USDA Natural Resources Conservation Service

Ecological site F144BY501ME
Loamy Slope (Northern Hardwoods)

Last updated: 6/29/2020
Accessed: 05/18/2024

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): 144B–New England and Eastern New York Upland, Northern Part

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This major land resource area (MLRA) is characterized by plateaus, plains, and mountains. The climate is generally cool and humid with an average annual precipitation of 34 to 62 inches (865 to 1,575 millimeters). The average annual air temperature is typically 40 to 48 degrees F (4 to 9 degrees C). The freeze-free period generally is 130 to 200 days, but it ranges from 110 days in the higher mountains to 240 days in some areas along the Atlantic coast. The soils in this region are dominantly Entisols, Spodosols, and Inceptisols. They commonly have a fragipan. The dominant suborders are Ochrepts, Orthods, Aquepts, Fluvents, and Saprists. The soils in the region dominantly have a frigid soil temperature regime with some cryic areas at higher elevation, a udic soil moisture regime, and mixed mineralogy. Most of the land is forested, and 98 percent is privately owned. Significant amounts of forest products are produced including lumber, pulpwood, Christmas trees, and maple syrup. Principal agricultural crops include forage and grains for dairy cattle, potatoes, apples, and blueberries. Wildlife habitat and recreation are important land uses. Stoniness, steep slopes, and poor drainage limit the use of many of the soils.

Classification relationships

NRCS:
Land Resource Region: R—Northeastern Forage and Forest Region
MLRA: 144B—New England and Eastern New York Upland, Northern PartMLRA resources
Major Land Resource Area (MLRA): 144B–New England and Eastern New York Upland, Northern Part

Ecological site concept

This site occurs mostly on well- to moderately well-drained loam soils and associated somewhat poorly-drained soils. Bedrock is greater than 20 inches below the mineral soil surface. Soils may be underlain by a densely compacted till layer. This site is commonly found on backslope and footslope positions but may occur on flats or any number of landforms. The vegetation is characterized by northern hardwoods, particularly sugar maple, red maple, yellow birch, red oak and beech, with diverse hardwood associates. Shallower and wetter inclusions in this site typically produce more softwoods, including red spruce, white pine, hemlock, northern white cedar, and balsam fir. This site is likely over-mapped. Perhaps a Silty Slope (mixed wood) concept could reflect consistent, meaningful patterns between vegetation and soil properties. Further field work is required.

Associated sites

F144BY502ME	**Loamy Till Toeslope** The somewhat poorly- and poorly-drained Loamy Till Toeslope site often occurs downslope of the moderately well- and well-drained Loamy Slope site

F144BY702ME	**Shallow and Moderately-deep Till** The Shallow and Moderately Deep Till site often occurs upslope of the Loamy Slope site, where much of the soil area is less than 20 inches deep to bedrock.

Similar sites

F144BY506ME	**Semi-rich Till Slope** The Semi-rich Till Slope site has similar soil texture and wetness, but is distinguished by higher soil nutrients derived from calcareous parent material (such as limestone), as evidenced by high soil pH and rich site indicator species.
F144BY502ME	**Loamy Till Toeslope** The Loamy Till Toeslope is somewhat poorly- and poorly-drained, supporting wetter species and more softwoods than the moderately well- and well-drained Loamy Slope site.
F144BY402ME	**Clay Hills** Clay Hills occur on finer-textured soils, usually of glaciomarine or glaciolacustrine origin, and produces more mixedwood stands, while the Loamy Slope site occurs on till soils that are typically coarser in texture and produces more hardwood species.
F144BY504ME	**Enriched Loamy Cove** The Enriched Loamy Cove site has similar soil texture and wetness, but is distinguished by higher soil nutrients which accumulate in protected cove setting and are evidenced by high soil organic matter and rich site indicator species. .

