesia ferruginea*
Herbaceous	(1) *Claytonia cordifolia* (2) *Asarum caudatum*

Physiographic features

Physiographic Features
This ecological site occurs mainly on concave slopes of mountains, drainageways and avalanche chutes. Parent materials are mostly colluvium derived from granitic or metamorphic rock mantled by volcanic ash and loess.

Landscapes: Mountains
Landforms: Mountain slopes, drainageways, avalanche chutes

Elevation:
Total range = 705 to 2110 m
(2,310 to 6,920 feet)
Central tendency = 1270 to 1645 m
(4,165 to 5,395 feet)

Slope (percent):
Total range = 0 to 125 percent
Central tendency = 45 to 75 percent

Aspect: Total range: 35-160-325
Central; tendency: 110-160-245

Table 2. Representative physiographic features

Landforms	(1) Mountains > Mountain slope (2) Mountains > Drainageway (3) Mountains > Avalanche chute
Flooding frequency	None
Ponding frequency	None
Elevation	1,269–1,644 m

Slope	45–75%
Water table depth	203 cm
Aspect	SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	None
Ponding frequency	None
Elevation	704–2,109 m
Slope	0–100%
Water table depth	203 cm

Climatic features

Climatic Features

The climate of this portion of the MLRA is controlled by a combination of large-scale and small-scale factors. The large-scale factors include latitude, relative position on the North American continent, prevailing hemispheric wind patterns, and extensive mountain barriers. Small-scale or local factors include the topographic setting and position (valley, slope, or ridge location), as well as orientation or aspect, and vegetative cover. Broadly, the climate is transitional between a northern Pacific coastal type and a continental type. The Pacific influence is noted particularly by the late autumn and winter maximum in cloudiness and precipitation and in the relatively moderate average winter temperatures, compared with areas east of the Rocky Mountains. Summer is characteristically sunny and dry, though July and August are the only distinct summer months. July and August are thus also the peak fire-danger months. Annual precipitation (rain and melted snow) averages as little as 10 inches at the lowest canyon floors; over 100 inches at the highest elevations. Wettest months are normally November, December, and January. Close to 60 percent of the annual total occurs during the period November through March. A slight, secondary peak in precipitation normally appears in May and June, followed by a sharp decrease in July. Snowfall accounts for more than 50 percent of the total precipitation at elevations above 4,800 ft. Snow cover usually persists in the mid elevation valleys from early December through the end of March. High-elevation snowpack reaches a depth of 5 ft or more in March and April and may linger into June. The main season of lightning (or thunderstorm) activity extends from late May through August. Storms occur on an average of 3 or 4 days each in June, July, and August. Monthly mean temperatures in populated valley locations range from 24 F (-4 C) in January to 65 F (18 C) in July; these are midpoint values between the average daily maximum and minimum temperatures. The annual mean is 43 F (6 C). A large diurnal range occurs in summer. Extreme temperatures have been as high as 103" to 105" F (about 40" C) and as low as -36" F (-38" C). Temperature inversions are commonplace, particularly on the clear summer and early autumn nights. The frost-free season, defined as the period with minimum temperatures staying above 32" F (0" C), varies widely with elevation and topographic position. The season is generally longer at lower elevation locations and on slope positions in the "thermal belt" around 3,500 ft. The season is shorter in positions affected by cold air drainage and slopes above the “thermal belt” at elevations >5,500 ft. Relative humidity is usually high throughout the day in late autumn and winter, averaging 70 to 80 percent or higher in midafternoon. In July and August, afternoon values average near 35 percent in the mid elevation valleys and 45 percent at 5,500 ft. Summer nighttime humidity in these valleys typically recovers to over 90 or 95 percent by dawn. On the slopes above the temperature inversion, at the same time, humidity may average only 50 to 60 percent. Winds have a prevailing (most frequent) direction from the southwest during all or most of the year. Local terrain effects modify the larger-scale wind that occurs in the adjacent free atmosphere. A nighttime drainage effect is common. Sunshine duration is at a minimum in December, when it may average only 20 percent of the maximum possible. July has close to 80 percent of the maximum possible.
(from Finklin, A. 1983. Climate of Priest River Experimental Forest, Northern Idaho.GTR-INT-159)

