USDA Natural Resources Conservation Service

Ecological site F115XA002IL
Silty Backslope

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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): 115X–Central Mississippi Valley Wooded Slopes

This MLRA is characterized by deeply dissected, loess-covered hills bordering well defined valleys of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers and their tributaries. It is used to produce cash crops and livestock. About one-third of the area is forested, mostly on the steeper slopes. This area is in Illinois (50 percent), Missouri (36 percent), Indiana (13 percent), and Iowa (1 percent) in two separate areas. It makes up about 25,084 square miles (64,967 square kilometers).

Most of this area is in the Till Plains section and the Dissected Till Plains section of the Central Lowland province of the Interior Plains. The Springfield-Salem plateaus section of the Ozarks Plateaus province of the Interior Highlands occurs along the Missouri River and the Mississippi River south of the confluence with the Missouri River. The nearly level to very steep uplands are dissected by both large and small tributaries of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers. The Ohio River flows along the southernmost boundary of this area in Indiana. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to undulating. Karst topography is common in some parts along the Missouri and Mississippi Rivers and their tributaries. Well-developed karst areas have hundreds of sinkholes, caves, springs, and losing streams. In the St. Louis area, many of the karst features have been obliterated by urban development.

Elevation ranges from 90 feet (20 meters) on the southernmost flood plains to 1,030 feet (320 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters) but can be 50 to 150 feet (15 to 45 meters) in the steep, deeply dissected hills bordering rivers and streams. The bluffs along the major rivers are generally 200 to 350 feet (60 to 105 meters) above the valley floor.

The uplands in this MLRA are covered almost entirely with Peoria Loess. The loess can be more than 7 feet (2 meters) thick on stable summits. On the steeper slopes, it is thin or does not occur. In Illinois, the loess is underlain mostly by Illinoian-age till that commonly contains a paleosol. Pre-Illinoian-age till is in parts of this MLRA in Iowa and Missouri and to a minor extent in the western part of Illinois. Wisconsin-age outwash, alluvial deposits, and sandy eolian material are on some of the stream terraces and on dunes along the major tributaries. The loess and glacial deposits are underlain by several bedrock systems. Pennsylvanian and Mississippian bedrock are the most extensive. To a lesser extent are Silurian, Devonian, Cretaceous, and Ordovician bedrock. Karst areas have formed where limestone is near the surface, mostly in the southern part of the MLRA along the Mississippi River and some of its major tributaries. Bedrock outcrops are common on the bluffs along the Mississippi, Ohio, and Wabash Rivers and their major tributaries and at the base of some steep slopes along minor streams and drainageways.

The annual precipitation ranges from 35 to 49 inches (880 to 1,250 millimeters) with a mean of 41 inches (1,050 millimeters). The annual temperature ranges from 48 to 58 degrees F (8.6 to 14.3 degrees C) with a mean of 54 degrees F (12.3 degrees C). The freeze-free period ranges from 150 to 220 days with a mean of 195 days.

Soils The dominant soil orders are Alfisols and, to a lesser extent, Entisols and Mollisols. The soils in the area have

a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, excessively drained to poorly drained, and loamy, silty, or clayey.

The soils on uplands in this area support natural hardwoods. Oak, hickory, and sugar maple are the dominant species. Big bluestem, little bluestem, and scattered oak and eastern redcedar grow on some sites. The soils on flood plains support mixed forest vegetation, mainly American elm, eastern cottonwood, river birch, green ash, silver maple, sweetgum, American sycamore, pin oak, pecan, and willow. Sedge and grass meadows and scattered trees are on some low-lying sites. (United States Department of Agriculture, Natural Resources Conservation Service, 2022)

LRU notes

Most of this LRU (Land Resource Unit) is in the glaciated Till Plains Section of the Central Lowland Province of the Interior Plains. The southeast corner is in the Highland Rim Section (locally known as the Shawnee Hills Section) of the Interior Low Plateaus Province of the Interior Plains. The nearly level to very steep uplands in this MLRA are dissected by both large and small tributaries of the Wabash and Ohio Rivers. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to gently sloping.