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs mostly on moderate slopes on till landforms, especially hills and drumlins. It may also be found on somewhat flatter till plains and ground moraine landforms. Slopes are typically 0-35%, sometimes up to 60%. Elevations range from 0-3810 feet above sea level. This site may have a seasonally-high water table within 6-42 inches of the soil surface, but often does not.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ground moraine (3) Drumlin
Flooding frequency	None
Ponding frequency	None
Elevation	0–1,161 m
Slope	0–35%
Aspect	Aspect is not a significant factor

Climatic features

The climate is humid and temperate. It is characterized by warm summers and cold winters. The average first frost around October 1st and the last freeze of the season occurs around April 23rd. Temperature extremes in the summer can reach as high as 100 degrees F and as low as -33 degrees F in the winter. The average relative humidity is 71 percent. The sun shines on average 57 percent of the time. Bad storm events can come in from the northeast, thus the term “nor’easter”. Winter blizzards can result in several feet of snow, while summer hurricane events can produce 2-3 inches of rain per hour. Annual rainfall occurs quite evenly over the entire year with August being the driest month during the growing season from April through September. Rainfall during this period

generally falls during thunderstorms, and fairly large amounts of rain may fall in a short time. Eighty-eight percent of the snowfall occurs from December through March and average total snowfall is 64 inches per year. This makes for a “mud season” from March through April where runoff is high and ponding may occur because surface water runoff is very slow. The original data used in developing the table below was obtained from the USDA-NRCS National Water & Climate Center climate information database. All the climate station monthly averages for maximum and minimum temperature and precipitation were then added together and averaged to make this table. The precipitation and temperature data come from the years 1981 through 2010.

Table 3. Representative climatic features

Frost-free period (characteristic range)	117-141 days
Freeze-free period (characteristic range)	143-172 days
Precipitation total (characteristic range)	1,092-1,245 mm
Frost-free period (actual range)	97-146 days
Freeze-free period (actual range)	133-180 days
Precipitation total (actual range)	1,041-1,372 mm
Frost-free period (average)	127 days
Freeze-free period (average)	159 days
Precipitation total (average)	1,194 mm