Frost-free period (days):
Total range = 35 to 95 days
Central tendency = 45 to 70 days

Mean annual precipitation (cm):
Total range = 900 to 1845 mm
(35 to 73 inches)
Central tendency = 1225 to 1475 mm
(48 to 58 inches)
MAAT (C)
Total range = 2.6 to 8.2
(37 to 47 F)
Central tendency = 4.7 to 6.1
(40 to 43 F)

Influencing water features

Water Table Depth: >80 inches

Flooding:
Frequency: None
Duration: None

Ponding:
Frequency: None
Duration: None

Soil features

Representative Soil Features

This ecological site is associated with several soil components (e.g. Andic Cryumbrepts, Handoff, Stepoff, and Weitas). The soil components are Andic Humicryepts, Typic Udivitrands, and Vitric Fulvicryands. These soils have developed in thick (>7 inches) Mazama tephra deposits (often highly mixed with colluvium) over colluvium derived from granitic or metamorphic rock. They have adequate water holding capacity and are well drained.

Typically, silicon and aluminum contained in volcanic ash weather to form various combinations of allophane and imogolite, which are noncrystalline hydrous aluminosilicates. Soils dominated by allophane and imogolite in the clay-size fraction are referred to as allophanic soils. They are characterized by moderately-to-slightly acid pH and low aluminum availability. Under certain conditions, aluminum-humus complexes are preferentially formed instead of allophane and imogolite. This process gives rise to non-allophanic soils. This process is well documented in the Grand Fir Mosaic Ecological site. There is some evidence that a similar process can occur in organic enriched volcanic ash materials in the alder dominated avalanche chutes and drainages.

Fragment content of surface layers (% Volume): 0 to 11 percent (median = 5%)
Content Fragments

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Colluvium–granite (3) Colluvium–metamorphic rock
Surface texture	(1) Medial loam (2) Ashy silt loam
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	203 cm
Surface fragment cover >3"	0%

Available water capacity (0-101.6cm)	18.54 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Clay content (0-152.4cm)	0%
Sodium adsorption ratio (0-152.4cm)	5
Subsurface fragment volume <=3" (25.4-152.4cm)	20%
Subsurface fragment volume >3" (25.4-152.4cm)	10%

Table 5. Representative soil features (actual values)

Drainage class	Well drained
Permeability class	Moderate
Depth to restrictive layer	203 cm
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.87–27.69 cm
Calcium carbonate equivalent (0-152.4cm)	0%
Clay content (0-152.4cm)	0%
Sodium adsorption ratio (0-152.4cm)	4–7
Subsurface fragment volume <=3" (25.4-152.4cm)	5–50%
Subsurface fragment volume >3" (25.4-152.4cm)	0–66%

