

Ecological site F144BY602ME Sandy Toeslope

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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): 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 Sapristis. 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 Part

Ecological site concept

This site occurs on somewhat poorly- to moderately well-drained sandy soils in low-lying areas associated with eskers, deltas, kame terraces, outwash plains, or sandy till deposits. Soils are typically very deep with a seasonally-high water table within 18-36 inches of the soil surface. Slopes are usually less than 8 percent.

Conifers are abundant and diverse, including white pine, red spruce, balsam fir, and eastern hemlock. Paper birch, red maple, bigtooth aspen, black cherry and yellow birch are common hardwood associates. This site is often downslope of the Dry Sands site, which occurs on better drained soils lacking a seasonally-high water table.

Associated sites

F144BY601ME	Dry Sand The Sandy Toeslope site may occur in wetter areas downslope of the Dry Sand site, which may shed water and nutrients downslope to the Sandy Toeslope. Similar Sites
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Similar sites

F144BY505ME	Loamy over Sandy The Loamy over Sandy site is moderately well- to well-drained, whereas the Sandy Toeslope site is somewhat poorly- to moderately well-drained.
F144BY601ME	Dry Sand The Sandy Toeslope site is somewhat poorly-to moderately well-drained and produces more diverse species, whereas the Dry Sand site is well- to excessively-drained and produces mostly pine and other softwood species.

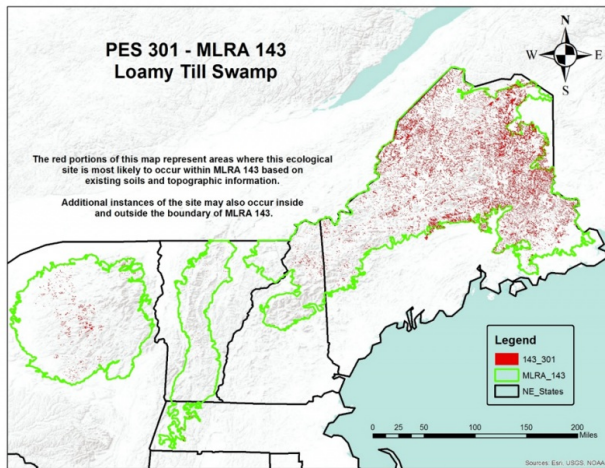


Figure 1.

Table 1. Dominant plant species

Tree	(1) <i>Pinus strobus</i> (2) <i>Betula papyrifera</i>
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on outwash plains and terraces, and at the base of eskers. Slopes are typically less than 8 percent but may be as high as 15 percent. Elevations range from sea level to 3810 feet. A seasonally-high water table is between 18 and 36 inches in depth from November to May.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain (2) Esker (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	0–1,161 m
Slope	0–15%
Ponding depth	0–15 cm
Aspect	W, NW, N, NE, E, SE, S, SW

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)	117-140 days
Freeze-free period (characteristic range)	144-170 days
Precipitation total (characteristic range)	1,067-1,219 mm
Frost-free period (actual range)	98-146 days
Freeze-free period (actual range)	133-180 days
Precipitation total (actual range)	1,016-1,372 mm
Frost-free period (average)	126 days
Freeze-free period (average)	159 days
Precipitation total (average)	1,168 mm

