USDA Natural Resources Conservation Service

Ecological site F124XY006OH
Wet Lowland and Depression

Last updated: 9/26/2024
Accessed: 05/11/2025

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): 124X–Western Allegheny Plateau

Major Land Resource Area (MLRA): 124—Western Allegheny Plateau (USDA-NRCS, 2006)
MLRA 124, Western Allegheny Plateau extends from and includes western PA just north of Pittsburgh through southeastern OH to and includes northeastern KY. This area is primarily in the Kanawha Section of the Appalachian Province of the Appalachian Highlands. This MLRA is on an unglaciated dissected plateau with narrow level valley floors, rolling ridgetops, and hilly to steep slopes with dendritic stream drainages. A notable exception is the broad, Teays Valley, and other glacio-fluvial and glacio-lacustrine features attributed to nearby Pleistocene glaciation. Elevation ranges from 660 to 1310 feet (200 to 400 meters). The geology is predominantly cyclic beds of sandstone, siltstone, clay, shale and coal of Pennsylvanian age. Soils are dominated by Udalfs, Udults, and Ochcrepts with a mesic temperature regime in combination with five parent materials, residuum, colluvium, alluvium, eolian, and extra-glacial material of glacio-fluvial and glaciolacustrine mesic materials. The climate is predominately a humid continental to temperate, with 940 to1145 millimeters (37 to 45 inches) of precipitation. Average annual temperature is 8 to 13 degree C (46 to 56 degrees F) with a freeze-free period averaging 185 days. Much of the areas is either forest or in farms, principally for hay and pasture, with fruits and vegetables grown locally. Coal and gas extraction are important industries in the northern part of the MLRA.

Classification relationships

USDA-NRCS (USDA 2006):
Land Resource Region (LRR): N—East and Central Farming and Forest Region
Major Land Resource Area (MLRA): 124—Western Allegheny Plateau

USDA-FS (Cleland et al. 2007):
Province: 221 - Eastern Broadleaf Province
Section: 221E - Southern Unglaciated Allegheny Plateau
Subsection: 221Ea - Pittsburgh Low Plateau
221Eb - Teays Plateau
221Ee - Unglaciated Muskingam Plains
221Ef - Western Hocking Plateau
221Eg - Lower Scotio River Plateau
221En - Kinniconick and Licking Knobs
Section: 221H - North Cumberland Plateau (in Part)
Subsection: 221Hb - Kinniconick and Licking Knobs
221He - Miami - Scioto Plain - Tipton Till Plain

Ecological site concept

Within the dissected plateau of the unglaciated Western Allegheny Plateau, the Wet Lowland and Depression ecological site is set in a variety of wetland landscapes ranging from bottomlands, valley basins, and depressions.

The ecological site is derived from calcareous to acid mixed sedimentary geology primarily composed of limestone, sandstone, shale, siltstone. The seasonably high water table is generally at 0 to 23 centimeters (0 to 9 inches) below the surface. Parent materials include recent slackwater alluvium, colluvium, lacustrine, and glacio-lacustrine material. These landscapes tend to be flat or only gently sloping. The substrate is mineral soil but may have a component of organic material. The sites are very poorly-drained to poorly-drained. The flooding frequency is none to rare and the ponding frequency is none to frequent. Representative soils include: Andover, Canadice, Ginat, (Jimtown), Killbuck, Knowlton, Lorain, Mullins, Peoga, Purdy, Purdy Variant, Sebring . Reference plant communities include: Maple - Ash - Elm Swamps and Pin Oak Mixed Hardwood Depression Forests.

Similar sites

F124XY008OH	**Wet Floodplain and Drainageway** Wet Floodplain and Drainage share wetland characteristics. However, Wet Lowland and Depression flood none or rarely.

