Ecological site F140XY021NY
Dry Outwash

Last updated: 10/01/2024
Accessed: 05/21/2025

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): 140X–Glaciated Allegheny Plateau and Catskill Mountains

This area is primarily in the Southern New York Section of the Appalachian Plateaus Province of the Appalachian Highlands. The top of the dissected plateau in this MLRA is broad and is nearly level to moderately sloping. The narrow valleys have steep walls and smooth floors. The Catskills in the east have steep slopes. Elevation is typically 650 to 1,000 feet on valley floors; 1,650 to 2,000 feet on the plateau surface; and 3,600 feet or more in parts of the Catskills.

The average annual precipitation in most of this area is 30 to 45 inches. Rainfall occurs as high-intensity, convective thunderstorms during the summer, but most of the precipitation in this area occurs as snow. The average annual temperature is 40 to 50 degrees F.

The dominant soil order in this MLRA is Inceptisols. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. Frigid soils are found within the higher elevations.

This area supports forest vegetation, particularly hardwood species. Beech-birch-maple and elm-ash-red maple are the potential forest types. The extent of oak species increases from east to west, particularly in areas of shallow and dry soils. In some areas conifers, such as white pine, are important. Aspen, hemlock, northern white-cedar, and black ash grow on the wetter soils. In some parts of the area, sugar maple has potential economic significance. Some of the major wildlife species in this area are white-tailed deer, cottontail, turkey, pheasant, and grouse.

Classification relationships

USDA NRCS:
LRR: R - Northeastern Forage and Forest Region
MLRA 140 - Glaciated Allegheny Plateau and Catskills Mountains

NY Natural Heritage Program Plant Community Classification:
Appalachian Oak-Pine Forest

PA Natural Heritage Program Plant Community Classification:
Dry oak - heath forest
Pitch pine - heath woodland

International Vegetation Classification Associations:
Eastern White Pine - (Northern Red Oak, Black Oak) - American Beech Forest (CEGL006293)
others?

NatureServe Ecological Systems:
Laurentian-Acadian Pine-Hemlock-Hardwood Forest (CES201.563)
Northeastern Interior Dry-Mesic Oak Forest (CES202.592)

Ecological site concept

Landform/Landscape Position:
The site occurs on outwash plains, terraces, moraines, kames, and eskers . Slopes range from 0 to 60 percent.

Soils:
The soils consists of very deep, well to somewhat excessively drained, gravelly soils that formed in glacialfluvial material. Representative soils are Tunkhannock, Chenango, Wyoming, and Allard.

Vegetation:
The reference community is oak-pine forest/woodland characterized by black oak, chestnut oak, eastern white pine, pitch pine, sassafras, black birch, American beech, witch-hazel, black huckleberry, lowbush blueberry, maple-leaved viburnum, and Pennsylvania sedge.

Associated sites

| F140XY022NY | **Moist Outwash** |
| F140XY018NY | **Moist Lake Plain** |

Similar sites

F140XY013PA	**High Floodplain**
F140XY014NY	**Low Floodplain**

Table 1. Dominant plant species

Tree	(1) *Quercus velutina* (2) *Pinus strobus*
Shrub	(1) *Gaylussacia baccata* (2) *Vaccinium angustifolium*
Herbaceous	(1) *Carex pensylvanica* (2) *Aralia nudicaulis*

Physiographic features

The site occurs on outwash plains, terraces, moraines, kames, and eskers . Slopes range from 0 to 60 percent.

Table 2. Representative physiographic features

Landforms	(1) Lake plain > Outwash plain (2) Mountains > Terrace (3) Outwash plain > Valley train (4) River valley > Stream terrace (5) Upland > Alluvial fan (6) Valley > Delta (7) Lake plain (8) Outwash terrace
Runoff class	Negligible to medium
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	49–2,460 ft
Slope	0–60%
Water table depth	36–72 in
Aspect	Aspect is not a significant factor

Climatic features

The Koppen-Geiger climate classification of the area in which this MLRA occurs is Dfb, Warm-summer humid continental. Mean annual precipitation is 43 inches and evenly distributed throughout the year. Rainfall occurs as high-intensity, convective

thunderstorms in the summer. However, snow comprises most of the precipitation in this area. Average frost-free and freeze-free days are 122 and 153, respectively, with the coldest temperatures and the shortest frost-free periods occurring in the high-elevation areas in the eastern part of the MLRA.