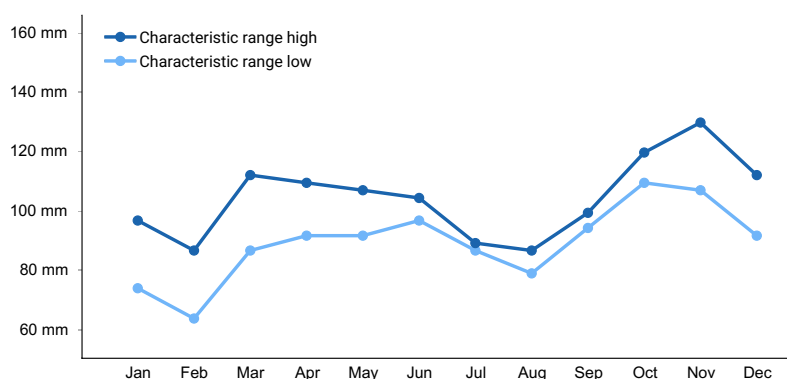


Figure 2. Monthly precipitation range

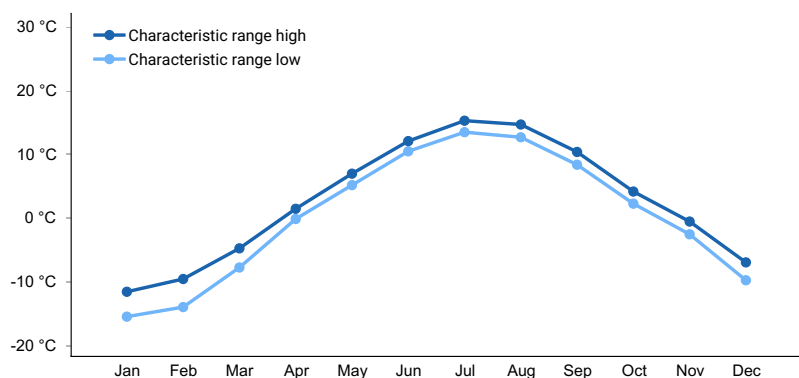


Figure 3. Monthly minimum temperature range

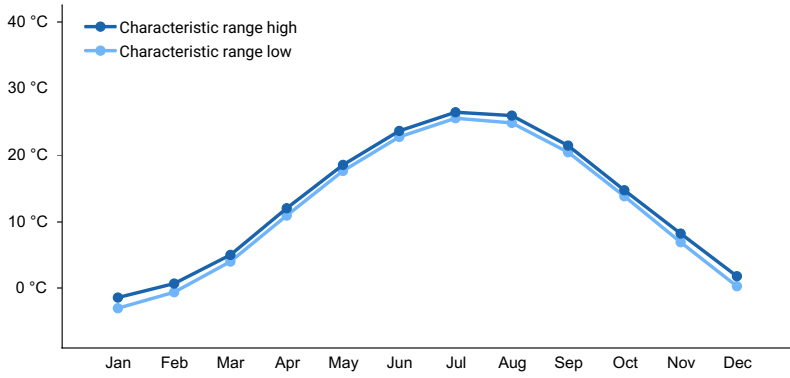


Figure 4. Monthly maximum temperature range

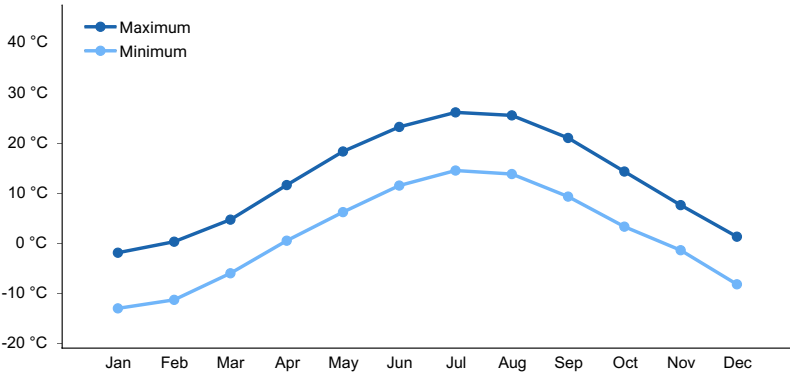


Figure 5. Monthly average minimum and maximum temperature

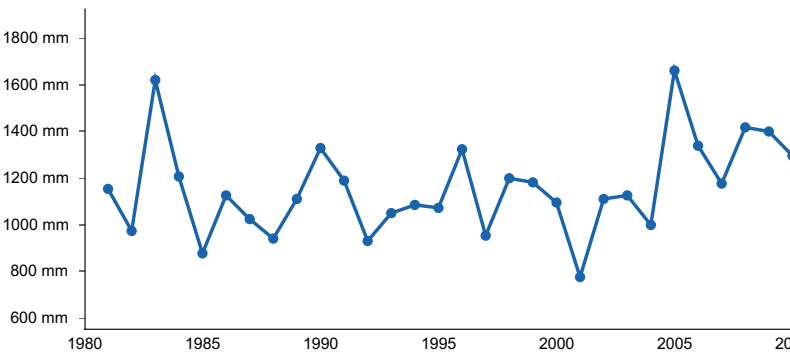


Figure 6. Annual precipitation pattern

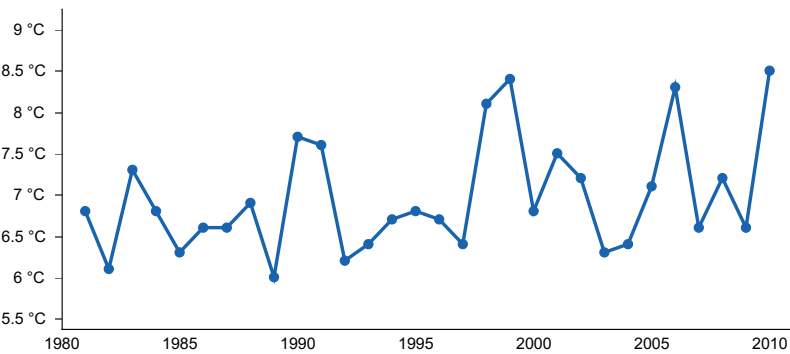


Figure 7. Annual average temperature pattern

Climate stations used

- (1) BELFAST [USC00170480], Belfast, ME
- (2) ACADIA NP [USC00170100], Bar Harbor, ME
- (3) CORINNA [USC00171628], Corinna, ME

- (4) DOVER-FOXCROFT WWTP [USC00171975], Dover Foxcroft, ME
- (5) FARMINGTON [USC00172765], Farmington, ME
- (6) GARDINER [USC00173046], Gardiner, ME
- (7) JONESBORO [USC00174183], Addison, ME
- (8) LEWISTON [USC00174566], Auburn, ME
- (9) MADISON [USC00174927], Anson, ME
- (10) NEWCASTLE [USC00175675], Newcastle, ME
- (11) ORONO [USC00176430], Old Town, ME
- (12) WATERVILLE TRTMT PLT [USC00179151], Waterville, ME
- (13) WEST ROCKPORT 1 NNW [USC00179593], Rockport, ME
- (14) AUGUSTA STATE AP [USW00014605], Augusta, ME
- (15) BANGOR INTL AP [USW00014606], Bangor, ME
- (16) PORTLAND INTL JETPORT [USW00014764], Portland, ME

Influencing water features

This site is not influenced by streams or wetlands.

Soil features

The soils of this site formed in sandy outwash and till deposits from melting glaciers. These soils occur in low-lying areas and are somewhat poorly- to moderately well-drained. Soil textures are sandy throughout and may have a thin sandy loamy surface horizon. Rock fragments may or may not be abundant in throughout the profile.

Representative soils are Naskeag, Croghan, Waumbek, Duane, Acton, Deerfield, Skowhegan, Udipsamments, and Naumburg.

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits–igneous and metamorphic rock (2) Melt-out till–igneous and metamorphic rock
Surface texture	(1) Loamy sand (2) Fine sandy loam (3) Loamy fine sand
Drainage class	Well drained to excessively drained
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–2%
Available water capacity (Depth not specified)	2.54–17.78 cm
Soil reaction (1:1 water) (Depth not specified)	3.5–6.5
Subsurface fragment volume <=3" (Depth not specified)	0–37%
Subsurface fragment volume >3" (Depth not specified)	0–16%

Ecological dynamics

This site typically supports a mixedwood community with white pine, red spruce, balsam fir, eastern hemlock, paper birch, red maple, bigtooth aspen, black cherry and yellow birch common in various combinations.

This site has been cleared and cultivated for pasture/hayland or crop production. Blueberries are particularly suited to these sandy soils.

Gravel and sand mining are common on this site, and often accompanied by heavy logging to remove timber prior to soil excavation. Following cutting, early successional species such as fir, white birch, pin cherry, and aspen may

enter the community, but they die out as the forest reaches maturity within about 80 years. Further study is required to understand plant community dynamics on this site.

