USDA Natural Resources Conservation Service

Ecological site RX141X501
Loamy Slopes

Last updated: 10/03/2024
Accessed: 05/14/2025

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): 141X–Tug Hill Plateau

MLRA 141 is entirely in New York and makes up about 1,173 square kilometers (3,037 square kilometers). It consists of a relatively small but unique upland that lies just off the eastern end of Lake Ontario and west of the Black River Valley and Adirondack Mountain region. It is essentially a north- and east-facing glaciated cuesta scarp and is underlain by thick Wisconsin till and small areas of outwash. Most of the plateau is woodland, so forestry and recreation are the primary uses, but small isolated dairy operations and hobby farms are located around the perimeter.

The area is bordered on the east by the Black River Valley, on the north by the St. Lawrence Lowland, on the west by the Ontario Lowland, and on the south by the Upper Mohawk Valley. The northern and eastern boundaries of MLRA 141 are distinct where they contact the physiographically dissimilar southwestern part of MLRA 142 (St. Lawrence-Champlain Plain). The western and southern boundaries are also distinct where they contact the physiographically dissimilar MLRA 101 (Ontario-Erie Plain and Finger Lakes Region).

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, and beech, with diverse hardwood associates. Shallower and wetter inclusions in this site typically produce more softwoods, including red spruce, hemlock, northern white cedar, and balsam fir. This site is likely overmapped. Perhaps a Mod-deep Loamy (mixedwood) concept and/or a Loamy Upland Flats (spruce-fir) concept could reflect consistent, meaningful patterns between vegetation and soil properties.

Associated sites

RX141X502	**Loamy Till Toeslope** This ecological site may be adjacent to Loamy Slopes on the landscape.
RX141X506	**Calcareous Till Slope** This ecological site may be adjacent to Loamy Slopes on the landscape.
RX141X507	**Calcareous Till Toeslope** This ecological site may be adjacent to Loamy Slopes on the landscape.

Similar sites

RX141X502	**Loamy Till Toeslope** Loamy Slope sites may transition into this ecological site and may have some overlap in vegetative composition and soil properties.

Table 1. Dominant plant species

Tree	(1) *Betula alleghaniensis* (2) *Acer saccharum*
Shrub	(1) *Viburnum lantanoides* (2) *Carpinus caroliniana*
Herbaceous	(1) *Dryopteris intermedia* (2) *Maianthemum canadense*

Legacy ID

F141XY501NY

Physiographic features

Table 2. Representative physiographic features

Landforms	(1) Till plain > Low hill (2) Till plain > Drumlinoid ridge (3) Alluvial fan (4) Terrace (5) Bench (6) Ridge (7) Delta (8) Outwash plain (9) Lake plain (10) Valley train (11) Drumlin
Runoff class	Low to very high
Elevation	61–635 m
Water table depth	48–183 cm
Aspect	Aspect is not a significant factor

Climatic features

Throughout the year precipitation is evenly distributed around most of this area with slightly less rainfall occurring around the lower margins of the plateau. Rainfall occurs as high-intensity, convective thunderstorms during the summer. Lake-effect snowfall is heavy from late autumn to early spring with the summit of the plateau having the lowest temperatures and the shortest freeze-free periods.

Climate stations Watertown and Old Forge are adjacent to the MLRA and were used to tabulate additional representative climate data.

Table 3. Representative climatic features

Frost-free period (characteristic range)	92-124 days
Freeze-free period (characteristic range)	129-159 days
Precipitation total (characteristic range)	1,194-1,346 mm
Frost-free period (actual range)	86-131 days
Freeze-free period (actual range)	119-164 days

Precipitation total (actual range)	1,118-1,448 mm
Frost-free period (average)	108 days
Freeze-free period (average)	143 days
Precipitation total (average)	1,270 mm