Table 3. Representative climatic features

| Frost-free period (characteristic range)	110-134 days
Freeze-free period (characteristic range)	136-168 days
Precipitation total (characteristic range)	38-49 in
Frost-free period (actual range)	101-136 days
Freeze-free period (actual range)	136-168 days
Precipitation total (actual range)	36-51 in
Frost-free period (average)	122 days
Freeze-free period (average)	154 days
Precipitation total (average)	43 in
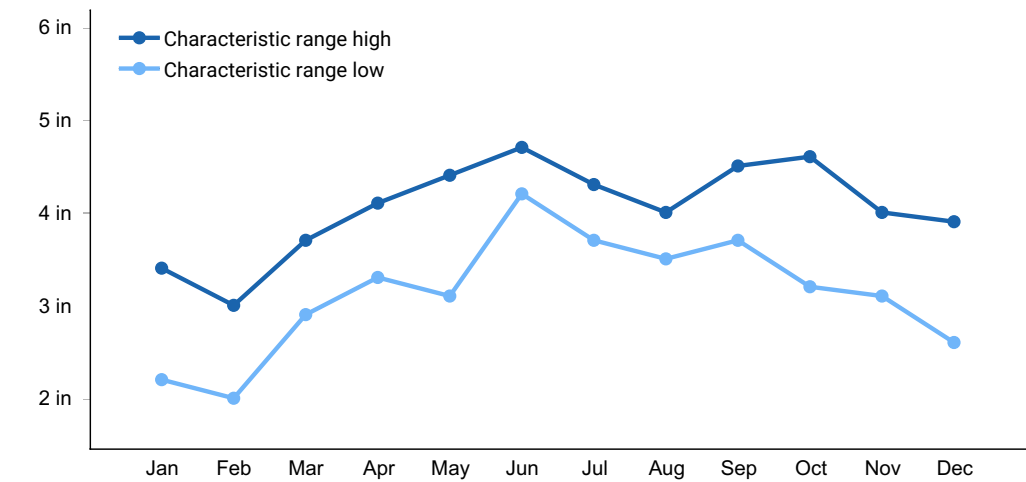
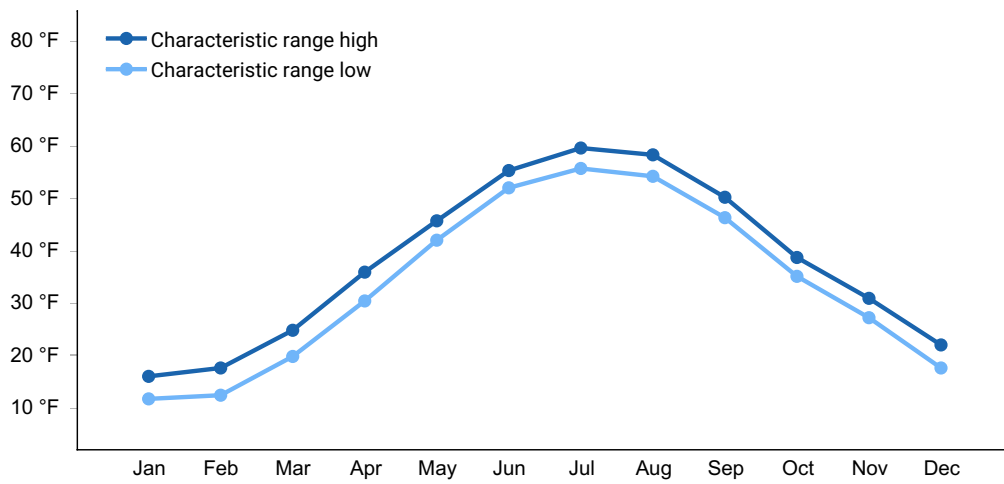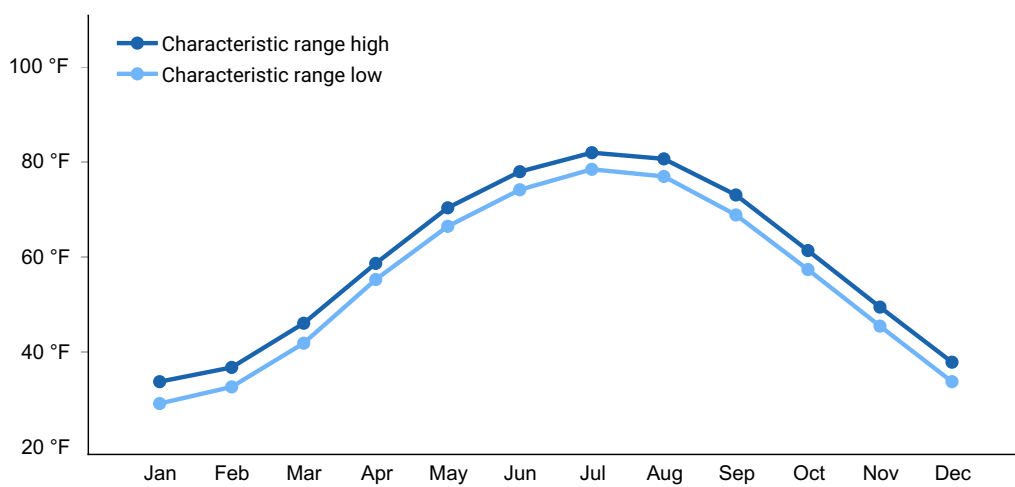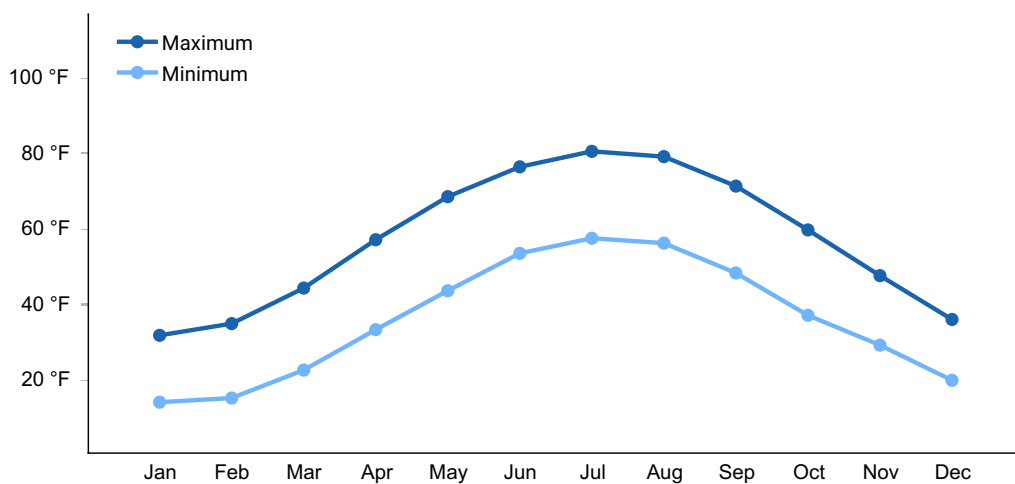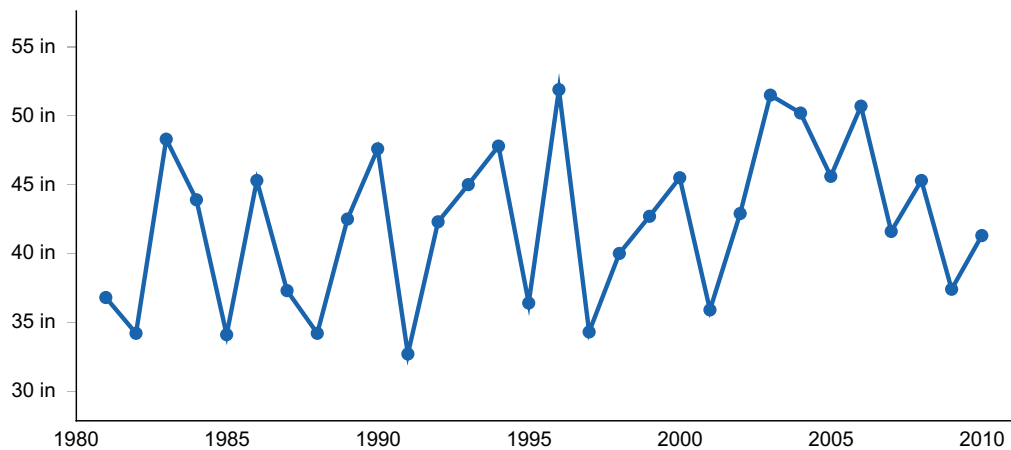**Figure 1. Monthly precipitation range**