Table 1. Dominant plant species

Tree	(1) *Acer rubrum* (2) *Ulmus americana*
Shrub	(1) *Carpinus caroliniana*
Herbaceous	(1) *Arisaema triphyllum*

Physiographic features

The Wet Lowland and Depression ecological site is found on hydric soils in bottomlands, bottomlands, valley basins, and depressions. The parent materials are varied and include recent slackwater alluvium, colluvium, lacustrine, and glaciolacustrine material derived from mixed sedimentary rocks of calcareous and noncalcareous shales, siltstones, sandstones, and limestone. These landscapes tend to be flat or only gently sloping. Generally, this site is not subject to flooding.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Draw
Runoff class	Very low to high
Flooding frequency	None to frequent
Ponding frequency	None to rare
Elevation	400–1,128 ft
Slope	0–15%
Water table depth	0–9 in
Aspect	Aspect is not a significant factor

Climatic features

The regional climate of the unglaciated Western Allegheny Plateau is predominately a humid continental climate grading at the extreme southwestern corner a to humid temperate climate with hot summers and cool winters (Beck et al., 2018; Bailey, 2014). However, the local climate is highly influenced by the dissected terrain, where climatic variations may be greater at the local scale, e.g., cooler temperatures and shorter growing season at higher elevations and more northerly latitudes.

Climate change is occurring, and the resiliency of any ecological site will depend upon the direct and indirect effects upon component species and shifting atmospheric and soil conditions.

Wetlands are probably low to moderately vulnerable to climate change effects. Uncertain whether greater frequency and magnitude of precipitation will offset hot droughts that may adversely affect woody wetland plants (Butler et al.,

2015).

Table 3. Representative climatic features

Frost-free period (characteristic range)	122-142 days
Freeze-free period (characteristic range)	156-178 days
Precipitation total (characteristic range)	40-44 in
Frost-free period (actual range)	115-148 days
Freeze-free period (actual range)	148-184 days
Precipitation total (actual range)	38-46 in
Frost-free period (average)	132 days
Freeze-free period (average)	167 days
Precipitation total (average)	42 in