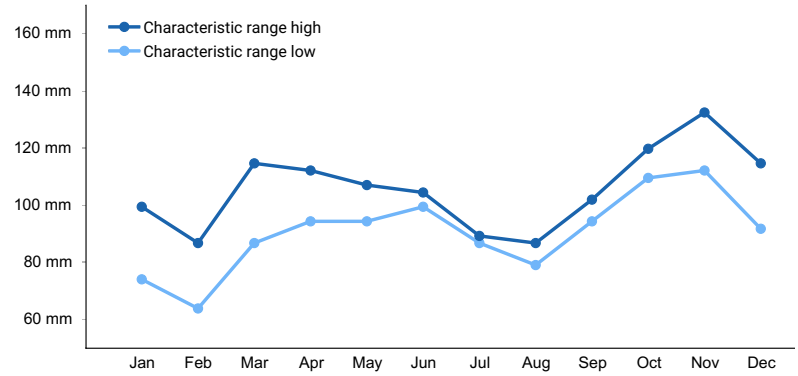


Figure 1. Monthly precipitation range

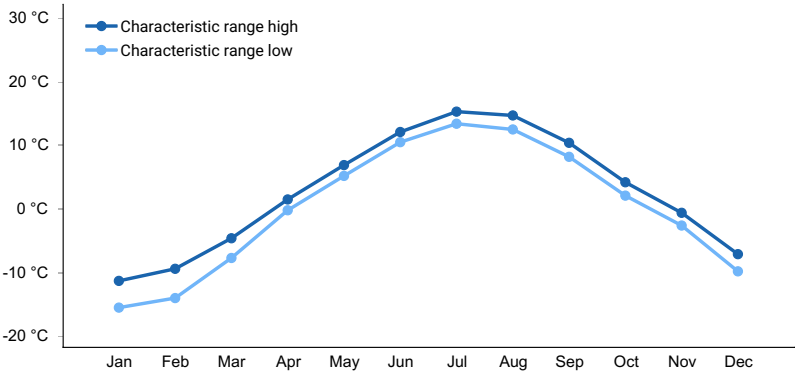


Figure 2. Monthly minimum temperature range

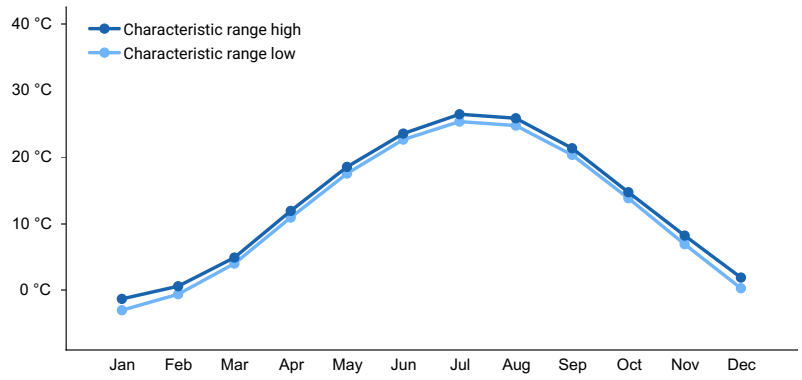


Figure 3. Monthly maximum temperature range

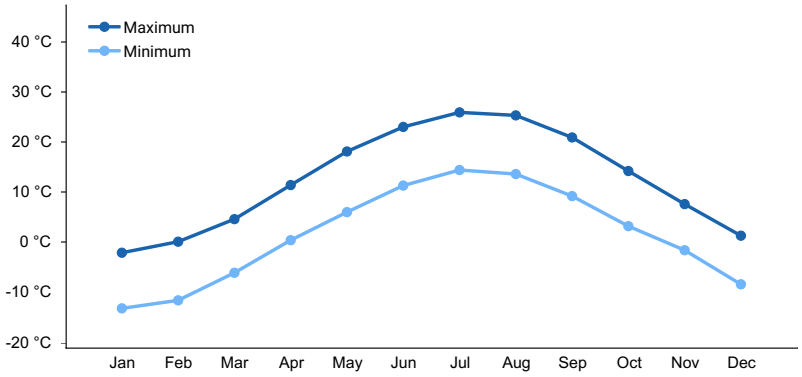


Figure 4. Monthly average minimum and maximum temperature

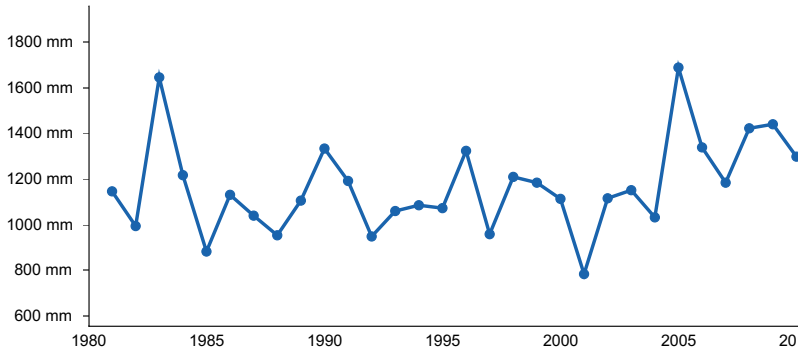


Figure 5. Annual precipitation pattern

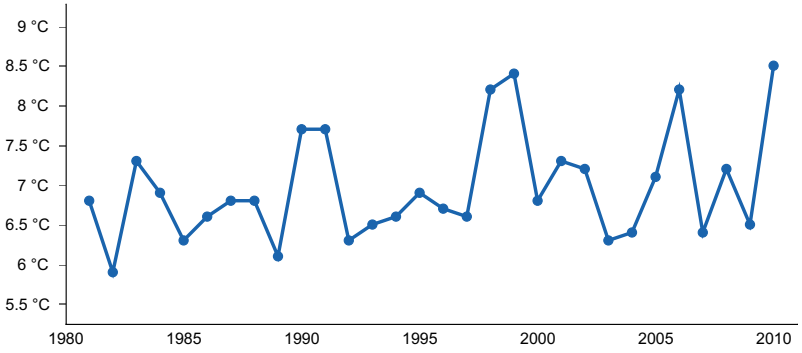


Figure 6. Annual average temperature pattern

Climate stations used

- (1) NEWCASTLE [USC00175675], Newcastle, ME
- (2) WATERVILLE TRTMT PLT [USC00179151], Waterville, ME
- (3) WEST ROCKPORT 1 NNW [USC00179593], Rockport, ME