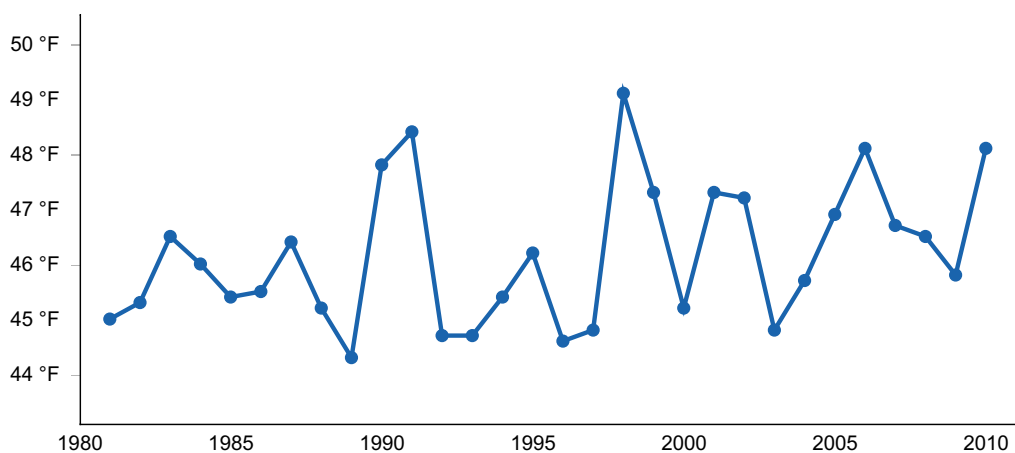**Figure 2. Monthly minimum temperature range**

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) BINGHAMTON [USW00004725], Johnson City, NY
- (2) STROUDSBURG [USC00368596], East Stroudsburg, PA
- (3) TOWANDA 1 S [USC00368905], Towanda, PA
- (4) MONTROSE [USC00365915], Montrose, PA
- (5) CORNING [USC00301787], Corning, NY
- (6) ROCK HILL 3 SW [USC00307210], Rock Hill, NY
- (7) CANTON [USC00361212], Canton, PA

Influencing water features

NONE

Wetland description

NONE

Soil features

The soils consists of very deep, well to somewhat excessively drained, gravelly soils that formed in glacialfluvial material. Representative soils are Allard, Alton, Arkport, Chenango, Colonie, Conotton, Haven, Hoosic, Howard, Plainfield, Riverhead, Tunkhannock, and Wyoming.