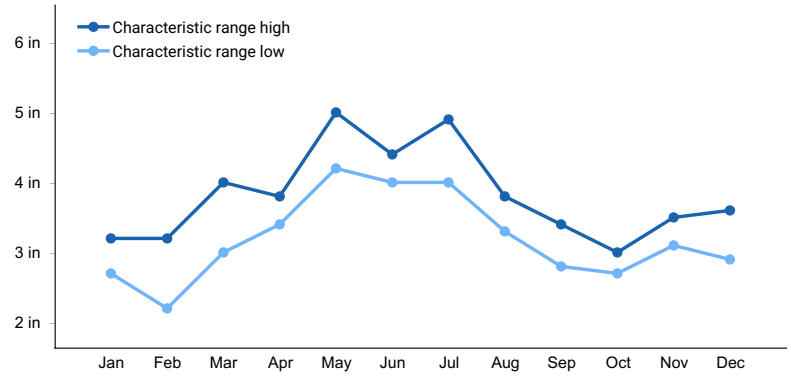


Figure 1. Monthly precipitation range

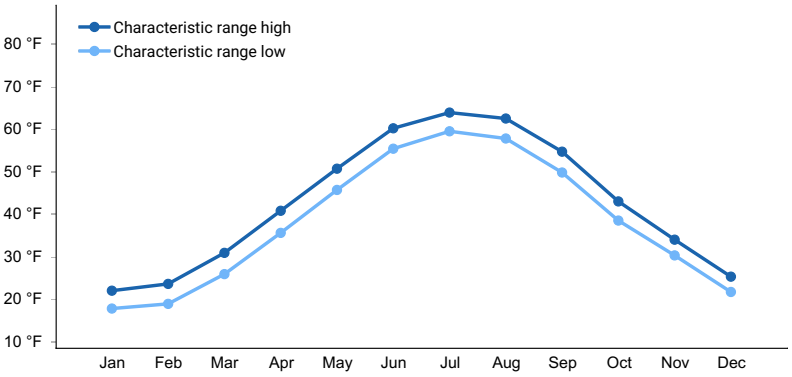


Figure 2. Monthly minimum temperature range

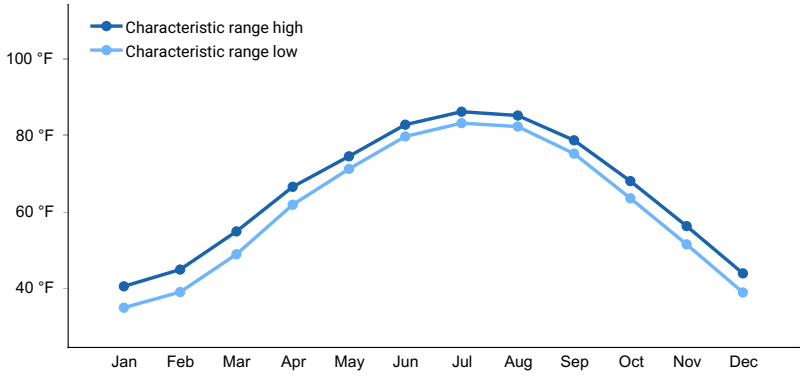


Figure 3. Monthly maximum temperature range

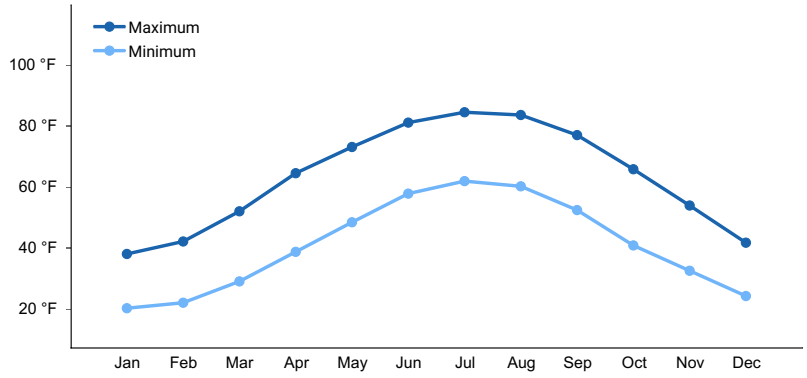


Figure 4. Monthly average minimum and maximum temperature

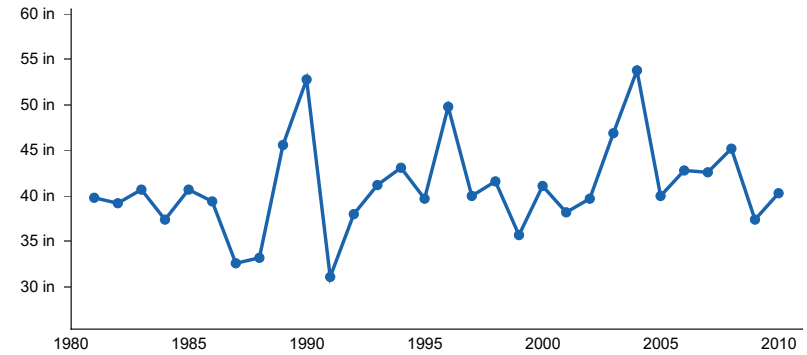


Figure 5. Annual precipitation pattern

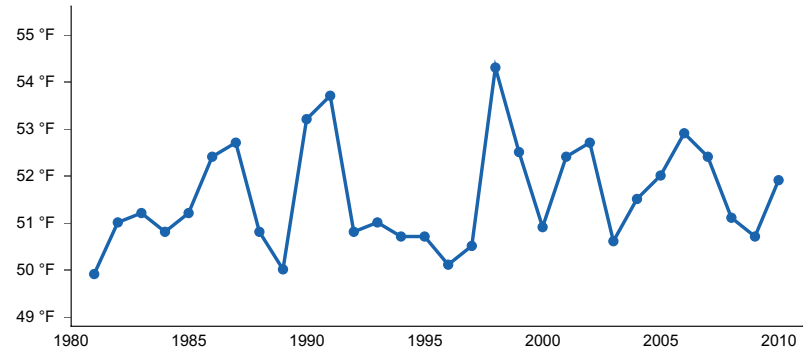


Figure 6. Annual average temperature pattern

Climate stations used

- (1) PUTNEYVILLE 2 SE DAM [USC00367229], Dayton, PA
- (2) FORD CITY 4 S DAM [USC00362942], Ford City, PA
- (3) BUTLER 2 SW [USC00361139], Butler, PA
- (4) DENISON WTR WKS [USC00332160], Dennison, OH
- (5) NEW PHILADELPHIA FLD [USW00004852], New Philadelphia, OH
- (6) MILLERSBURG [USC00335297], Millersburg, OH
- (7) DANVILLE 2 W [USC00332044], Danville, OH
- (8) COSHOCTON AG RSCH STN [USC00331905], Fresno, OH
- (9) COSHOCTON WPC PLT [USC00331890], Coshocton, OH
- (10) ZANESVILLE MUNI AP [USW00093824], Zanesville, OH
- (11) PHILO 3 SW [USC00336600], Philo, OH
- (12) NEW LEXINGTON 2 NW [USC00335857], New Lexington, OH
- (13) LOGAN [USC00334672], Logan, OH
- (14) JACKSON 3 NW [USC00334004], Jackson, OH
- (15) WAVERLY [USC00338830], Waverly, OH
- (16) PORTSMOUTH-SCIOTOVILLE [USC00336781], South Shore, OH

- (17) WARNOCK2 [USC00158432], Greenup, KY
- (18) GRAYSON 2 E [USC00153389], Grayson, KY
- (19) OLIVE HILL 5NE [USC00156012], Olive Hill, KY
- (20) GRAYSON 3 SW [USC00153391], Grayson, KY
- (21) GIMLET 9N [USC00153230], Olive Hill, KY
- (22) CAVE RUN LAKE [USC00152791], Morehead, KY
- (23) ASHLAND [USC00150254], South Point, KY

Influencing water features

Wet Lowland and Depression ecological site is found on hydric soils in bottomlands, valley basins, and depressions which can be associated with waterbodies such as lakes and river systems.

Wetland description

In the National Wetland Classification System (Cowardin et al., 1979), the Wet Lowland and Depression ecological site may be considered in the palustrine system and less commonly in the riverine, and lacustrine systems. In the palustrine system, this ecological site would have a persistent vegetated class, such as emergent, scrub-shrub, or forested, and modified by any non-tidal water regime. Less commonly, in the riverine/lower perennial subclass and the lacustrine/littoral subclass this ecological site would range from unconsolidated vegetated shores, to non-persistent emergent vegetation with a variety of non-tidal flooding regimes.

