USDA Natural Resources Conservation Service

Ecological site F144BY601ME
Dry Sand

Last updated: 9/27/2024
Accessed: 05/13/2025

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

This major land resource area (MLRA) is in Maine (56 percent), New Hampshire (22 percent), Vermont (14 percent), Massachusetts (6 percent), Connecticut (1 percent), and New York (1 percent). It makes up about 22,728 square miles (58,864 square kilometers). The MLRA consists of a relatively young landscape shaped by the Laurentide Ice Sheet, which covered the region from 35,000 to 10,000 years ago. Rolling hills of dense basal till converge on ridges of shallow bedrock that were scoured by glacial ice. River valleys that were flooded by melting glacial water or seawater house large expanses of glacial outwash and stratified drift in inland areas and, to a lesser extent, glaciomarine and glaciolacustrine sediment deposits in coastal areas. Organic bogs, ablation till, and alluvial flood plains make up the remaining portions of the MLRA.

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 Part

Ecological site concept

Additional research and on-site data collection is needed to further develop interpretations for this ecological site.

Table 1. Dominant plant species

Tree	(1) *Pinus strobus* (2) *Picea rubens*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site usually occurs on landforms comprised of sandy glacial outwash deposits such as eskers, kame terraces

and outwash plains, and can also occur on sandy till deposits such as moraines and till plains. It can be found from sea level to 3810 feet on slopes ranging from 0 to 45 percent, sometimes up to 60 percent.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain > Outwash delta (2) Plains > River valley (3) Upland > Kame (4) Upland > Esker (5) Upland > Kame terrace (6) Upland > Moraine (7) Upland > Hill (8) Upland > Ridge (9) Valley > Kame (10) Valley > Outwash plain (11) Valley > Outwash terrace (12) Hillslope (13) Terrace
Runoff class	Very low to high
Flooding frequency	None
Ponding frequency	None
Elevation	0–3,805 ft
Slope	0–60%
Ponding depth	0–6 in
Water table depth	24–72 in
Aspect	Aspect is not a significant factor

Climatic features

The climate is humid and temperate and is characterized by warm summers and cold winters. Precipitation generally is evenly distributed throughout the year. Near the coast, it is slightly lower in summer. In inland areas, it is slightly higher in spring and fall. Rainfall occurs during high-intensity, convective thunderstorms in summer. In winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. Heavy snowfalls commonly occur late in winter. Temperatures and the length of the freeze-free period increase from north to south and closer to the coast.

This major land resource area (MLRA) covers four states and may have substantial climate variability among locations: Maine (56 percent), New Hampshire (22 percent), Vermont (14 percent), Massachusetts (6 percent), Connecticut (1 percent), and New York (1 percent).

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)	42-48 in
Frost-free period (actual range)	98-146 days
Freeze-free period (actual range)	133-180 days
Precipitation total (actual range)	40-54 in
Frost-free period (average)	126 days
Freeze-free period (average)	159 days
Precipitation total (average)	46 in

