

Ecological site R043BP823MT

Shallow Alpine Group

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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): 043B–Central Rocky Mountains

The Central Rocky Mountains (MLRA 43B) of Montana occupy some 28,850 square miles and exist primarily in Central and SW portions of the state. The climate is extremely variable with precipitation lows of 9 to 100 inches per year and frost free days of less than 30 to over 110 days. The geology of the region is also highly variable. The combination of variable climate and geology create a complex relationship of plant communities. MLRA 43B elevations typically exist between 6000 and 12,799 at Granite Peak (the highest point in Montana). The Continental Divide runs through this MLRA effectively splitting its watershed to contribute to either the Missouri River to the East and the Columbia River to the West.

Ecological site concept

- Site does not receive any additional water
- Soils are
 - o Generally not saline or saline-sodic (limited extent)
 - o Soil shallow (less than 50cm deep to bedrock, lithic, or paralithic root restrictive layer)
 - o Not Strongly or violently effervescent within surface mineral 4"
 - o Soil is not ashy or medial textural family
 - o Stones and/or boulders cover >15% surface area or fragmental textural class
- Moisture Regime: Udic
- Temperature Regime: Cryic
- Dominant Cover: Non-forested land (typically associated with Krummholz vegetation)
- Elevation Range: 5000-10000 ft
- Slope Range: 0-70%

Associated sites

R043BP821MT	Upland Alpine Group The Upland Alpine is a neighboring site that shares similar plant communities and state and transition models however, the Upland Alpine Site will produce higher amounts annual production.
F043BP902MT	Shallow Cold Woodland Group The Shallow Cold Woodland is a neighboring forested site that shares landscape position.

Similar sites

R043BP821MT	Upland Alpine Group The Upland Alpine is a neighboring site that shares similar plant communities and state and transition models however, the Upland Alpine Site will produce higher amounts annual production. The Shallow Alpine has a root restrictive layer within 20 inches of the soil surface.
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Table 1. Dominant plant species

Tree	(1) <i>Pinus albicaulis</i> (2) <i>Abies lasiocarpa</i>
Shrub	(1) <i>Juniperus horizontalis</i> (2) <i>Arctostaphylos uva-ursi</i>
Herbaceous	(1) <i>Poa alpina</i> (2) <i>Festuca idahoensis</i>

Physiographic features

Site is located at the top of mountain ridges and escarpments. Slopes are variable from nearly level to 70 percent. This site slope rarely exceeds 25 percent.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Ridge (2) Mountains > Escarpment
Runoff class	High
Elevation	1,520 – 3,050 m
Slope	0 – 70 %
Aspect	Aspect is not a significant factor

Climatic features

- Representative Value (RV) of range of Effective Precipitation: 24+ inches
- Representative Value (RV) of range of Frost Free Days: <30 days

Site does not have climate stations but often receives high amounts of precipitation though due to short growing season plant production can be very low. Very little data exists outside of raster models.

Table 3 Representative climatic features

Frost-free period (average)	0 days
Freeze-free period (average)	30 days
Precipitation total (average)	890 mm

Influencing water features

n/a

Wetland description

n/a

Soil features

Soils are shallow having less than 20 inches (50 cm) to bedrock, lithic, or paralithic root restrictive layer). Soils are not ashy or medial. Textures vary based on local geology. Parent material is residuum.

Table 4. Representative soil features

Parent material	(1) Residuum – igneous, metamorphic and sedimentary rock
Surface texture	(1) Coarse sandy loam (2) Very gravelly, cobbly loam
Family particle size	(1) Loamy (2) Loamy-skeletal
Drainage class	Excessively drained to well drained
Permeability class	Very rapid to moderate
Depth to restrictive layer	50 cm
Soil depth	50 cm
Surface fragment cover <=3"	0 – 70 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-50.8cm)	0.51 – 5.84 cm
Soil reaction (1:1 water) (0-50.8cm)	5.6 – 8.4
Subsurface fragment volume <=3" (0-50.8cm)	0 – 60 %

Subsurface fragment volume >3" (0-50.8cm)	0 – 40 %
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Ecological dynamics

Shallow Alpine 43B (R043BP823MT)

1 - Reference State

1.1 Reference Community Phase: Short-stature grasses (typically bluegrasses), sedges, forbs (Dryas sp) and shrubs share nearly equal dominance of this site. Grouse whortleberry, bearberry and creeping juniper are most common shrubs. Minimal tree cover in form of krummholz limber pine, whitebark pine, and subalpine fir. Community is resistant to most disturbance (fire, grazing) due to remote locations and rocky nature of soil.

T1A Vegetation removal due to catastrophic event; namely fire, however drought, climate change, and grazing may occur.

R2A Time and stability for vegetation to re-establish

2 - Rock Covered State

2.1 Plant community is generally devoid of most species due to extreme fire. Grasses and fire resistant shrubs remain. Few trees remain as seed source for future communities.

State and transition model

Additional community tables

Animal community

Site is considered poor for livestock due to low production and remote access and difficult terrain. Site is good to excellent for wildlife.

Recreational uses

hunting, hiking, camping, landscape viewing.

Wood products

Site is not suited to commercial production of wood products

Inventory data references

Information presented was derived from NRCS inventory data, literature, field observations, and personal contacts with range-trained personnel (i.e., used professional opinion of agency specialists, observations of land managers, and outside scientists).

Other references

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Contributors

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Approval

Kirt Walstad, 3/01/2024

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	09/14/2026
Approved by	
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:
