USDA Natural Resources Conservation Service

Ecological site F144AY027MA
Moist Sandy Outwash

Last updated: 10/04/2024
Accessed: 05/12/2025

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): 144A–New England and Eastern New York Upland, Southern Part

MLRA 144A: New England and Eastern New York Upland, Southern Part. The eastern half of the eastern part of this MLRA is in the Seaboard Lowland Section of the New England Province of the Appalachian Highlands. The western half of the eastern part and the southeastern half of the western part are in the New England Upland Section of the same province and division. The northwestern half of the western part is in the Hudson Valley Section of the Valley and Ridge Province of the Appalachian Highlands. This MLRA is a very scenic area of rolling to hilly uplands that are broken by many gently sloping to level valleys that terminate in coastal lowlands. Elevation ranges from sea level to 1,000 feet (0 to 305 meters) in much of the area, but it is 2,000 feet (610 meters) on some hills. Relief is mostly about 6 to 65 feet (2 to 20 meters) in the valleys and about 80 to 330 feet (25 to 100 meters) in the uplands.
This area has been glaciated and consists almost entirely of till hills, drumlins, and bedrock-controlled uplands with a mantle of till. It is dissected by narrow glacio-fluvial valleys. The southernmost boundary of the area marks the farthest southward extent of Wisconsinian glaciation on the eastern seaboard. The river valleys and coastal plains are filled with glacial lake sediments, marine sediments, and glacial outwash. The bedrock in the eastern half of the area consists primarily of igneous and metamorphic rocks of early Paleozoic age. Granite is the most common igneous rock, and gneiss, schist, and slate are the most common metamorphic rocks. In the parts of the MLRA in eastern and southeastern New York, Devonian- to Pennsylvanian-age sandstone, shale, and limestone are dominant. Carbonate rocks, primarily dolomite and limestone, are the dominant kinds of bedrock in the part of this MLRA in northwestern Connecticut.

Classification relationships

USDA-NRCS (USDA 2006):
Land Resource Region (LRR): N—East and Central Farming and Forest Region
Major Land Resource Area (MLRA): 144A— New England and Eastern New York Upland, Southern Part.

USDA-FS (Cleland et al. 2007)
Province: 221 - Eastern Broadleaf Province
Section: 221A - Lower New England
Subsection: 221Aa – Boston Basin
221Ac – Narragansett-Bristol Lowland and Islands
221Ad – Southern New England Coastal Lowland
221Ae – Hudson Highlands
221Ag - Southeast New England Coastal Hills and Plains
221Ah - Worcester-Monadnock Plateau
221Ai – Gulf of Maine Coastal Plain
221Ak - Gulf of Maine Coastal Lowland
Section: 221B – Hudson Valley
Subsection: 221Ba – Hudson Limestone Valley

221Bb - Miami – Taconic Foothills
221Bc – Hudson Glacial Lake Plains

Ecological site concept

The Moist Sandy Outwash ecological site consists of very deep, moderately well drained soils formed in glaciofluvial deposits. They are nearly level to strongly sloping soils on terraces, deltas, and outwash plains. Representative soils are Amostown, Castile, Deerfield, Eldridge, Elnora, Horseneck, Pascack, Pompton, Stafford and Sudbury,. These sites are very similar to the Moist Silty Outwash counterpart, but have fewer ferns and a less diverse understory. The representative plant communities are varied but consist largely of northern red oak (*Quercus rubra*), and occasional white oak (*Quercus alba*) or black oak (*Quercus velutina*),) and red maple (*Acer rubrum*) with occasional tulip tree (Liriodendrion tulipfera), and occasional pines (pitch pine (*Pinus rigida*) and white pine (*Pinus strobus*).

Associated sites

F144AY022MA	**Dry Outwash**
F144AY028MA	**Wet Outwash**

Similar sites

F144AY010NH	**Sandy High Floodplain**
F144AY025MA	**Semi-Rich Moist Outwash**

Table 1. Dominant plant species

Tree	(1) *Quercus rubra* (2) *Acer rubrum*
Shrub	(1) *Vaccinium corymbosum*
Herbaceous	(1) *Osmunda cinnamomea*

Physiographic features

This site occurs across a range of landforms and is not subject to flooding.

Table 2. Representative physiographic features

Landforms	(1) Delta plain > Beach ridge (2) Lake plain > Delta (3) Outwash plain > Depression (4) Till plain > Lakebed (5) Lowland > Drainageway (6) River valley > Outwash plain (7) Valley > Terrace (8) Flat (9) Flood plain (10) Lake plain (11) Lake terrace (12) Outwash terrace (13) Valley (14) Valley train
Runoff class	Negligible to very high
Flooding frequency	None
Ponding frequency	None to occasional
Elevation	0–1,158 m
Slope	0–8%

Water table depth	0–76 cm
Aspect	Aspect is not a significant factor

Climatic features

The Koppen-Geiger climate classification of the area in which this MLRA occurs varies between Dfb (Warm-summer humid continental) in the North, and Dfa (Hot-summer humid continental) in the southern portion of the MLRA. Precipitation is usually uniformly distributed throughout the year. Near the coast, however, it is slightly lower in summer. Precipitation is slightly higher in spring and fall in inland areas. Rainfall occurs as high-intensity, convective thunderstorms during the summer. During the winter, most of the precipitation occurs as moderate-intensity storms (northeasters) that produce large amounts of rain or snow. The freeze-free period increases in length to the south.

Table 3. Representative climatic features

Frost-free period (characteristic range)	127-145 days
Freeze-free period (characteristic range)	147-188 days
Precipitation total (characteristic range)	1,092-1,219 mm
Frost-free period (actual range)	117-173 days
Freeze-free period (actual range)	146-208 days
Precipitation total (actual range)	1,041-1,219 mm
Frost-free period (average)	140 days
Freeze-free period (average)	173 days
Precipitation total (average)	1,143 mm