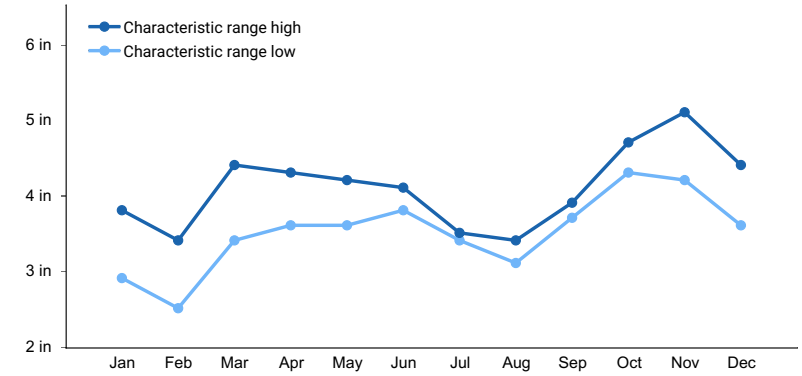


Figure 1. Monthly precipitation range

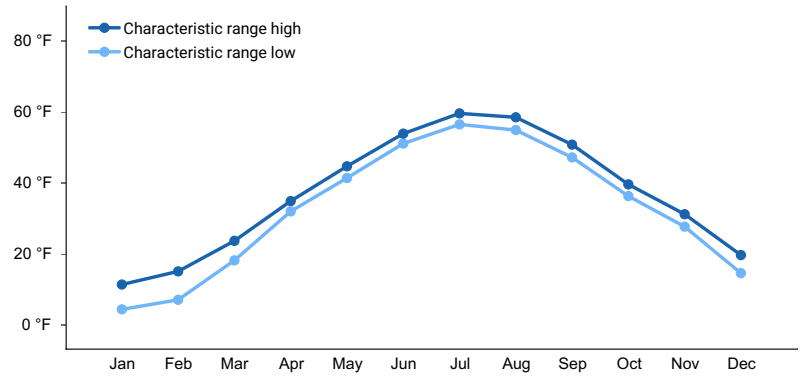


Figure 2. Monthly minimum temperature range

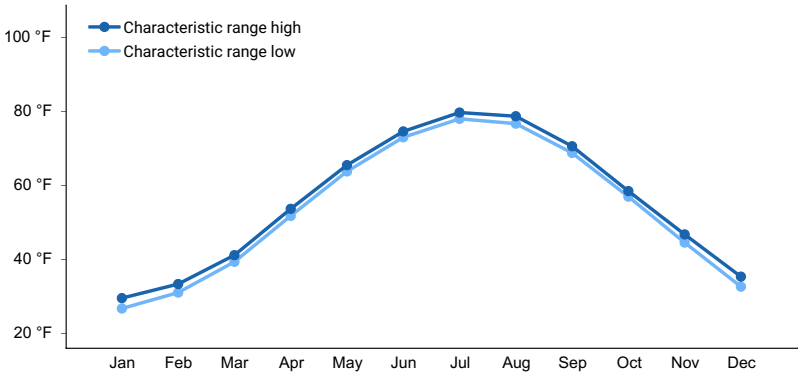


Figure 3. Monthly maximum temperature range

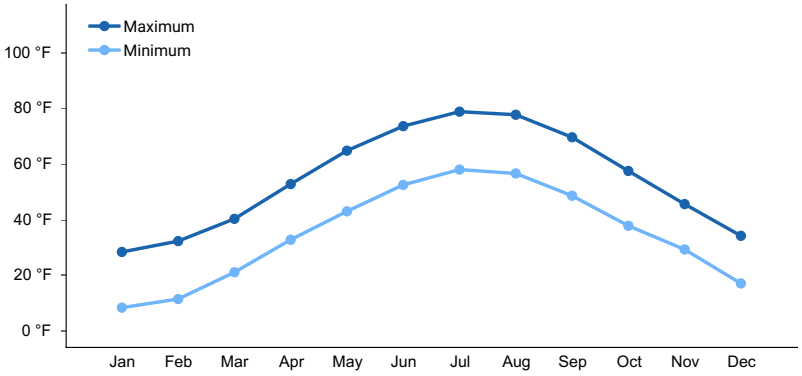


Figure 4. Monthly average minimum and maximum temperature

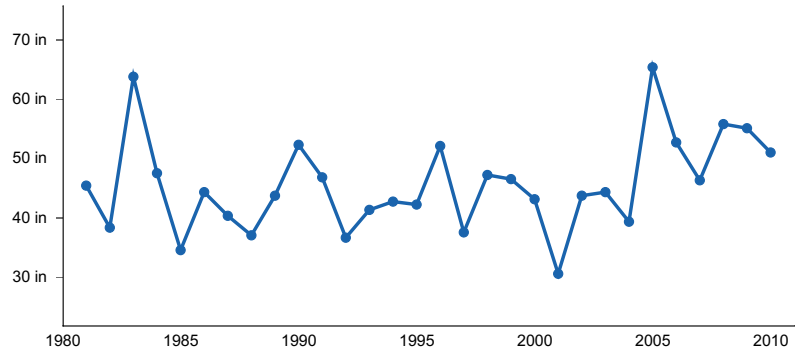


Figure 5. Annual precipitation pattern

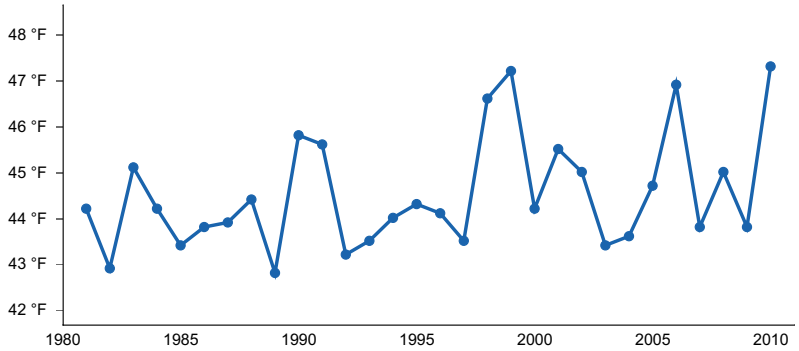


Figure 6. Annual average temperature pattern

Climate stations used

- (1) 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 are sandy throughout, sometimes with a thin sandy loam surface horizon. They formed in glaciofluvial deposits or meltout till deposited by receding glaciers. Rock fragments may or may not be present on the soil surface and throughout the profile. These soils are well- to excessively-drained.

The representative soils are Colton, Adams, Monadnock, Hermon, Udipsamments, Masardis, Hinckley, Windsor, Merrimac, Champlain, Boscawen, Gloucester, Duxbury, Groton, Stetson, Masardis variant, Teago, Pomfret, Windsor variant, and Caesar.

Table 4. Representative soil features

Parent material	(1) Outwash (2) Till (3) Supraglacial meltout till–granite and gneiss (4) Glaciofluvial deposits–schist
Surface texture	(1) Loamy sand (2) Sandy loam (3) Fine sandy loam (4) Gravelly sand
Drainage class	Moderately well drained to excessively drained
Permeability class	Very slow to rapid
Soil depth	60 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	2–9%
Available water capacity (1-6in)	Not specified
Soil reaction (1:1 water) (3.2-7.8in)	Not specified
Subsurface fragment volume <=3" (0-50in)	Not specified
Subsurface fragment volume >3" (0-35in)	Not specified

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, and future projects support validation through field work. *] The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer et al., 2003) and localized associations provided by the New York Natural Heritage Program (Edinger et al., 2014), Maine Natural Areas Program (Gawler and Cutko, 2010), New Hampshire Natural Heritage Program (Sperduto and Nichols, 2011), and Massachusetts Division of Fisheries and Wildlife (Swain, 2020).