Soil features

Representative soils include: Andover, Canadice, Ginat, (Jimtown), Killbuck, Knowlton, Lorain, Mullins, Peoga, Purdy, Purdy Variant, Sebring . The substrate is mineral soil but may have a component of organic material. The sites are very poorly-drained to poorly-drained. The flooding frequency is none to rare and the ponding frequency is none to frequent.

Table 4. Representative soil features

Parent material	(1) Alluvium–shale and siltstone (2) Lacustrine deposits (3) Glaciolacustrine deposits
Surface texture	(1) Silt (2) Silt loam
Drainage class	Very poorly drained to poorly drained
Permeability class	Slow to very slow
Soil depth	16–72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–9%
Available water capacity (Depth not specified)	2–8 in
Soil reaction (1:1 water) (Depth not specified)	3.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–12%
Subsurface fragment volume >3" (Depth not specified)	0–17%

Ecological dynamics

[Caveat: The vegetation information contained in this section 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 et al.,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. They are intended to provide a classification unit that is readily mappable, often from terrain and remote imagery, and readily identifiable by conservation and resource managers in the field. A 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 (FDGC, 2008; USNVC, 2017). Each association will be named by the diagnostic and often dominant species that occupy the different height strata (represented by tree, shrub, and herb layers). Within the NatureServe Explorer database, 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 can be provided by the various State Heritage Programs. Additional insights to the vegetation were provided by Plant Communities of Ohio: A Preliminary Classification (Anderson, 1982)) and Terrestrial and Palustrine Plant Communities of Pennsylvania, 2nd Edition (Zimmerman et al., 2012).