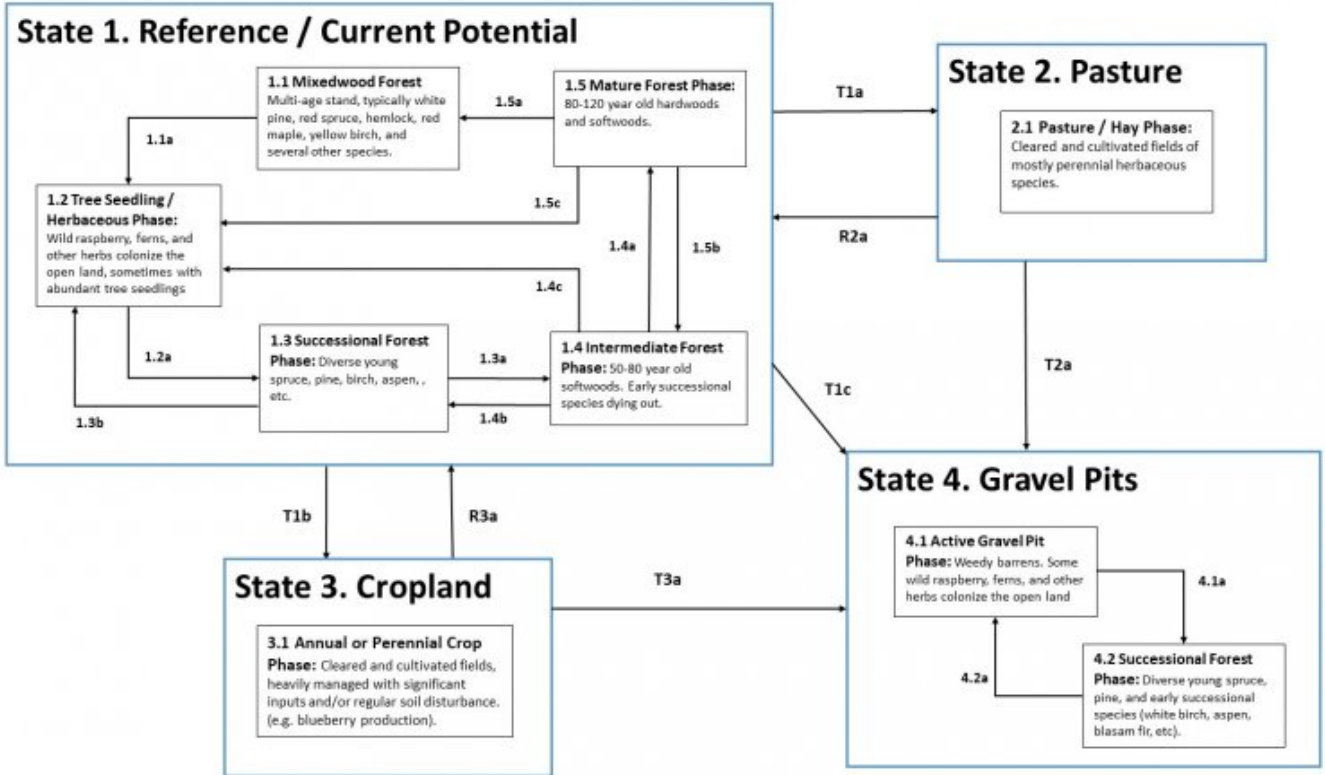
Relationship to Other Classification Systems

This site includes the following state natural heritage program types:

- Spruce – Northern Hardwoods Forest (Gawler and Cutko 2010)
- Lower Elevation Spruce-Fir Forests (Gawler and Cutko 2010)

State and transition model

F144BY602ME – Sandy Toeslope



**State 1
Reference/ Current Potential**

**Community 1.1
Mixed wood forest**

Multi-age stand, typically white pine, red spruce, hemlock, red maple, yellow birch, and several other species.

**Community 1.2
Tree Seedling/ Herbaceous Phase**

Wild raspberry, ferns, and other herbs colonize the open land, sometimes with abundant tree seedlings

**Community 1.3
Successional Forest Phase**

Diverse young spruce, pine, birch, aspen, , etc.

Community 1.4

Intermediate Forest Phase

50-80 year old softwoods. Early successional species dying out.

Community 1.5 Mature Forest Phase

80-120 year old hardwoods and softwoods.