This area is covered almost entirely with Wisconsin loess. The loess can be more than 7 feet (2 meters) thick on stable summits. On the steeper slopes, it is thin or does not occur. The loess throughout the area is underlain dominantly by glacial till. Wisconsin outwash, alluvial deposits, and sandy eolian material are on some of the stream terraces and on dunes along the major tributaries in the area. The loess and glacial drift are underlain by Pennsylvanian-age bedrock. Bedrock outcrops are common in the walls of the valleys along the Wabash and Ohio Rivers and at the base of some steep slopes along minor streams and drainageways.

The dominant soil orders in this LRU are Alfisols, Entisols, Inceptisols, and Mollisols. The soils in the area have a mesic soil temperature regime, a udic or aquic soil moisture regime, and dominantly mixed or smectitic mineralogy. The soils are very deep, poorly drained to excessively drained, and loamy, silty, or clayey. Nearly level Endoaqualfs (Iva series) and Argiaquolls (Ragsdale series) formed in loess on broad upland summits and flats. Nearly level to steep Hapludalfs (Alford, Iona, Muren, Stoy, and Sylvan series) and Fragiudalfs (Hosmer series) formed in loess on uplands. Hapludalfs (Alvin, Bloomfield, and Princeton series) and Argiudolls (Ade series) formed in sandy eolian material in areas of dunes on uplands and stream terraces. Steep and very steep Hapludalfs (Hickory series) formed in Illinoian till along the major streams and dissected upland drainageways. Hapludalfs (Wellston series) formed in siltstone or sandstone residuum on strongly sloping to steep side slopes underlain by bedrock.

The soils in the major stream valleys include Hapludolls (Carmi series), Argiudolls (Elston series), and Hapludalfs (Skelton series), all of which formed in outwash on nearly level to moderately sloping stream terraces and outwash plains. Endoaquolls (Montgomery series), Endoaquepts (Zipp series), Epiaqualfs (McGary series), and Hapludalfs (Shircliff and Markland series) formed in clayey lacustrine sediments on nearly level to strongly sloping lacustrine terraces or lake plains. Endoaquepts (Evansville series), Endoaquolls (Patton series), and Hapludalfs (Henshaw and Uniontown series) formed in silty sediments on terraces and lake plains.

LRU notes (excerpts from Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. USDA Handbook 296, 2006)

Classification relationships

Major Land Resource Area (MLRA) (USDA-NRCS, 2022):
115X–Central Mississippi Valley Wooded Slopes

U.S. Forest Service Ecoregions (Cleland et al. 2007):
Domain: Humid Temperate Domain
Division: Hot Continental Division
Province: Eastern Broadleaf Forest (Continental)
Province Code: 222
Section Code: 222G, 222D

These PES sites are similar to other established ecological classifications. Field verification is needed to confirm the association.

International Vegetation Classification Hierarchy
Class: 1. Forest & Woodland
Subclass: 1.B. Temperate & Boreal Forest & Woodland
Formation: 1.B.2. Cool Temperate Forest & Woodland
Division: 1.B.2.Na. Eastern North American Forest & Woodland
Macrogroup: M012. Central Midwest Oak Forest, Woodland & Savanna
Group: G649. North-Central Oak - Hickory Forest & Woodland

Alliance: A3323. Quercus alba - Quercus rubra - Carya spp. North-Central Forest Alliance
Associated Ecological Sites

Ecological site concept

The historic pre-European settlement vegetation or reference plant community was an oak-hickory forest. These sites are generally on sites with slopes over 18 – 70%. The reference ecological site includes multiple codominant species including white oak (Quercus alba), black oak (Quercus velutina), red hickory (Carya ovalis), shagbark hickory (Carya ovata), scarlet oak (Quercus coccinea), and/or pignut hickory (Carya glabra). Post oak (Q. stellata) and chestnut oak (Q. montana) may be present on the driest sites. Other trees on site may include black cherry (Prunus serotina), sassafras (Sassafras albidum), and red maple (Acer rubrum).

The shrub layer is quite variable depending on slope, aspect, and soil characteristics. Species may include greenbrier (Smilax spp.), flowering dogwood (Cornus florida), and sassafras (Sassafras albidum). The herbaceous layer is usually sparse and varies according to slope and aspect. Common species include shining bedstraw (*Galium concinnum*), licorice bedstraw (Galium circaezans), panicle leaf ticktrefoil (Desmodium paniculatum) and other native forbs and grasses.