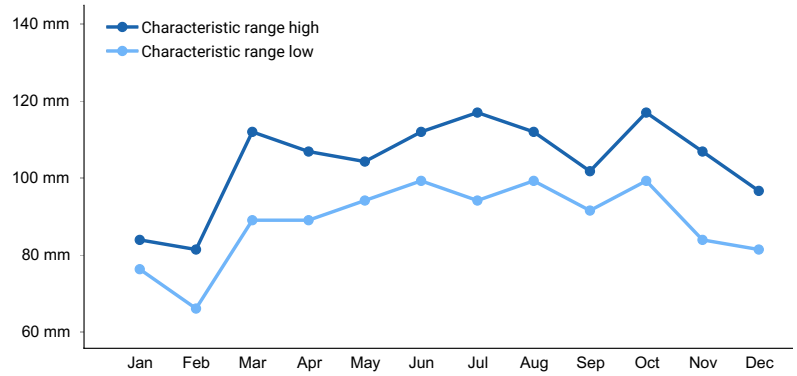


Figure 1. Monthly precipitation range

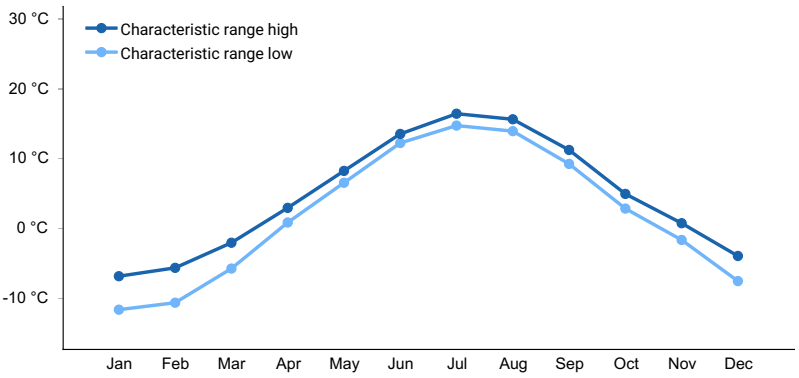


Figure 2. Monthly minimum temperature range

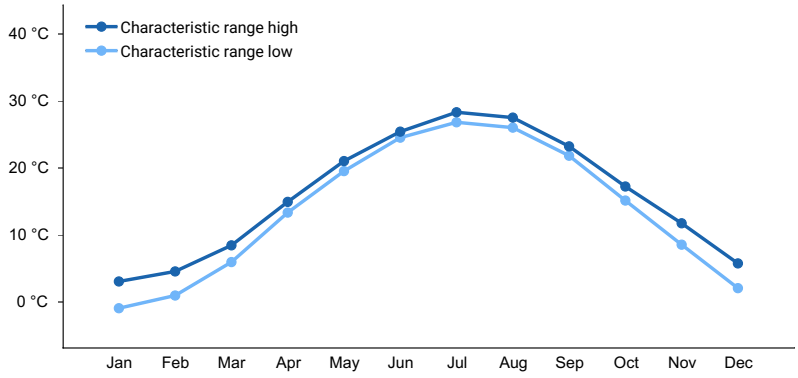


Figure 3. Monthly maximum temperature range

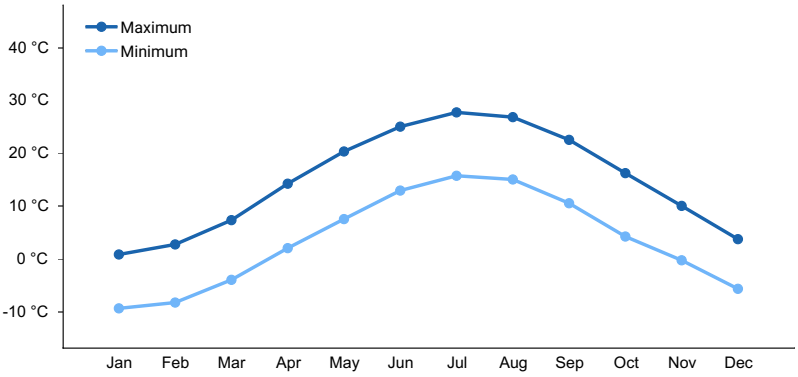


Figure 4. Monthly average minimum and maximum temperature

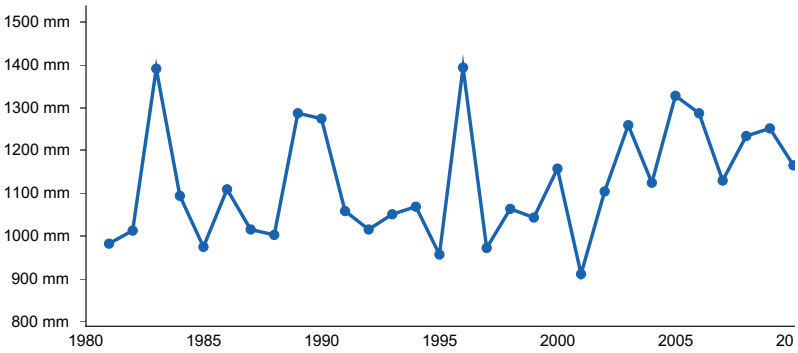


Figure 5. Annual precipitation pattern

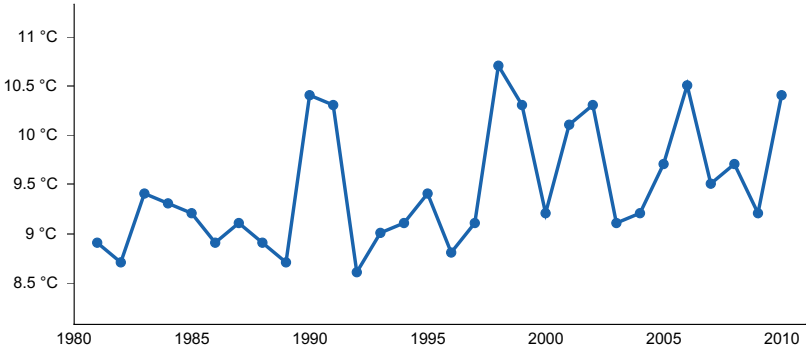


Figure 6. Annual average temperature pattern

Climate stations used

- (1) RUTLAND [USC00436995], Rutland, VT
- (2) GLOVERSVILLE [USC00303319], Gloversville, NY
- (3) COPAKE [USC00301761], Copake, NY

- (4) BELVIDERE BRG [USC00280734], Bangor, NJ
- (5) BRIDGEPORT SIKORSKY MEM AP [USW00094702], Stratford, CT
- (6) NEW BEDFORD MUNI AP [USW00094726], New Bedford, MA
- (7) DURHAM 2 N [USW00054794], Madbury, NH
- (8) BELCHERTOWN [USC00190562], Belchertown, MA

Influencing water features

Poorly drained
Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. Internal free water occurrence is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow depth. Free water at shallow depth is common. The water table is commonly the result of low or very low saturated hydraulic conductivity, nearly continuous rainfall, or a combination of these.