Pathway P1.1-1.2 Community 1.1 to 1.2

clearcutting, blowdown

Pathway P1.2-1.3 Community 1.2 to 1.3

vegetation development (succession)

Pathway P1.3-1.2 Community 1.3 to 1.2

selective cutting, forest management

Conservation practices

Forest Stand Improvement
Forest Land Management
Forest Management Plan - Written
Forest Management Plan - Applied

Pathway P1.3-1.4 Community 1.3 to 1.4

vegetation development (succession)

Pathway P1.4-1.2 Community 1.4 to 1.2

selective cutting, forest management

Conservation practices

Forest Stand Improvement
Forest Land Management
Forest Management Plan - Written
Forest Management Plan - Applied

Pathway P1.4-1.3 Community 1.4 to 1.3

selective cutting, forest management

Conservation practices

Forest Stand Improvement
Forest Land Management
Forest Management Plan - Written
Forest Management Plan - Applied

Pathway P1.4-1.5
Community 1.4 to 1.5

vegetation development (succession)

Pathway P1.5-1.1
Community 1.5 to 1.1

cutting, logging

Conservation practices

Upland Wildlife Habitat Management
Forest Trails and Landings
Forest Stand Improvement
Record Keeping
Forest Land Management
Forest Management Plan - Written
Forest Management Plan - Applied
Forest stand improvement for habitat and soil quality

Pathway P1.5-1.2
Community 1.5 to 1.2

selective cutting, forest management

Pathway P1.5-1.4
Community 1.5 to 1.4

selective cutting thinning, forest management

Conservation practices

Forest Stand Improvement
Forest Land Management
Forest Management Plan - Written
Forest Management Plan - Applied

State 2
Pasture

Community 2.1
Pasture/Hay Phase

Cleared and cultivated fields of mostly perennial herbaceous species.

State 3
Cropland

Community 3.1
Annual or Perennial Crop Phase

: Cleared and cultivated fields, heavily managed with significant inputs and/or regular soil disturbance. (e.g. blueberry production).

State 4
Gravel Pits

Community 4.1
Active Gravel Pit Phase

Weedy barrens. Some wild raspberry, ferns, and other herbs colonize the open land

Community 4.2
Successional Forest Phase

Diverse young spruce, pine, and early successional species (white birch, aspen, blasam fir, etc).

Pathway P4.1-4.2
Community 4.1 to 4.2

abandonment, vegetation development (succession)

Conservation practices

Tree/Shrub Site Preparation
Tree/Shrub Establishment

Pathway P4.2-4.1
Community 4.2 to 4.1

clearing and cutting

Conservation practices

Clearing and Snagging
Land Clearing

Transition T1-2
State 1 to 2

Cutting and clearing, meadow/pasture establishment

Conservation practices

Brush Management
Clearing and Snagging
Land Clearing
Upland Wildlife Habitat Management
Early Successional Habitat Development/Management
Record Keeping

Native Plant Community Restoration and Management
Invasive Species Pest Management

Transition T1-3
State 1 to 3

cutting and clearing, crop establishment

Conservation practices

Clearing and Snagging
Land Clearing
Land Smoothing
Record Keeping

Transition T1-4
State 1 to 4

cutting and clearing, sand and gravel mining operations (excavation)

Conservation practices

Clearing and Snagging
Land Clearing
Monitoring and Evaluation

Restoration pathway R2-1
State 2 to 1

abandonment, vegetation development (succession), plantings

Conservation practices

Brush Management
Tree/Shrub Site Preparation
Tree/Shrub Establishment
Upland Wildlife Habitat Management
Record Keeping
Invasive Plant Species Control

Transition T2-4
State 2 to 4

sand and gravel excavation

Conservation practices

Land Clearing
Monitoring and Evaluation

Restoration pathway R3-1

State 3 to 1

abandonment, vegetation development (succession), plantings

Conservation practices

Tree/Shrub Site Preparation
Tree/Shrub Establishment
Upland Wildlife Habitat Management
Record Keeping
Invasive Plant Species Control

Transition T3-4

State 3 to 4

sand and gravel excavation

Conservation practices

Land Clearing
Monitoring and Evaluation

Restoration pathway R4-1

State 4 to 1

forest re-establishment

Conservation practices

Tree/Shrub Site Preparation
Land Reclamation, Abandoned Mined Land
Land Reclamation, Currently Mined Land
Spoil Spreading
Tree/Shrub Establishment
Upland Wildlife Habitat Management
Land Grading
Record Keeping
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Plant Species Control

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

Gawler, S. and A. Cutko. 2010. Natural Landscapes of Maine. A Guide to Natural Communities and Ecosystems. Maine Natural Areas Program, Maine Department of Conservation, Augusta, ME.

Johanson, J. K., Butler, N. R. and C. Bickford. 2016. Classifying Northern New England Landscapes for Improved Conservation. *Rangelands* 38:6.

USDA NRCS 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. USDA Handbook 296.

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	07/17/2024
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:**