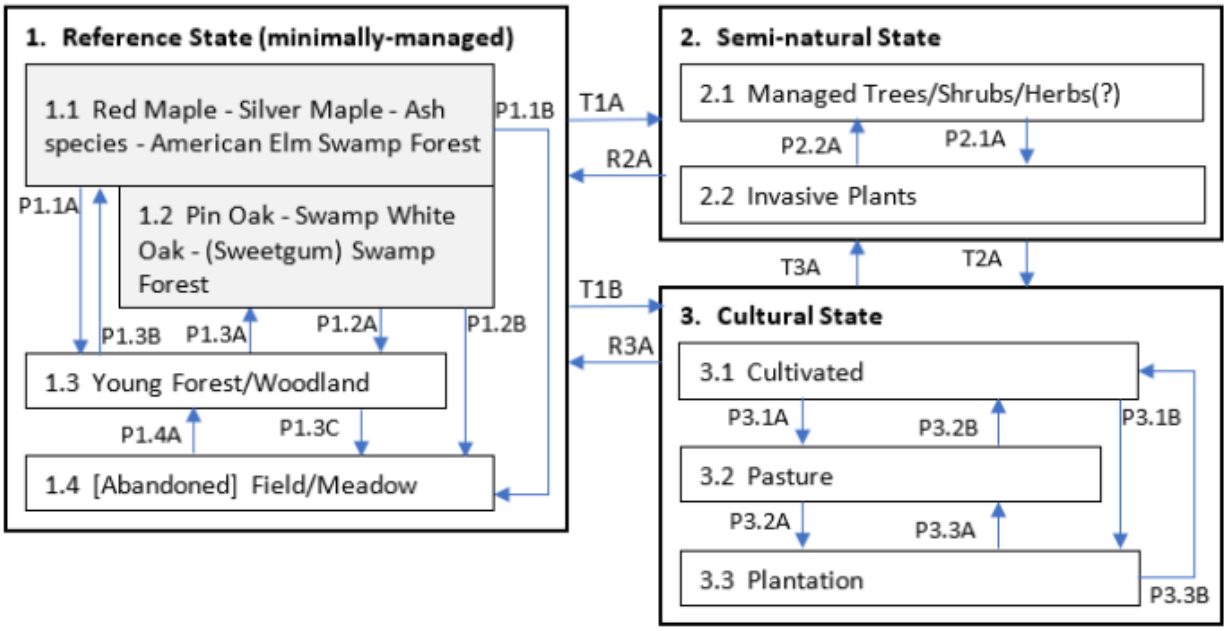
Due to a long history of human activity, the reference condition more accurately reflects the current naturalized, minimally-managed state rather than the historic, pre-European settlement condition. Within the Reference State, plant communities characteristic to the Wet Lowland and Depression ecological sites belong to the North-Central Interior and Appalachian Rich Swamp system (CES202.605) and the North-Central Appalachian Acidic Swamp system (CES202.604) as categorized and described by NatureServe (2020). Wet Lowland and Depression ecological sites include depressions, wet backwaters of rivers, and lakeside wetlands. Besides the mature plant community-types listed, other spontaneous, successional plant community-types may exist following natural disturbances.

Other ecological states, a Semi-natural State and a Cultural State are recognized. The Semi-natural State would expect plant communities where ecological processes primarily operate with some conditioning by land management, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants. The Cultural State is a completely converted or transformed state heavily or completely conditioned by land management, e.g., cultivated lands, pasture/haylands, vineyards, and plantations, etc. Generally, the form of vegetation in the Semi-natural State or the Cultural State is not able to be specified until field work is conducted.

[*Caveat] The vegetation information presented is representative of complex plant 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

124XY006 – Wet Lowland and Depression



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..
P1.4A, P1.3A, 1.3B	Abandonment, succession
P1.1A, P1.1B, P1.2A, P1.2B, P1.3C	Disturbance, Early Successional Habitat Development
P3.1A, P3.2A, P3.3A, P3.1B, P3.2B, P3.3B	Changing Agricultural phases

State 1
Reference State (minimally-managed)