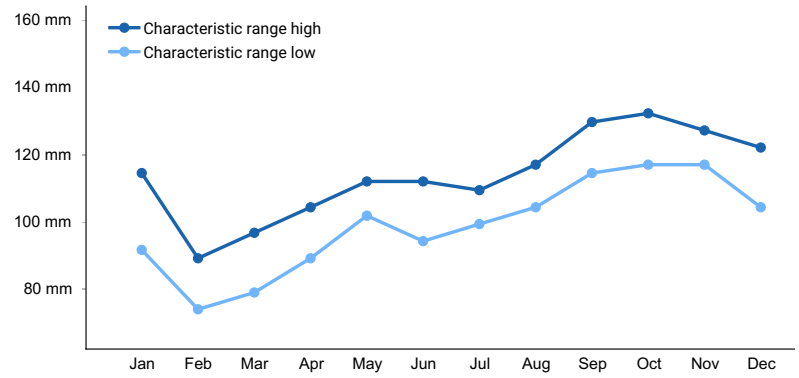


Figure 1. Monthly precipitation range

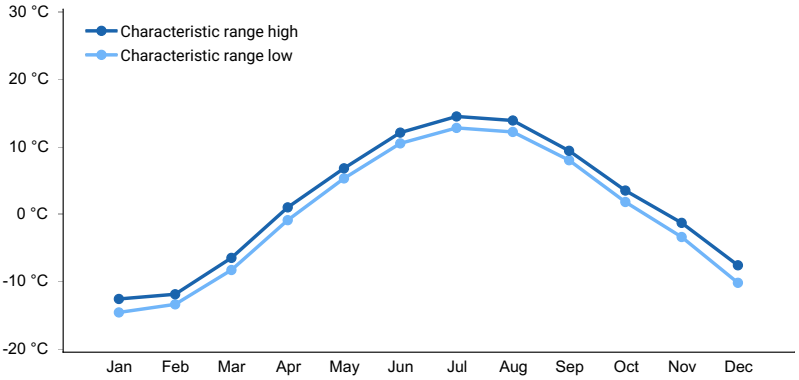


Figure 2. Monthly minimum temperature range

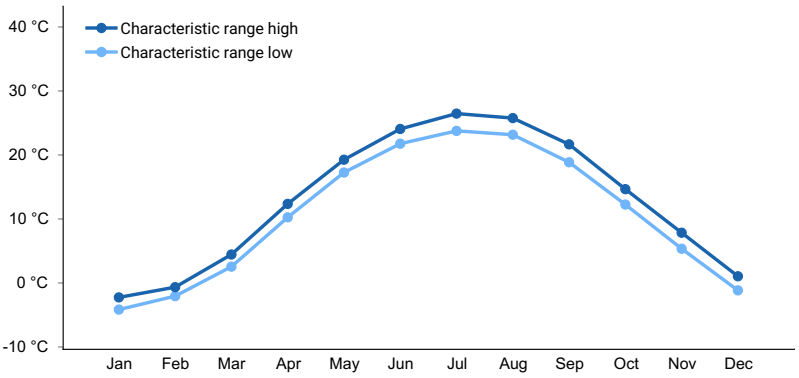


Figure 3. Monthly maximum temperature range

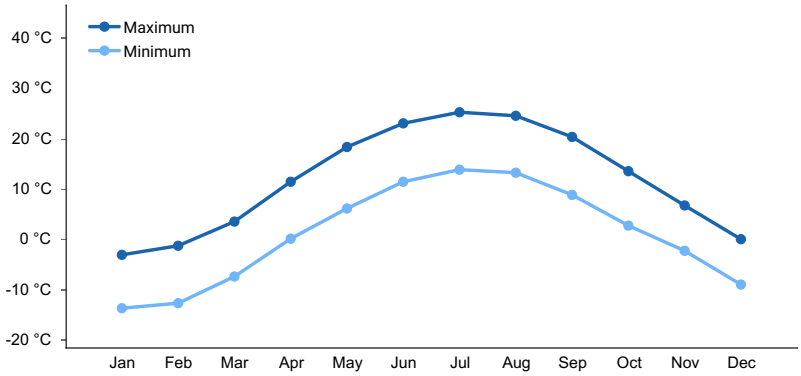


Figure 4. Monthly average minimum and maximum temperature

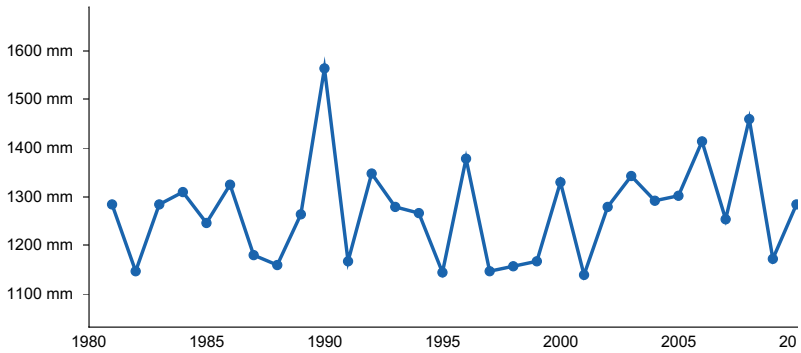


Figure 5. Annual precipitation pattern

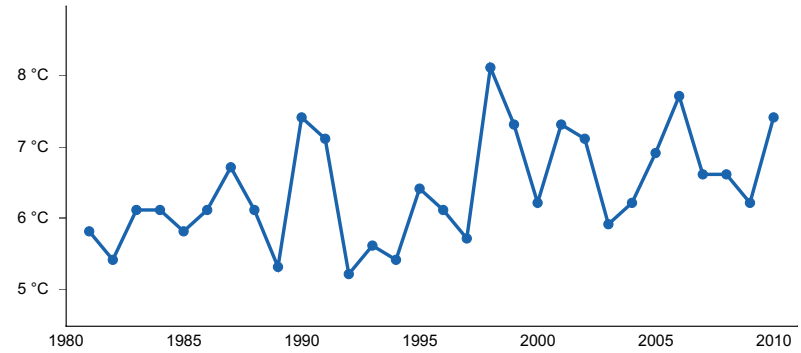


Figure 6. Annual average temperature pattern

Climate stations used

- (1) BOONVILLE 4 SSW [USC00300785], Boonville, NY
- (2) CAMDEN [USC00301110], Camden, NY
- (3) WATERTOWN [USC00309000], Watertown, NY
- (4) OLD FORGE [USC00306184], Eagle Bay, NY

Influencing water features

Soil features

Table 4. Representative soil features

Parent material	(1) Glaciofluvial deposits–acid shale (2) Glaciolacustrine deposits (3) Eolian deposits (4) Glaciofluvial deposits–sandstone and siltstone (5) Till–sedimentary rock (6) Till–shale and siltstone

Surface texture	(1) Channery loam (2) Silt (3) Very fine sand (4) Gravelly loamy sand (5) Loam
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderate
Soil depth	51–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–9%
Available water capacity (7.6-17.8cm)	Not specified
Soil reaction (1:1 water) (8.9-21.3cm)	Not specified
Subsurface fragment volume <=3" (15.2-81.3cm)	Not specified
Subsurface fragment volume >3" (5.1-38.1cm)	Not specified