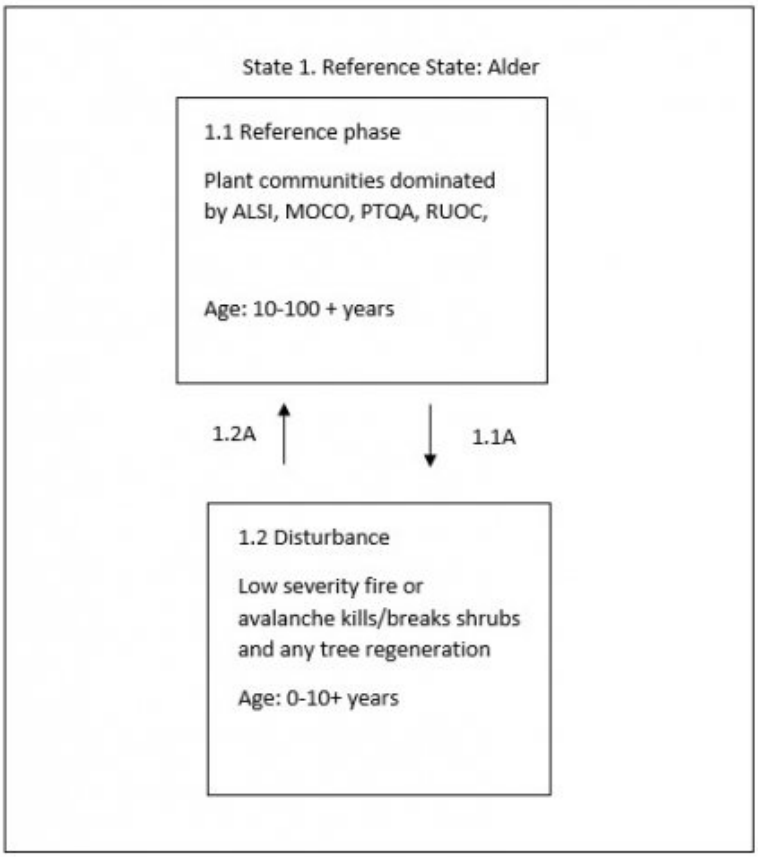
Ecological dynamics

Ecological Dynamics of the Site
Alder glades occur within most of the moderate and moist habitat types of northern Idaho. Alder glades form on seepage sites, either as narrow stringers or as isolated patches taking the shape of the water source. Their understories contain species characteristic of both mesic and wet sites, including ferns. They remain moist throughout the summer and do not burn readily. When burned, alders resprout vigorously from surviving root crowns and can also germinate from wind-dispersed seed (Smith and Fischer, 1997). In northern Idaho attempts to convert pure A. sinuata stands to coniferous forest have generally been failures. Among other problems within these sites are high population densities of pocket gophers and hares. On steep terrain in areas of heavy snowpack, recurrent avalanches play a role in creation and maintenance of this community. The plant’s resilient wood bowed growth form, and ability to sprout when broken allow Sitka alder to withstand repeated avalanche destruction (FEIS).

State and transition model

State and Transition Diagram

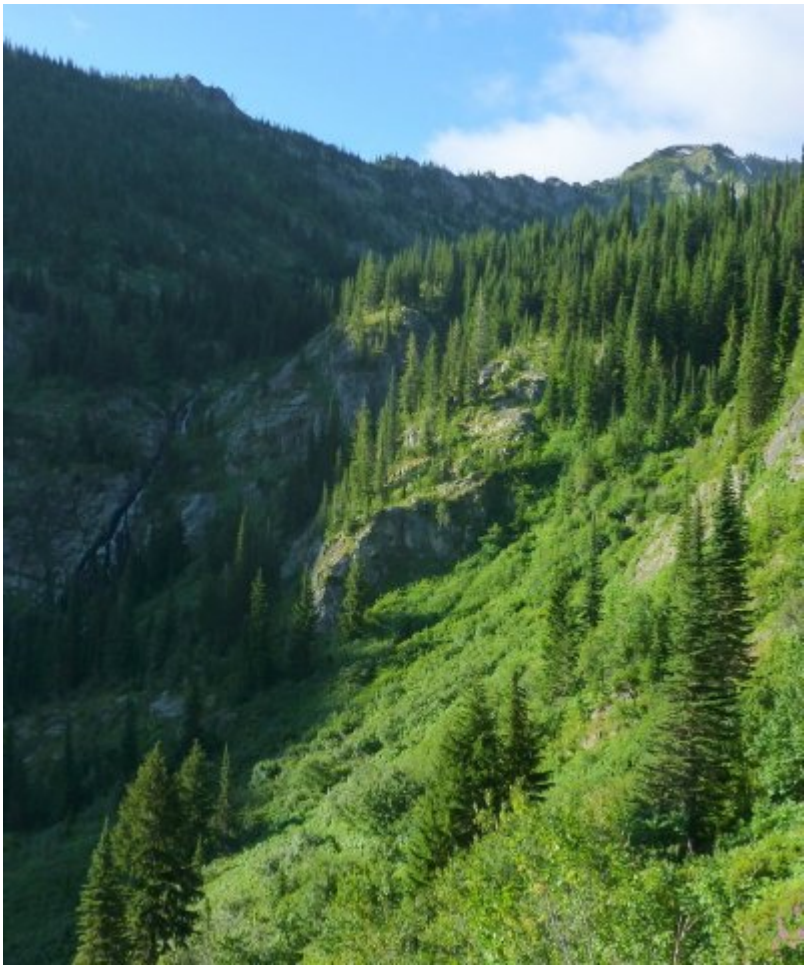
Ecological Site
Warm-Cryic, Moist-Udic Loamy Avalanche Chutes and Drainages (Sitka alder/Miner's Lettuce)