Historically, natural disturbances such as fire, grazing and wind damage impacted the maintenance and regeneration of these sites. Today, a long-term lack of fire will increase the density of fire-intolerant species such as tulip poplar (Liriodendron tulipifera), red maple (Acer rubrum), sugar maple (Acer saccharum), white ash (Fraxinus americana) and basswood (Tilia americana).

Associated sites

F115XA001IL	**Silty Upland** Silty Upland. These sites are on loess uplands but are on sites with less than 18% slope.
F115XA003IL	**Wet Silty Upland** Wet Silty Upland. These sites are located on loess uplands bur are somewhat poorly to poorly drained.

Similar sites

F115XA001IL	**Silty Upland** These sites are also on loess uplands, are moderately well drained to well drained, but are on sites with less than 18% slope.

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Carya ovata*
Shrub	(1) *Smilax rotundifolia*
Herbaceous	(1) *Galium circaezans* (2) *Desmodium paniculatum*

Physiographic features

These sites are located on various landforms including hillslopes, loess bluffs, and loess hills. The hill position is backslope. Elevation of these sites are between 328’ to 1348’. Parent material kind and origin is loess. Runoff class is high. These ecological sites do not flood or pond.

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillside (2) Hills > Bluff
Runoff class	Medium to high
Elevation	100–411 m
Slope	18–70%
Water table depth	122–183 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

About 60 percent of the precipitation falls during the freeze-free period. Most of the rainfall occurs as high-intensity, convective thunderstorms in summer. Snowfall is common in winter.

Table 3. Representative climatic features

Frost-free period (characteristic range)	171-179 days
Freeze-free period (characteristic range)	192-199 days
Precipitation total (characteristic range)	1,118-1,194 mm
Frost-free period (actual range)	166-180 days
Freeze-free period (actual range)	190-204 days
Precipitation total (actual range)	1,016-1,219 mm
Frost-free period (average)	175 days
Freeze-free period (average)	196 days
Precipitation total (average)	1,143 mm