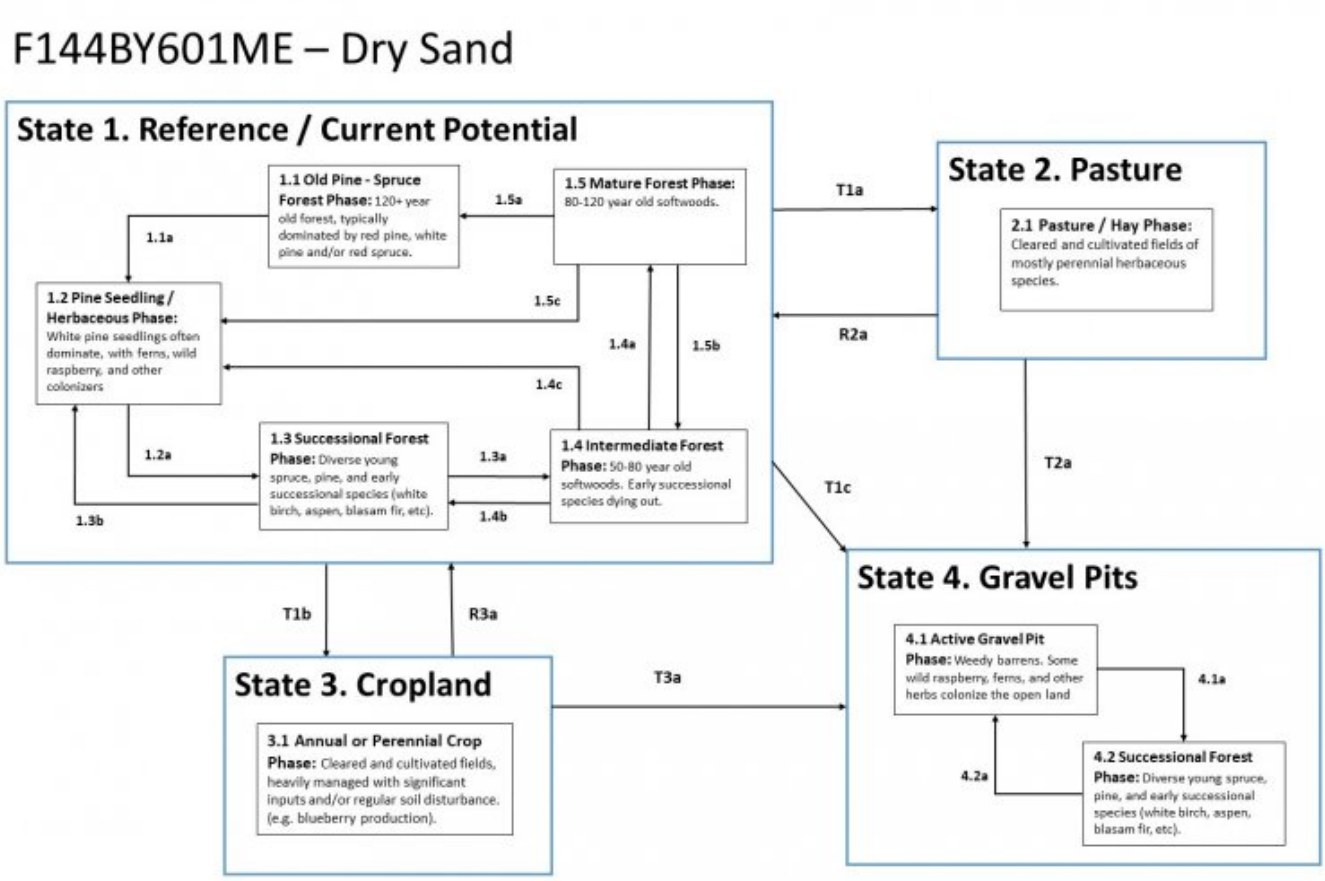
This site is typically dominated by red pine, white pine, and/or red spruce. Hemlock and other softwood species may also be abundant, and scattered hardwoods may be present. The understory is generally sparse.

On gentler slopes, 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.

This site includes the following state natural heritage program types:
• Red and White Pine Forest (Sperduto and Nichols 2004)
• Red and White Pine Forests (Gawler and Cutko 2010)
• White Pine Forests (Gawler and Cutko 2010)

State and transition model



State 1
Reference/ Current Potential

Community 1.1
Old Pine - Spruce Forest Phase: 120+Yrs

120+ year old forest, typically dominated by red pine, white pine and/or red spruce.

Dominant plant species

- eastern white pine (*Pinus strobus*), tree
- red spruce (*Picea rubens*), tree

Community 1.2
Pine Seedling/ Herbaceous Phase

White pine seedlings often dominate, with ferns, wild raspberry, and other colonizers.

Dominant plant species

- eastern white pine (*Pinus strobus*), tree

Community 1.3
Successional Forest Phase

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

Community 1.4
Intermediate Forest Phase: 50 - 80 yrs

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

Community 1.5
Mature Forest Phase: 80 - 120 yrs

80-120 year old hardwoods and softwoods.

Pathway P1.1-1.2
Community 1.1 to 1.2

clearcutting, blowdown, fire

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, fire

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

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

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

Future work is needed, as described in a future 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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Contributors

Christopher Mann

Approval

Nels Barrett, 9/27/2024

Acknowledgments

Nels Barrett and Nick Butler provided considerable review of this ecological site concept.

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	06/29/2020
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):

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**