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits–shale and siltstone (2) Glaciofluvial deposits–sandstone (3) Alluvium–sedimentary rock (4) Eolian deposits–limestone (5) Glaciolacustrine deposits (6) Outwash
Surface texture	(1) Gravelly loam (2) Very gravelly sandy loam (3) Very fine sandy loam (4) Fine sandy loam (5) Silt loam (6) Gravelly fine sandy loam (7) Gravelly sandy loam (8) Gravelly loam (9) Channery loam (10) Channery silt loam (11) Fine gravelly sandy loam (12) Gravelly silt loam (13) Sandy loam (14) Loamy fine sand (15) Cobbly loam (16) Cobbly sandy loam (17) Very cobbly sandy loam
Family particle size	(1) Loamy-skeletal (2) Coarse-loamy (3) Coarse-loamy over sandy or sandy-skeletal (4) Coarse-silty over sandy or sandy-skeletal (5) Sandy-skeletal
Drainage class	Well drained to excessively drained
Permeability class	Moderately slow to rapid
Depth to restrictive layer	34–72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	2–10%
Available water capacity (Depth not specified)	2–7 in

|	
Soil reaction (1:1 water) (Depth not specified)	3.5–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–57%
Subsurface fragment volume >3" (Depth not specified)	0–53%

Ecological dynamics

The reference community is oak-pine forest/woodland characterized by black oak, chestnut oak, eastern white pine, pitch pine, sassafras, black birch, American beech, witch-hazel, black huckleberry, lowbush blueberry, mountain laurel, maple-leaved viburnum, and Pennsylvania sedge.
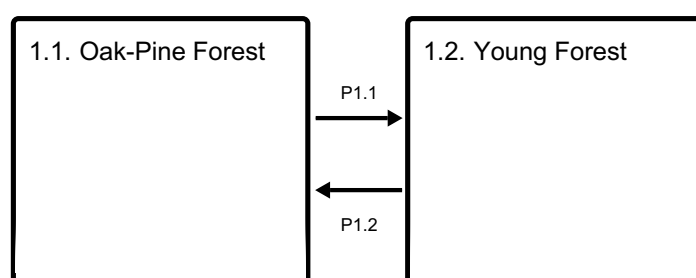
Disturbances or threats to these forests and woodlands include fragmentation, invasive species, over-browsing by deer, fire suppression, insects, and air pollution (New York Natural Heritage Program, 2020).

State and transition model

Ecosystem states
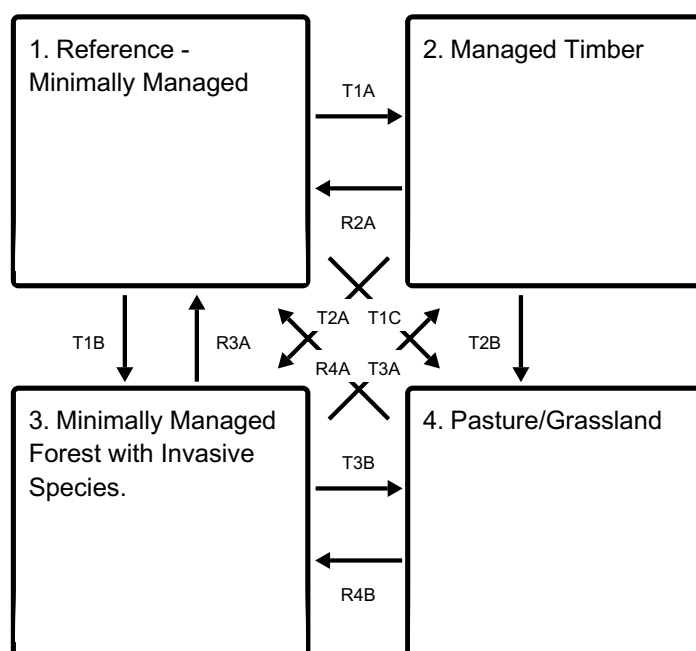
State 1 submodel, plant communities

State 2 submodel, plant communities

2.1. Managed Timber

State 3 submodel, plant communities

3.1. Oak-pine forest with invasive species

State 4 submodel, plant communities

4.1. Introduced grasses and forbs	→P4.1→ ←P4.2←	4.2. Woody plant encroachment

State 1
Reference - Minimally Managed

Reference is an oak-pine forest. Natural disturbances such and wind and ice storms, tree fall, insect damage will create openings for an early successional plant community or young forest. This forest may have at one time been cleared or plowed during colonial times.

Characteristics and indicators. Soil may have evidence of an historic plow layer (Ap horizon).

