

Ecological site F047XC531UT

High Mountain Stony Loam (quaking aspen)

Last updated: 2/05/2025
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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): 047X–Wasatch and Uinta Mountains

MLRA 47 occurs in Utah (86 percent), Wyoming (8 percent), Colorado (4 percent), and Idaho (2 percent). It encompasses approximately 23,825 square miles (61,740 square kilometers). The MLRA includes the Uinta Mountains, which trend east and west. The Uinta Mountains have a broad, gently arching, elongated shape. Structurally, they consist of a broadly folded anticline that has an erosion-resistant quartzite core. The Wasatch and Uinta Mountains have an elevation of 4,900 to about 13,500 feet (1,495 to 4,115 meters). The mountains in this area are primarily fault blocks that have been tilted up. Alluvial fans at the base of the mountains are recharge zones for the basin fill aquifers. Rocks exposed in the Uinta mountains are Precambrian. The Uinta Mountains are one of the few ranges in the United States that are oriented west to east. The average precipitation can range up to 73 inches (1854 mm) in the mountains. The Uinta mountains have a greater incidence of high-intensity summer thunderstorms; hence, a significant amount of precipitation occurs during the summer months. The average annual temperature is 30 to 50 degrees Fahrenheit (-1 to 15 C). The freeze-free period averages 140 days and ranges from 60 to 220 days, generally decreasing in length with elevation. The dominant soil orders in this MLRA are Entisols, Inceptisols, and Mollisols.

LRU notes

This LRU is the Uinta Mountains portion of MLRA 47 that run east and west which includes the Uinta Wilderness and The Flaming Gorge National Recreation Area and towns such as Evanston, Wyoming, Hanna and Tabiona, Utah. Structurally these mountains consist of a broadly folded anticline that has an erosion resistance quartzite core. The Duchesne River and many other tributaries to the Green River run through this range, as well as the headwaters of the Bear River. The lower elevations are dominated by a frigid temperature regime, while the higher elevations experience cryic temperature regimes. The soil moisture regime is typically ustic. The minerology is generally mixed and the soils are very shallow to very deep, generally well drained, and loamy, sandy or sandy-skeletal.

Ecological site concept

The soils of this site formed mostly in colluvium derived from sandstone, conglomerate, or quartzite. Surface soils are very dark and very cobbly loams and sandy loams in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up more than 50 percent of the soil volume. These soils are deep to very deep, moderately well to well-drained, and have moderately slow to moderate permeability. pH is slightly acidic to slightly alkaline. Available water-holding capacity ranges from 2.8 to 4.8 inches of water in the upper 60 inches of soil. The soil moisture regime is udic and the soil temperature regime is cryic. Precipitation ranges from 22 to 38 inches annually.

Associated sites

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Similar sites

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Table 1. Dominant plant species

Tree	(1) <i>Populus tremuloides</i>
Shrub	(1) <i>Thalictrum fendleri</i>
Herbaceous	(1) <i>Bromus carinatus</i>

Physiographic features

This ecological site typically occurs on mountain slopes and mountains. Slopes normally range from 20 to 60 percent but may occasionally be steeper. Slope steepness, aspect and elevation will influence the vegetative floristics of this site. Sites are typically located between 7,200 to 10,300 feet in elevation. Runoff is high.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope (2) Mountain
Runoff class	High
Flooding frequency	None
Ponding frequency	None
Elevation	2,200 – 3,140 m
Slope	20 – 60 %
Aspect	Aspect is not a significant factor

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	2,090 – 3,150 m
Slope	Not specified

Climatic features

The climate of this site characterized by cold, snowy winters and cool summers. The average annual precipitation ranges from 22 to 38 inches. March thru May and August, are typically the wettest months with June and July being the driest. The most reliable sources of moisture for plant growth are the snow that accumulates over the winter, and spring rains. Summer thunderstorms are intermittent and sporadic in nature, and thus, are less reliable sources of moisture to support vegetative growth on this site.

Table 4 Representative climatic features

Frost-free period (characteristic range)	50-70 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	560-970 mm
Frost-free period (average)	
Freeze-free period (average)	
Precipitation total (average)	760 mm

Influencing water features

This site is not influenced by water from a wetland or stream.