- (4) JONESBORO [USC00174183], Addison, ME
- (5) CORINNA [USC00171628], Corinna, ME
- (6) GARDINER [USC00173046], Gardiner, ME
- (7) PORTLAND INTL JETPORT [USW00014764], Portland, ME
- (8) ACADIA NP [USC00170100], Bar Harbor, ME
- (9) BELFAST [USC00170480], Belfast, ME
- (10) AUGUSTA STATE AP [USW00014605], Augusta, ME
- (11) BANGOR INTL AP [USW00014606], Bangor, ME
- (12) DOVER-FOXCROFT WWTP [USC00171975], Dover Foxcroft, ME
- (13) FARMINGTON [USC00172765], Farmington, ME
- (14) LEWISTON [USC00174566], Auburn, ME
- (15) MADISON [USC00174927], Anson, ME

Influencing water features

This site is not typically influenced by streams or wetlands.

Soil features

The soils of this site are mostly well- and moderately well-drained and may include patches of somewhat poorly-drained soils when associated with drier soils. They formed mostly in, and may or may not have a layer of densely-compacted soil within 43 inches of the soil surface. When present, this restrictive layer limits both root penetration and water percolation on the site, and often has coarser textures and more rock fragments than the upper soil layers.

These soils are typically derived from granite, gneiss, or mica schist, but also occurs in less abundant minerals found in the region. Soil textures range from silt loams to fine sandy loams at the surface, with coarse loamy or loamy subsoils. Soil pH ranges from 3.5 to 6.8.

Often this site includes patches of moderately deep soils, with lithic bedrock within 20 to 40 inches of the soil surface. In these areas, as well as in wetter drainageways, softwoods tend to be more abundant in the plant community. These patches tend to be embedded within a larger matrix of soils that are more typical of this ecological site.

Table 4. Representative soil features

Parent material	(1) Lodgment till–granite (2) Basal till–gneiss (3) Till–mica schist
Surface texture	(1) Silt loam (2) Fine sandy loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Soil depth	51 cm
Surface fragment cover >3"	0–2%
Available water capacity (0-101.6cm)	4.57–27.94 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0

Soil reaction (1:1 water) (0-101.6cm)	3.5–6.8
Subsurface fragment volume <=3" (Depth not specified)	2–21%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Table 5. Representative soil features (actual values)

Drainage class	Somewhat poorly drained to well drained
Soil depth	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	Not specified
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