As a result of a long history of human activity, the associations listed below, may in reality, reflect the current naturalized, minimally-managed state rather than the historic, pre-European settlement condition. Notice that no transition pathways are designated between some of the communities in the reference state because the differences in vegetation are more controlled by landscape position, rather than disturbances or management, or that the relationships are not understood. In addition, undisclosed successional plant community-types following disturbance may be included as community phases. Within the reference state, the plant communities are quite variable depending on many factors such as differences in hydrology and the nature of the substrate. Typical plant communities include: • Acer (rubrum, saccharinum) - Fraxinus spp. - *Ulmus americana* Swamp Forest (CEGL005038) Translated Name: (Red Maple, Silver Maple) - Ash species - American Elm Swamp Forest) Common Name: [Maple - Ash - Elm Swamp] • *Quercus palustris* - *Quercus bicolor* - (*Liquidambar styraciflua*) Swamp Forest (CEGL002432) Translated Name: (Pin Oak - Swamp White Oak - (Sweetgum) Swamp Forest)

Common Name: [Pin Oak Mixed Hardwood Depression Forest] And many others: • *Quercus palustris* - *Quercus bicolor* - *Nyssa sylvatica* - *Acer rubrum* Sand Wet Flatwoods Forest (CEGL002100) Translated Name: (Pin Oak - Swamp White Oak - Blackgum - Red Maple Sand Wet Flatwoods Forest) Common Name: [Pin Oak - Swamp White Oak Sand Wet Flatwoods] • *Larix laricina* / *Aronia melanocarpa* / Sphagnum spp. Swamp Forest (CEGL002472) Translated Name: (Tamarack / Black Chokeberry / Peatmoss species Swamp Forest) Common Name: [Southern Tamarack Swamp] • *Fraxinus nigra* - *Acer rubrum* / *Rhamnus alnifolia* / *Carex leptalea* Swamp Forest(CEGL007144) Translated Name: (Black Ash - Red Maple / Alderleaf Buckthorn / Bristly-stalked Sedge Swamp Forest) Common Name: [Black Ash - Red Maple Swamp Forest] • *Cornus sericea* - Salix spp. - (*Rosa palustris*) Shrub Swamp (CEGL002186) Translated Name: (Red-osier Dogwood - Willow species - (Swamp Rose) Shrub Swamp) Common Name: [Red-osier Dogwood - Willow Midwest Shrub Swamp] (Source: NatureServe, 2020)

Community 1.1
Maples (Red Maple, Silver Maple) - Ash species - American Elm Swamp Forest

Acer (rubrum, saccharinum) - Fraxinus spp. - *Ulmus americana* Swamp Forest (CEGL005038) Translated Name: Maples (Red Maple, Silver Maple) - Ash species - American Elm Swamp Forest) Common Name: [Maple - Ash - Elm Swamp] Within the Wet Lowland and bottom land, the canopy cover of this plant community is dominated by redmaple (*Acer rubrum*), including in parts of the ecological site, silver maple (*Acer saccharinum*), green ash (*Fraxinus pennsylvanica*), and only occasionally American elm (*Ulmus americana*) (diminished by Dutch elm disease). Other trees, pin oak (*Quercus palustris*), swamp white oak (*Quercus bicolor*), bur oak (*Quercus macrocarpa*), and blackgum (*Nyssa sylvatica*) are also commonly encountered. The subcanopy consists primarily of red maple (*Acer rubrum*) and occasionally American elm (*Ulmus americana*) and a mixed shrub layer with American hornbeam (*Carpinus caroliniana*), common winterberry (*Ilex verticillata*), northern spicebush (*Lindera benzoin*), American black elderberry (*Sambucus nigra* ssp. canadensis), northern arrowwood (*Viburnum recognitum* [= *Viburnum dentatum* var. lucidum]), and speckled alder (*Alnus incana* ssp. rugosa [= Alnus rugosa]). Common vines often include Virginia creeper (*Parthenocissus quinquefolia*) and poison ivy (*Toxicodendron radicans*). Flooding and openness of the forest canopy influence the herbaceous layer which may include jewelweed (*Impatiens capensis*), Jack-in-the-pulpit (*Arisaema triphyllum*), fowl mannagrass (*Glyceria striata*), and many rushes (Juncus spp.) and sedges (Carex spp.) which are among the most common species encountered. (Source: NatureServe 2020 [accessed April 2020], USNVC 2019 [accessed April 2020]).