Ecological dynamics

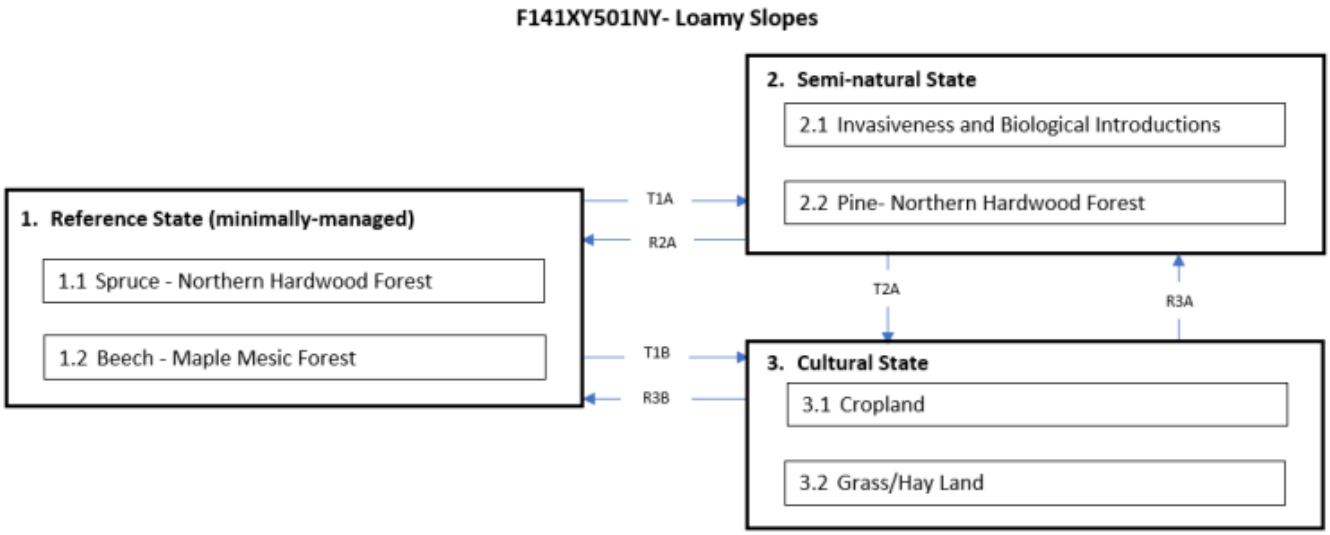
Caveat: The vegetation information contained in this section and is only provisional, based on concepts, and future projects support validation through field work. *] The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003) and localized associations provided by the New York Natural Heritage Program (Edinger et al. 2014).

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 and beech. However, where soils somewhat shallower or wetter than the typical site concept there is often more red spruce, balsam fire, white birch and eastern hemlock present in the community.

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. When cropland or pastureland management ceases, 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



Transition	*Drivers/practices*
T1A	climate change, dominant hardwood loss, introduction of invasive species, pests, and pathogens
R2A	management of invasive species, pests, and pathogens, restoration of key native plant species, restoration of terrestrial habitat, white pine thinning
T1B, T2A	landscape alteration, logging, mechanical soil disturbance, landscape clearing, seeding, planting
R3A, R3B	seeding, planting, restoration of compacted soil, establishment of key native plant species

State 1
Reference State (minimally-managed)

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 and beech. However, where soils somewhat shallower or wetter than the typical site concept there is often more red spruce, balsam fire, white birch and eastern hemlock present in the community. On gentler slopes, this site may be cultivated for crop or pasture. When cropland or pastureland management ceases, 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.

Resilience management. 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.

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates

Community 1.1
Spruce - Northern Hardwood Forest

A mixed forest that occurs on lower mountain slopes and upper margins of flats on glacial till. This is a broadly defined community with several regional and edaphic variants. Codominant trees are red spruce (*Picea rubens*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*), with scattered balsam fir (*Abies balsamea*). Striped maple (*Acer pensylvanicum*) and mountain maple (*A. spicatum*) are common subcanopy trees. Characteristic shrubs are hobblebush (*Viburnum*

lantanoides), American fly honeysuckle (*Lonicera canadensis*), and Canada yew (*Taxus canadensis*). Characteristic groundlayer plants are common wood-sorrel (*Oxalis montana*), common wood fern (*Dryopteris intermedia*), shining fir clubmoss (*Huperzia lucidula*), wild sarsaparilla (*Aralia nudicaulis*), blue bead-lily (*Clintonia borealis*), goldthread (*Coptis trifolia*), bunchberry (*Cornus canadensis*), Canada mayflower (*Maianthemum canadense*), Indian cucumber-root (*Medeola virginiana*), and twisted stalk (Streptopus roseus). (Edinger et al. 2014)

Resilience management. New York Natural Heritage Program State Rank: S3/S4 S3- Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State. S4- Apparently secure in New York State.