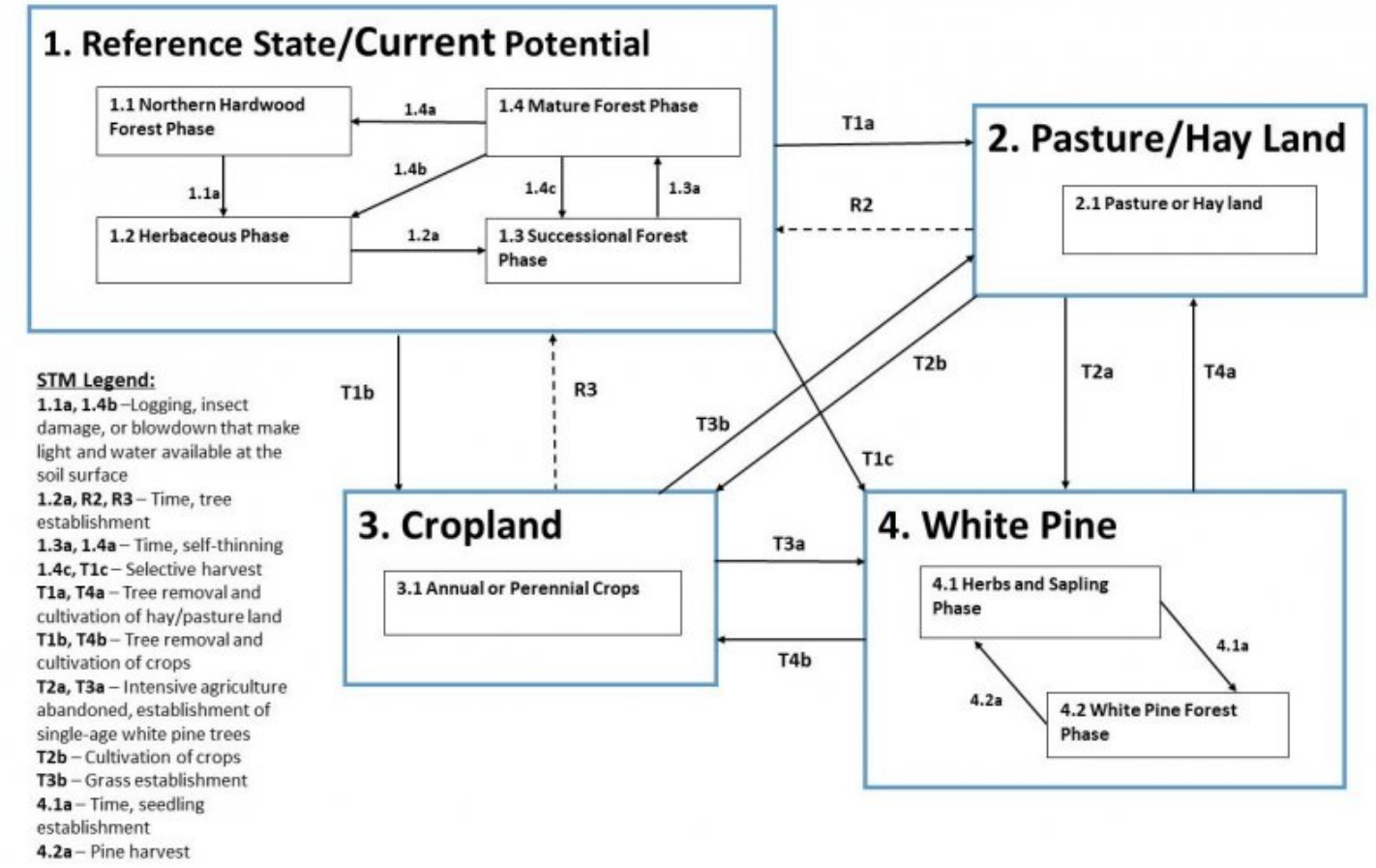
This site covers a broad area and will require significant study to identify the full range of disturbances and plant communities associated with it. Northern hardwoods dominate, particularly yellow birch, sugar maple, red oak and beech. However, where soils somewhat shallower or wetter than the typical site concept there is often more red spruce, white pine balsam fire, white birch and eastern hemlock present in the community. Historically, American chestnut would also be dominant on this site, but currently it has been all but eliminated from the region by chestnut blight.

Treethrow and logging are the most common disturbances on this site. The site is resilient following these disturbances and succeeds through an herbaceous and shrubby phase prior to tree establishment and eventual return to the reference community. The young forest stands include several species not typically dominant in the reference community, including pin cherry, white birch, aspen, balsam fir, etc.

On gentler slopes, this site may be cultivated for crop or pasture, though soil amendments are needed since they are both acidic and nutrient-poor. When cropland or pastureland management ceases, as occurred across most of the area in the late 19th century, the site either returns to northern hardwoods or may transition to a white pine forest. Once white pine is established, it tends to form a single age stand with low diversity and little understory.

State and transition model

F144BY501ME – Loamy Slope (Northern Hardwoods)



State 1
Reference State / Current Potential

Community 1.1
Northern Hardwood Forest

Multi-age stand dominated by white ash, yellow birch, sugar maple, and/or beech.