Resilience management. Ensure that regenerating trees and shrubs are not heavily browsed by deer that they cannot replace overstory trees. Deer have been shown to have negative effects on forest understories (New York Natural Heritage Program, 2020). Avoid cutting old-growth forests.

Community 1.1
Oak-Pine Forest

The reference community is oak-pine forest/woodland characterized by black oak, chestnut oak, eastern white pine, pitch pine, sassafras, black birch, American beech,

witch-hazel, black huckleberry, lowbush blueberry, mountain laurel, maple-leaved viburnum, and Pennsylvania sedge.

Dominant plant species

- oak (*Quercus*), tree
- maple (*Acer*), tree
- green ash (*Fraxinus pennsylvanica*), tree
- mapleleaf viburnum (*Viburnum acerifolium*), shrub
- sedge (*Carex*), grass

Community 1.2
Young Forest

More open canopy, black birch is a common early successional tree.

Pathway P1.1
Community 1.1 to 1.2

Natural disturbances - wind/ice storm, tree fall, and insect damage.

Conservation practices

Early Successional Habitat Development/Management

Pathway P1.2
Community 1.2 to 1.1

Time (succession).

State 2
Managed Timber

The state is characterized by active logging. Composition of forest stands will vary based on management objectives.

Community 2.1
Managed Timber

State 3
Minimally Managed Forest with Invasive Species.

Invasive species such as Japanese barberry, bush honeysuckle, multiflora rose, garlic mustard, and stiltgrass are common in the understory.

Community 3.1
Oak-pine forest with invasive species

State 4
Pasture/Grassland

Forest has been cleared and grasses and forbs have been introduced for livestock grazing, hay production, and/or wildlife.

Community 4.1
Introduced grasses and forbs

Community 4.2
Woody plant encroachment

Pathway P4.1
Community 4.1 to 4.2

Abandonment (lack of mowing or fire suppression)

Pathway P4.2
Community 4.2 to 4.1

Mowing, prescribed fire, and/or brush management.

Conservation practices

Brush Management

Transition T1A
State 1 to 2

Timber harvest; logging.

Transition T1B
State 1 to 3

Introduction of invasive species usually after disturbance.

Transition T1C
State 1 to 4

Land use conversion.

Restoration pathway R2A
State 2 to 1

Time (succession). Forest stand improvement, restoration.

Transition T2A
State 2 to 3

Introduction of invasive species. Lack of timber management.

Transition T2B
State 2 to 4

Land use conversion

Restoration pathway R3A
State 3 to 1

Brush management, invasive species management.

Transition T3A
State 3 to 2

Timber management/harvest, logging.

Transition T3B
State 3 to 4

Land use conversion.

Restoration pathway R4A
State 4 to 1

Abandonment, Time (succession), forest restoration.

Restoration pathway R4B
State 4 to 3

Abandonment, time (sucession) and introduction of invasive species.

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Table 7. Community 3.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)

Table 8. Community 3.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)

Inventory data references

Site Development and Testing Plan:
Future work to validate the vegetation information in this provisional ecological site description is needed. This will include field activities to collect low and medium intensity sampling and analysis of that data. Field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final approved level document. Reviews of the project plan are to be conducted by the Ecological Site Technical Team.

Other references

New York Natural Heritage Program. 2020. Online Conservation Guide for Appalachian oak-pine forest. Available from: https://guides.nynhp.org/appalachian-oak-pine-forest/. Accessed January 21, 2020.

Zimmerman, E., T. Davis, G. Podniesinski, M. Furedi, J. McPherson, S. Seymour, B. Eichelberger, N. Dewar, J. Wagner, and J. Fike (editors). 2012. Terrestrial and Palustrine Plant Communities of Pennsylvania, 2nd Edition. Pennsylvania Natural Heritage Program, Pennsylvania Department of Conservation and Natural Resources, Harrisburg, Pennsylvania.

Contributors

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Approval

Greg Schmidt, 10/01/2024

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	05/20/2020
Approved by	Greg Schmidt
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:**

   _____