Very poorly drained
Water is removed from the soil so slowly that free water remains at or very near the surface during much of the growing season. Internal free water occurrence is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. In areas where rainfall is high or nearly continuous, slope gradients may be greater.

Wetland description

National Wetland Classification (Cowardin et al., 1979):

Palustrine, class variable, leaf morphology variable, water regime variable, chemistry modifier variable.

Soil features

This site consists of shallow to very deep, very poor to moderately well drained soils formed in a variety of parent materials. Representative soils are Amostown, Castile, Deerfield, Eldridge, Elnora, Horseneck, Pascack, Pompton, Stafford and Sudbury,.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–basalt (2) Glaciofluvial deposits–gneiss (3) Outwash–metamorphic rock (4) Glaciolacustrine deposits–sandstone (5) Schist (6) Shale and siltstone (7) Quartzite
Surface texture	(1) Fine sandy loam (2) Silt loam (3) Loamy fine sand (4) Fine sand (5) Sandy loam (6) Sand (7) Loam (8) Muck (9) Gravelly fine sandy loam (10) Gravelly silt loam
Family particle size	(1) Coarse-loamy (2) Coarse-loamy over sandy or sandy-skeletal (3) Loamy-skeletal (4) Sandy (5) Sandy over loamy
Drainage class	Very poorly drained to moderately well drained

Permeability class	Very slow to rapid
Depth to restrictive layer	36–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	2.54–45.72 cm
Soil reaction (1:1 water) (Depth not specified)	3.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0–15%

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, not yet validated with field work.*]

The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003). Terrestrial ecological SYSTEMS are specifically defined as a group of plant community-types called ASSOCIATIONS that tend to [co-]occur within landscapes with similar ecological processes, substrates, and/or environmental gradients. Any given system will typically manifest itself in a landscape at intermediate geographic scales of tens-to-thousands of hectares and will persist for 50 or more years. A vegetation association is a plant community that is much more specific to a given soil, geology, landform, climate, hydrology, and disturbance history. It is the basic unit for vegetation classification and recognized by the US National Vegetation Classification (US FDGC 2008). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (tree, sapling, shrub, and herb). Within the NatureServe Explorer database (NatureServe, 2015), ecological systems are numbered by a Community Ecological System Code (CES) and individual vegetation associations are assigned an identification number called a Community Element Global Code (CEGL).

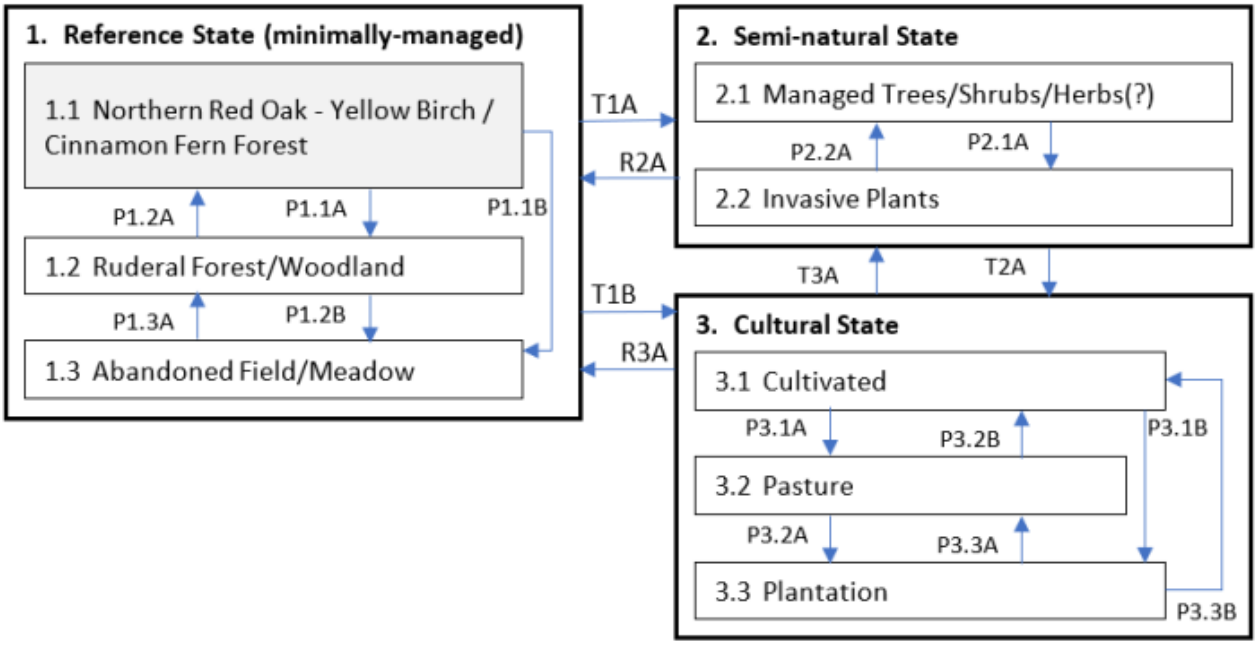
Additional and more localized vegetation information is provided by the State Natural Heritage Programs of Connecticut (Metzler and Barrett 2001), Massachusetts (Swain and Kearsley 2001), New Hampshire (Sperduto and Nichols, 2011), New York (Edinger et al., 2014), and Rhode Island (Enser and Lungren, 2006).