Wetland description

N/A

Soil features

The soils of this site formed mostly in colluvium derived from sandstone, conglomerate, or quartzite. Surface soils are very dark and very cobbly loams and sandy loams in texture. Rock fragments may be present on the soil surface and throughout the profile, but make up more than 50 percent of the soil volume. These soils are deep to very deep, moderately well to well-drained, and have moderately slow to moderate permeability. The pH is slightly acidic to slightly alkaline. Available water-holding capacity ranges from 2.8 to 4.8 inches of water in the upper 60 inches of soil. The soil moisture regime is udic and the soil temperature regime is cryic. Precipitation ranges from 22 to 38 inches annually.

Table 5. Representative soil features

Parent material	(1) Colluvium – quartzite (2) Colluvium – sandstone (3) Colluvium – conglomerate
Surface texture	(1) Very cobbly loam (2) Very cobbly sandy loam

Family particle size	(1) Loamy-skeletal
Drainage class	Moderately well drained to excessively drained
Permeability class	Moderately slow to moderate
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-152.4cm)	7.62 – 12.7 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Electrical conductivity (0-152.4cm)	Not specified
Sodium adsorption ratio (0-152.4cm)	Not specified
Soil reaction (1:1 water) (0-152.4cm)	6.5 – 7.5
Subsurface fragment volume <=3" (0-152.4cm)	10 – 40 %
Subsurface fragment volume >3" (0-152.4cm)	10 – 30 %

Table 6. Representative soil features (actual values)

Drainage class	Not specified
Permeability class	Moderately slow to moderately rapid

Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-152.4cm)	4.32 – 18.03 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Electrical conductivity (0-152.4cm)	Not specified
Sodium adsorption ratio (0-152.4cm)	Not specified
Soil reaction (1:1 water) (0-152.4cm)	6.4 – 7.8
Subsurface fragment volume <=3" (0-152.4cm)	Not specified
Subsurface fragment volume >3" (0-152.4cm)	10 – 30 %

Ecological dynamics

The following State and Transition diagram depicts the most common plant communities found on this ecological site. It does not necessarily depict all the plant communities that can occur, but does show the most prevalent and repeatable. As more data are collected, some of these plant communities may be revised or removed, and new ones added. These descriptions capture the current knowledge and experience at the time of this revision.

State and transition model

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 1.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 13. Community 2.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 14. Community 2.4 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 15. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Animal community

a. Livestock Grazing This site is suited to cattle and sheep grazing during the summer and fall. Livestock will often concentrate on this site taking advantage of the shade and shelter offered by the tree overstory. Wildlife species seeking food and cover in this forest site include moose, elk, mule deer, bear, porcupine, snowshoe hare, owl, and woodpecker.

Wood products

Silvicultural Practices a. Harvest cut selectively or in small patches (size dependent upon site conditions) to enhance forage production. 1. Thinning and improvement cutting – removal of poorly formed, diseased, and low vigor trees for fuelwood. 2. Harvest cutting–selectively harvest surplus trees to achieve desired spacing. Harvest stands in small blocks of 1/5 to ½ acre with slash left in place to shelter emerging aspen suckers from browsing. 3. Spacing guide: A spacing of about 15 X 15 feet is considered desirable for multiple use management during period of stand maturity. b. Selective tree removal on suitable sites to enhance forage production and manage site reproduction.

Other information

4. Limitations and Considerations a. Potential for sheet and rill erosion is moderate to severe depending on slope. b. Moderate to severe equipment limitations on wet soils during critical times of the year. c. Proper spacing is the key to a well managed, multiple use and multi-product aspen forest. 5. Essential Requirements a. Adequately protect from high intensity wildfire. b. Protect soils from accelerated erosion. c. Apply proper grazing management practices

Table 16. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
quaking aspen	<i>POTR5</i>	40	50	16	21	–	–	–	

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range trained personnel were also used.

Other references

Contributors

V. Keith Wadman
Garth W. Leishman, James L. Brown

Approval

Kendra Moseley, 2/05/2025

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	08/21/2026
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:
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17. Perennial plant reproductive capability:
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