Community 1.2
Herbaceous Phase

Wild raspberry, ferns, and other herbs colonize the open land

Community 1.3
Successional Forest

Diverse young hardwoods, including species not dominant in the reference community

Community 1.4
Mature Forest 50-80 yr

50-80 year old hardwoods. Early successional species (white birch, fir, grey birch, aspen) dying out.

Pathway P1.1-1.2
Community 1.1 to 1.2

windthrow, blowdown, fire

Pathway P1.2-1.3
Community 1.2 to 1.3

vegetation development (succession)

Pathway P1.3-1.4
Community 1.3 to 1.4

vegetation development (succession)

Pathway P1.4-1.1
Community 1.4 to 1.1

windthrow, blowdown, fire

Pathway P1.4-1.2
Community 1.4 to 1.2

windtrhrow, blowdown, fire

State 2
Grassland / Hay land

Community 2.1
Pasture or Hay Land

Cleared and planted fields of mostly perennial herbaceous species.

State 3
Crop Land

Community 3.1
Annual or Perennial Crops

Cleared and cultivated fields, heavily managed with regular soil disturbance.

State 4
White Pine

Community 4.1
Herbs and Shrubs

Wild raspberry, ferns, and other herbs colonize the open land

Community 4.2
White Pine Forest

Single age white pine forest.

Pathway P4.1-4.2
Community 4.1 to 4.2

Vegetation development (succession)

Pathway P4.2-4.1
Community 4.2 to 4.1

harvest, logging

Conservation practices

Forest Stand Improvement
Forest Land Management

Transition T1-2
State 1 to 2

tree removal, pasture or hayfield establishment

Conservation practices

Clearing and Snagging
Land Clearing
Invasive Plant Species Control
Managed Haying/Grazing

Transition T1-3
State 1 to 3

Tree clearing, crop establishment

Conservation practices

Clearing and Snagging
Cover Crop
Land Clearing

Transition T1-4
State 1 to 4

selective harvest

Conservation practices

Forest Stand Improvement
Forest Land Management

Transition R2-1
State 2 to 1

abandonment, vegetation development (succession), planting

Conservation practices

Tree/Shrub Site Preparation
Tree/Shrub Establishment
Upland Wildlife Habitat Management
Restoration and Management of Natural Ecosystems

Native Plant Community Restoration and Management
Invasive Plant Species Control
Managed Haying/Grazing

Transition T2-4
State 2 to 4

tree establishment

Conservation practices

Tree/Shrub Site Preparation
Tree/Shrub Establishment
Invasive Plant Species Control

Restoration pathway R3-1
State 3 to 1

abandonment, vegetation development (succession), tree planting

Conservation practices

Tree/Shrub Establishment
Upland Wildlife Habitat Management
Tree/Shrub Pruning
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Plant Species Control

Transition T3-4
State 3 to 4

tree planting

Conservation practices

Tree/Shrub Site Preparation
Tree/Shrub Establishment
Invasive Plant Species Control

Restoration pathway R4-1
State 4 to 1

abandonment, vegetation development (succession), plantings

Conservation practices

Tree/Shrub Site Preparation
Tree/Shrub Establishment
Upland Wildlife Habitat Management
Restoration and Management of Natural Ecosystems

Native Plant Community Restoration and Management
Invasive Plant Species Control

Restoration pathway T4-2
State 4 to 2

Tree removal, pasture or hay land establishment

Conservation practices

Clearing and Snagging
Land Clearing

Transition T4-3
State 4 to 3

tree removal, cropland establishment

Conservation practices

Clearing and Snagging
Cover Crop
Land Clearing

Additional community tables

Inventory data references

Site Development and Testing Plan
Future work is needed, as described in a project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

Other references

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Thompson, E. H., and E. R. Sorenson. 2000. Wetland, woodland, wildland: A guide to the natural communities of Vermont. The Nature Conservancy and the Vermont Department of Fish and Wildlife. University Press of New England, Hanover, NH. 456 pp.

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Contributors

Jamin Johanson
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Approval

Nels Barrett, 6/29/2020

Acknowledgments

Nels Barrett, Ph.D.

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	05/18/2024
Approved by	Nels Barrett
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:**