The Moist Sandy Outwash ecological site is characteristic of the Northern Atlantic Coastal Plain Hardwood Forest system (CES203.475) and North-Central Appalachian Acidic Swamp system (CES202.604). The representative plant communities are varied but consist largely of oaks northern red oak (*Quercus rubra*), and occasionally white oak (*Quercus alba*)) and red maple (*Acer rubrum*) with occasional tulip tree (Liriodendrion tulipfera), and occasional pines (pitch pine (*Pinus rigida*) and white pine (*Pinus strobus*). Natural disturbances include climate extremes such as, excessive droughts, or storm activity ranging from windthrows to downbursts to ice-storms. Atmospheric deposition may effect trees at high elevations. Wildfires do happen but are largely suppressed. Other agents-of-change include land conversions and fragmentation by agricultural, development and logging. Invasive plants include tree-of-heaven (*Ailanthus altissima*), European buckthorn (*Rhamnus cathartica*), multiflora rose (*Rosa multiflora*) and Japanese barberry (*Berberis thunbergii*).

[*Caveat] The information presented is representative of very complex vegetation communities. Key indicator plants and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and geography. The reference plant community is not necessarily the management goal. The drafts of species lists are merely representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

State and transition model

144AY027 – Moist Sandy Outwash



Transition	*Drivers/practices*
T1A	Forest mgmt., Disturbance
T1B, T2A	Disturbance/cutting/clearing, Brush removal
R2A, R2B	Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment
T3A	Abandonment, Plant establishment, Forest mgmt.
P2.1A	Disturbance, Invasive species establishment
P2.2A	Invasive spp. Control, Forest mgmt..
P1.3A, P1.2A	Abandonment, succession
P3.1A, P3.2A, P3.3A, P3.1B, P3.2B, P3.3B	Changing agricultural phases
P1.1A, P1.1B, P1.2B	Disturbance, Early Successional Habitat Development

State 1
Reference State (Minimally-managed)

The reference community type is characterized by: *Quercus rubra - Betula alleghaniensis / Osmunda cinnamomea* Forest Translated Name: Northern Red Oak - Yellow Birch / Cinnamon Fern Forest Common Name: Upland/Wetland Transitional Forest (CEGL006000)

Community 1.1
Northern Red Oak - Yellow Birch / Cinnamon Fern Forest (CEGL006000)

Quercus rubra - Betula alleghaniensis / Osmunda cinnamomea Forest Translated Name: Northern Red Oak - Yellow Birch / Cinnamon Fern Forest Common Name: Upland/Wetland Transitional Forest (CEGL006000) The tree canopy is nearly closed, with tree height reflecting moisture availability. Dominant species include red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), northern red oak (*Quercus rubra*), and black oak (*Quercus velutina*). Occasionally white oak (*Quercus alba*), pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*), and eastern hemlock (*Tsuga canadensis*) as well as tuliptree (*Liriodendron tulipifera*) may occur. The shrub layer includes witch hazel (*Hamamelis virginiana*), highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush

(*Clethra alnifolia*), mountain laurel (*Kalmia latifolia*), and northern spicebush (*Lindera benzoin*). Herb layer is often dominated by ferns cinnamon fern (*Osmunda cinnamomea*), interrupted fern (*Osmunda claytoniana*), New York fern (*Thelypteris noveboracensis*), Jack-in-the-pulpit (*Arisaema triphyllum*), and sessile-leaved bellwort (*Uvularia sessilifolia*). Jewelweed (*Impatiens capensis*), American false hellebore (*Veratrum viride*), and skunk cabbage (*Symplocarpus foetidus*) may also occur where this vegetation grades into a wetland forest. (Source: NatureServe 2018 [accessed 2019], USNVC 2017 [accessed 2019]). Cross-referenced plant community concepts (typically by political State): CT: Red maple -yellow birch /cinnamon fern Swamp (Metzler and Barrett, 2006) MA: Red Maple Swamp (Swain and Kearsley, 2001) NH: Red maple – red oak / cinnamon fern Swamp (Sperduto and Nichols, 2011) NY: Red maple hardwood Swamp (Edinger et al., 2014) RI: Red maple – decisuous shrub Swamp (Enser and Lundgren, 2006)

Dominant plant species

- red maple (*Acer rubrum*), tree
- northern red oak (*Quercus rubra*), tree
- highbush blueberry (*Vaccinium corymbosum*), shrub
- cinnamon fern (*Osmunda cinnamomea*), other herbaceous

Community 1.2
Ruderal Forest/Woodland

Community 1.3
Abandoned Field/Meadow

Pathway P1.1A
Community 1.1 to 1.2

Disturbance, early successional habitat development

Pathway P1.1B
Community 1.1 to 1.3

Disturbance, early successional habitat development

Pathway P1.2A
Community 1.2 to 1.1

Abandonment, succession

Pathway P1.2B
Community 1.2 to 1.3

Disturbance, early successional habitat development

Pathway P1.3A
Community 1.3 to 1.2

Abandonment, succession

State 2
Semi-natural State

The Semi-natural State would expect plant communities where ecological processes are primarily operating with some land conditioning in the past or present, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants.

Community 2.1

Managed trees/shrubs/herbs(?)

Community 2.2
Invasive Plants

Pathway P2.1A
Community 2.1 to 2.2

Disturbance, invasive species management

Pathway P2.2A
Community 2.2 to 2.1

Invasive species control, forest management

State 3
Cultural State

The Cultural State would expect the ecological site to be very strongly conditioned by land management conversion, by transformation to Cultivated/Pasture/Plantation.

Community 3.1
Cultivated

Community 3.2
Pasture

Community 3.3
Plantation

Pathway P3.1A
Community 3.1 to 3.2

Changing agricultural phases

Pathway P3.1B
Community 3.1 to 3.3

Changing agricultural phases

Pathway P3.2A
Community 3.2 to 3.1

Changing agricultural phases

Pathway P3.2B
Community 3.2 to 3.3

Changing agricultural phases

Pathway P3.3A
Community 3.3 to 3.1

Changing agricultural phases

Pathway P3.3B

Community 3.3 to 3.2

Changing agricultural phases

Transition T1A
State 1 to 2

Forest management, disturbance

Transition T1B
State 1 to 3

Disturbance/cutting/clearing, brush removal

Restoration pathway R2A
State 2 to 1

Restoration and management, forest stand improvement, early successional habitat development, upland wildlife management, invasive species control, plant establishment

Transition T2A
State 2 to 3

Disturbance/cutting/clearing, brush removal

Restoration pathway R3A
State 3 to 1

Restoration and management, forest stand improvement, early successional habitat development, upland wildlife management, invasive species control, plant establishment

Transition T3A
State 3 to 2

Abandonment, plant establishment, forest management

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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Approval

Greg Schmidt, 10/04/2024

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Michael Margo and tech team provided earlier drafts. Josh Hibit made compliance updates w/ 2021 Checklist V.2

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	05/12/2025
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:

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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:**