State 1
Reference: Alder

Historic disturbance creates glade openings. Alder establishes as early seral species. Alder dominance is maintained by repeated disturbance combined with other site factors. Scattered individual conifers may establish temporarily but rarely reach pole size. Most common is Picea engelmanii. Sitka alder provides thermal and hiding cover for many wildlife species and can have high population densities of pocket gophers and hares. These populations can impede conifer establishment. Most commonly observed understory species are Montia cordifolia, *Pteridium aquilinum*, *Rudbeckia occidentalis*, *Achillea millefolium*, *Arnica latifolia* and Carex spp.

Community 1.1
Reference



Dense canopy of A. sinuata. *Acer glabrum*, Sambucus spp and Sorbus spp. also present. Most commonly observed understory species are Montia cordifolia, *Pteridium aquilinum*, *Rudbeckia occidentalis*, *Achillea millefolium*, *Arnica latifolia* and Carex spp

Dominant plant species

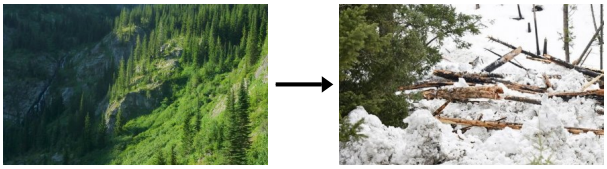
- Engelmann spruce (*Picea engelmannii*), tree
- Sitka alder (*Alnus viridis ssp. sinuata*), shrub
- Rocky Mountain maple (*Acer glabrum var. diffusum*), shrub
- Scouler's willow (*Salix scouleriana*), shrub
- red elderberry (*Sambucus racemosa*), shrub
- Sitka mountain ash (*Sorbus sitchensis var. sitchensis*), shrub
- heartleaf springbeauty (*Claytonia cordifolia*), other herbaceous
- British Columbia wildginger (*Asarum caudatum*), other herbaceous
- common yarrow (*Achillea millefolium*), other herbaceous
- western coneflower (*Rudbeckia occidentalis*), other herbaceous
- western brackenfern (*Pteridium aquilinum*), other herbaceous
- sedge (*Carex*), other herbaceous

Community 1.2
Disturbance

Figure 1. photo from Idaho Mountain Express

Site is damaged by avalanche or (rarely) fire. Alder and other shrubs resprout from root collars. Seed can establish where mineral soil is exposed. Most forbs (e.g. PTAQ) are able to resprout from roots if stored energy is sufficient.

Pathway 1.1A
Community 1.1 to 1.2



Reference **Disturbance**

Disturbance in the form of fire (rarely) or avalanche kills or destroys above ground vegetative growth. Temporarily reduces site to forbs and exposed organic layer. Any coniferous regeneration is destroyed.

Pathway 1.2A
Community 1.2 to 1.1

Disturbance **Reference**

Time allows regrowth to fully occupy site. Alder community is maintained

Additional community tables

References

. Fire Effects Information System. http://www.fs.fed.us/database/feis/.

Cooper, S.V., K.E. Neiman, R. Steele, and D.W. Roberts. 1991. Forest Habitat types of Northern Idaho, A Second Approximation.

Ferguson, D.E. and F.D. Johnson. 1996. Classification of Grand Fir Mosaic habitats.. Gen. Tech. Rep. INT-159. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. Ogden UT. 1–53.

Finklin, A.I. 1983. Climate of Priest River Experimental Forest, northern Idaho. Gen. Tech. Rep. INT-159. U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT. 53.

Smith and Fischer. 1997. Fire Ecology of the Forest Habitat Types of Northern 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	05/19/2024
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:**

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17. **Perennial plant reproductive capability:**