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates

Community 1.2
Beech - Maple Mesic Forest

Anorthern hardwood forest with sugar maple (*Acer saccharum*) and American beech (*Fagus grandifolia*) codominant. This is a broadly defined community type with several regional and edaphic variants. These forests occur on moist, well-drained, usually acid soils. Common associates are yellow birch (*Betula alleghaniensis*), white ash (*Fraxinus americana*), hop hornbeam (*Ostrya virginiana*), and red maple (*Acer rubrum*). Characteristic small trees or tall shrubs are hobblebush (*Viburnum lantanoides*), American hornbeam (*Carpinus caroliniana*), striped maple (*Acer pensylvanicum*), witch hazel (*Hamamelis virginiana*), and alternate-leaved dogwood (*Cornus alternifolia*). Typically there is also an abundance of tree seedlings, especially of sugar maple; American beech and sugar maple saplings are often the most abundant “shrubs” and small trees. Eastern hemlock (*Tsuga canadensis*) may be present at a low density. In the Adirondacks a few red spruce (*Picea rubens*) may also be present. Characteristic herbs are woodferns (*Dryopteris intermedia*, *D. carthusiana*, *D. marginalis*), Canada mayflower (*Maianthemum canadense*), Christmas fern (*Polystichum acrostichoides*), white wood aster (*Eurybia divaricata*), common wood-sorrel (*Oxalis montana*), Pennsylvania sedge (*Carex pensylvanica*), jack-in-the-pulpit (*Arisaema triphyllum*), sarsaparilla (*Aralia nudicaulis*), shining fir clubmoss (*Huperzia lucidula*), bearded short-husk (*Brachyelytrum erectum*), white snakeroot (*Ageratina altissima* var. altissima), violets (Viola spp.), star flower (*Trientalis borealis*), partridge berry (*Mitchella repens*), Solomon's-seals (*Polygonatum pubescens*, *P. biflorum*), foam flower (*Tiarella cordifolia*), false Solomon's seal (*Maianthemum racemosum*), whorled aster (*Oclemena acuminata*), Indian cucumber-root (*Medeola virginiana*), wreath goldenrod (*Solidago caesia*), trilliums (*Trillium undulatum*, *T. erectum*), mayapple (*Podophyllum peltatum*), troutlily (*Erythronium americanum*), and sessile-leaved bellwort (*Uvularia sessilifolia*). In forests that have American beech as a codominant tree, beech-drops (*Epifagus virginiana*) are common. Hay-scented fern (*Dennstaedtia punctilobula*) may be common in canopy gaps. There are many spring ephemerals which bloom before the canopy trees leaf out. (Edinger et al. 2014)

Resilience management. New York Natural Heritage Program State Rank: S4- Apparently secure in New York State. Sugar maple leaf litter is high in nitrogen relative to lignin and thus decomposes rapidly, increasing the nutrient pool in the soil organic layer. Structure and composition of the forest are maintained primarily by single small tree-fall gaps. Yellow birch is maintained in the system by mineral soils on "tip up mounds."

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates

State 2
Semi-natural State

Shifts in ecological site composition, functionality, and dynamics driven by natural disturbances, processes, and pressures (may have some anthropogenic drivers). More research is needed to determine the extent of the Semi-

natural state associated with this ecological site.

Dominant resource concerns

- Ponding and flooding
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Wildfire hazard from biomass accumulation
- Terrestrial habitat for wildlife and invertebrates

Community 2.1
Invasiveness and Biological Introductions

Introduction of invasive species, pathogens, and/or pests resulting in shifts in ecological site composition, functionality, and dynamics. More research is needed to determine the extent of these effects on the semi-natural state associated with this ecological site.