Community 1.2
Pin Oak - Swamp White Oak - (Sweetgum) Swamp Forest

Quercus palustris - *Quercus bicolor* - (*Liquidambar styraciflua*) Swamp Forest (CEGL002432) Translated Name: (Pin Oak - Swamp White Oak - (Sweetgum) Swamp Forest) Common Name: [Pin Oak Mixed Hardwood Depression Forest] This plant community exhibits a closed to partially open canopy dominated by pin oak (*Quercus palustris*) and red maple (*Acer rubrum*). Other typical canopy associates may dominate, including sweetgum (*Liquidambar styraciflua*), blackgum (*Nyssa sylvatica*), and swamp white oak (*Quercus bicolor*). Additional wetland hardwood trees may include siler maple (*Acer saccharinum*), river birch (*Betula nigra*), bur oak (*Quercus macrocarpa*), and northern red oak (*Quercus rubra*). Woody shrubs and vines are variable and may include dogwoods (Cornus spp.), northern spicebush (*Lindera benzoin*), Virgina creeper (*Parthenocissus quinquefolia*), and American black elderberry (*Sambucus nigra* ssp. canadensis). Herbaceous species may also vary including sweet woodreed (*Cinna arundinacea*), growing with eastern woodland sedge (*Carex blanda*), spreading sedge (*Carex laxiculmis*), rosy sedge (*Carex rosea*), riverbank wildrye (*Elymus riparius*), Virginia wildrye (*Elymus virginicus*), bulbous bittercress (*Cardamine bulbosa*), Pennsylvania bittercress (*Cardamine pensylvanica*), Virginia springbeauty (*Claytonia virginica*), violet woodsorrel (*Oxalis violacea*), and mayapple (*Podophyllum peltatum*). Other herbs may include smallspike false nettle (*Boehmeria cylindrica*), creeping Jenny (*Lysimachia nummularia*), stiff marsh bedstraw (*Galium tinctorium*), Virginia water horehound (*Lycopus virginicus*), fowl manna grass (*Glyceria striata*), squarrose sedge (*Carex squarrosa*), and greater bladder sedge (*Carex intumescens*). (Source: NatureServe 2020 [accessed April 2020], USNVC 2019 [accessed April 2020]).

Community 1.3
Successional forest/shrublands

(to be developed)

Community 1.4
Sucessional/[Abandoned] Field/Meadow

to be developed

Pathway P1.1A
Community 1.1 to 1.3

disturbance

Pathway P1.2A
Community 1.2 to 1.3

disturbance

Pathway P1.3A
Community 1.3 to 1.1

vegetation development/succession

Pathway P1.3B
Community 1.3 to 1.2

vegetation development/succession

Pathway P1.3C
Community 1.3 to 1.4

Pathway P1.4A
Community 1.4 to 1.3

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 Forest/Woodland

(to be developed)

Community 2.2
Invasive Plants

(to be developed)

Pathway P2.1A
Community 2.1 to 2.2

invasive plant establishment, vegetation development/succession

Pathway P2.2A

Community 2.2 to 2.1

invasive plant management, forest management

Conservation practices

Forest Stand Improvement
Invasive Plant Species Control

State 3
Cultural State

The Cultural State would expect the ecological site to be very strongly conditioned by land management, i.e., transformed/converted to cultivated, pasture, or plantation.

Community 3.1
Cultivated

(to be developed)

Community 3.2
Pasture

(to be developed)

Community 3.3
Plantation

(to be developed)

Transition T1A
State 1 to 2

forest management, disturbance, invasive plant establishment

Conservation practices

Forest Stand Improvement

Transition T1B
State 1 to 3

cutting, land clearing, plant establishment

Conservation practices

Land Clearing

Restoration pathway R2A
State 2 to 1

plant removal, plant establishment, successional management

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management

Invasive Plant Species Control

Transition T2A
State 2 to 3

cutting, land clearing, plant establishment

Conservation practices

Land Clearing

Restoration pathway R3A
State 3 to 1

plant removal, plant establishment, successional management

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Plant Species Control

Restoration pathway R3B
State 3 to 2

forest management, disturbance, invasive plant establishment

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management

Additional community tables

Inventory data references

Site Development and Testing Plan
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.

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Approval

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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	06/30/2020
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):

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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:**