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates

Community 2.2
Pine - Northern Hardwood Forest

A mixed forest that occurs on gravelly outwash plains, delta sands, eskers, and dry lake sands. The dominant trees are white pine (*Pinus strobus*) and red pine (*P. resinosa*); these are mixed with scattered paper birch (*Betula papyrifera*) and quaking aspen (*Populus tremuloides*). In some stands there is an admixture of other northern hardwoods and conifers such as yellow birch (*Betula alleghaniensis*), red maple (*Acer rubrum*), balsam fir (*Abies balsamea*), and red spruce (*Picea rubens*); these are never common in a pine-northern hardwood forest. Characteristic shrubs are blueberries (*Vaccinium angustifolium*, *V. myrtilloides*), sheep laurel (*Kalmia angustifolia*), wild raisin (*Viburnum nudum* var. cassinoides), and serviceberry (*Amelanchier canadensis*). Characteristic herbs are bracken fern (*Pteridium aquilinum* var. latiusculum), wintergreen (*Gaultheria procumbens*), trailing arbutus (*Epigaea repens*), cow-wheat (*Melampyrum lineare*), Canada mayflower (*Maianthemum canadense*), bunchberry (*Cornus canadensis*), star flower (*Trientalis borealis*), blue bead-lily (*Clintonia borealis*), painted trillium (*Trillium undulatum*), spreading ricegrass (*Oryzopsis asperifolia*), and Pennsylvania sedge (*Carex pensylvanica*). Mosses and lichens may be common to abundant, especially the mosses big red stem moss (*Pleurozium schreberi*), Brachythecium spp., and *Dicranum polysetum*. (Edinger et al. 2014)

Resilience management. New York Natural Heritage State Rank: S4- Apparently secure in New York State.

State 3
Cultural State

Shifts in ecological site composition, functionality, and dynamics that are primary driven by anthropogenic disturbances and pressures (may have some associated natural drivers). More research is needed to determine the extent of the cultural state associated with this ecological site.

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Terrestrial habitat for wildlife and invertebrates

Community 3.1
Cropland

Site altered to support crop cultivation and production

Community 3.2
Grass/Hay Land

Site altered for grazing grass or hay production.

Transition T1A
State 1 to 2

climate change, dominant hardwood loss, introduction of invasive species, pests, and pathogens

Conservation practices

Monitoring and Evaluation

Transition T1B
State 1 to 3

landscape alteration, logging, mechanical soil disturbance, landscape clearing, seeding, planting

Conservation practices

Cover Crop
Land Clearing
Precision Land Forming
Irrigation Land Leveling
Land Smoothing
Grazing Land Mechanical Treatment
Planned Grazing System
Forest Land Management
Conversion of cropped land to grass-based agriculture

Restoration pathway R2A
State 2 to 1

management of invasive species, pests, and pathogens, restoration of key native plant species, restoration of terrestrial habitat, white pine thinning

Conservation practices

Restoration and Management of Rare and Declining Habitats
Upland Wildlife Habitat Management
Early Successional Habitat Development/Management
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Plant Species Control
Pathogen Management
Invasive Species Pest Management
Precision Pest Control Application
Restoration and Management of Rare or Declining Habitats

Multi-species Native Perennials for Biomass/Wildlife Habitat
Establish pollinator habitat
Hardwood Crop Tree Release
Habitat Development for Beneficial Insects for Pest Management
Biological suppression and other non-chemical techniques to manage brush, weeds and invasive species
Biological suppression and other non-chemical techniques to manage herbaceous weeds invasive species
Monitoring and Evaluation

Transition T2A
State 2 to 3

landscape alteration, logging, mechanical soil disturbance, landscape clearing, seeding, planting

Conservation practices

Cover Crop
Land Clearing
Precision Land Forming
Irrigation Land Leveling
Land Smoothing
Forage Harvest Management
Planned Grazing System
Monitor key grazing areas to improve grazing management
Conversion of cropped land to grass-based agriculture

Restoration pathway R3B
State 3 to 1

seeding, planting, restoration of compacted soil, establishment of key native plant species

Conservation practices

Critical Area Planting
Restoration and Management of Rare and Declining Habitats
Upland Wildlife Habitat Management
Early Successional Habitat Development/Management
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Restoration and Management of Rare or Declining Habitats
Multi-species Native Perennials for Biomass/Wildlife Habitat
Monitoring and Evaluation

Restoration pathway R3A
State 3 to 2

seeding, planting, restoration of compacted soil, establishment of key native plant species

Conservation practices

Critical Area Planting
Restoration and Management of Rare and Declining Habitats
Upland Wildlife Habitat Management
Early Successional Habitat Development/Management
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Restoration and Management of Rare or Declining Habitats
Multi-species Native Perennials for Biomass/Wildlife Habitat
Monitoring and Evaluation

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

Greg Schmidt, 10/03/2024

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	05/14/2025
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:**

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:**