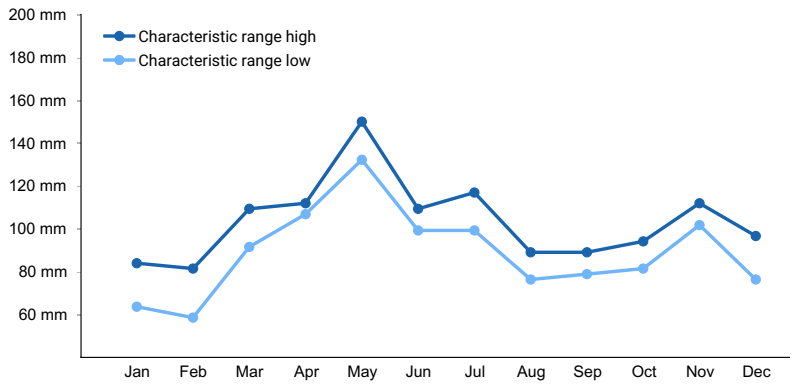

Figure 1. Monthly precipitation range

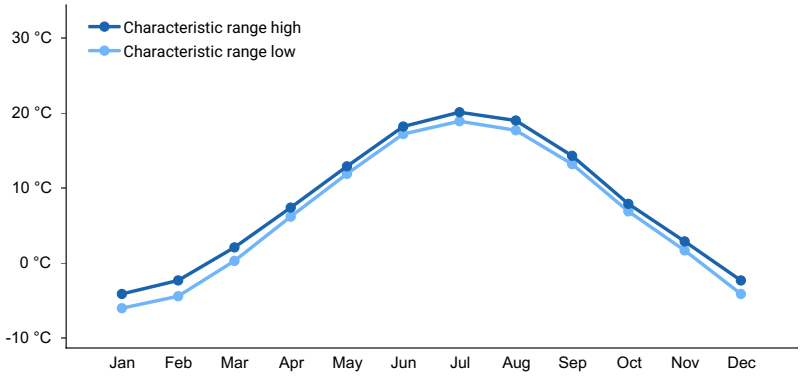

Figure 2. Monthly minimum temperature range

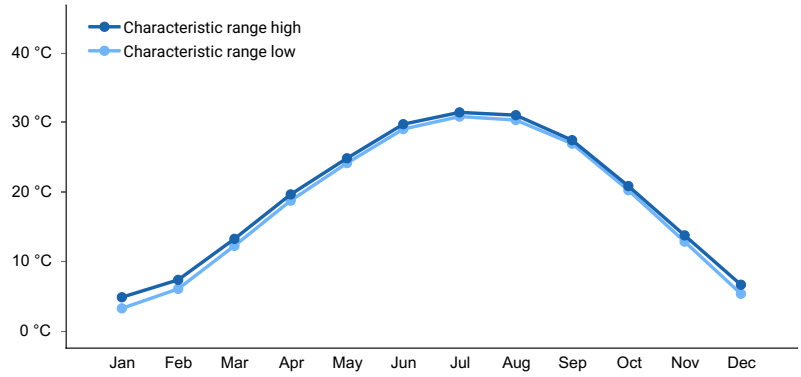

Figure 3. Monthly maximum temperature range

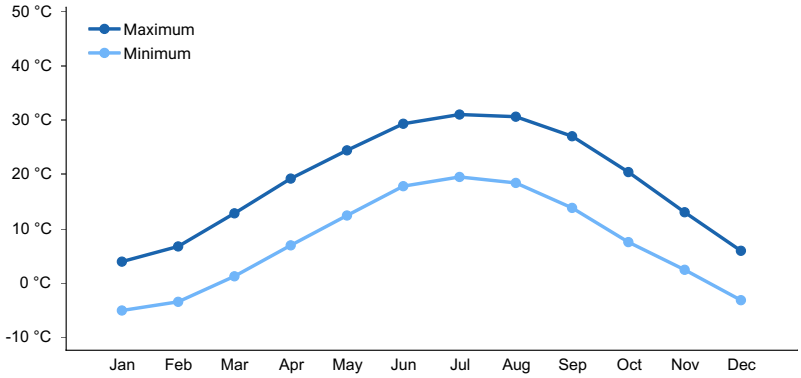

Figure 4. Monthly average minimum and maximum temperature

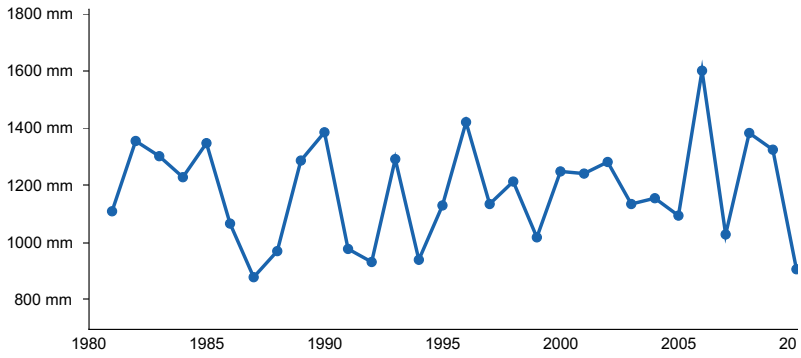

Figure 5. Annual precipitation pattern

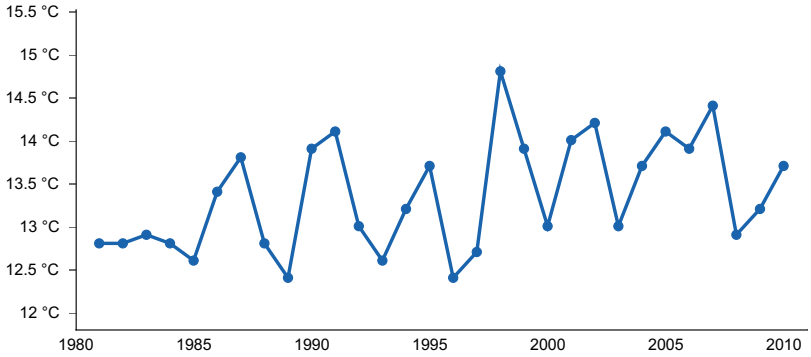

Figure 6. Annual average temperature pattern

Climate stations used

- (1) MT VERNON [USC00126001], Uniontown, IN
- (2) EVANSVILLE REGIONAL AP [USW00093817], Evansville, IN
- (3) PRINCETON 1 W [USC00127125], Princeton, IN
- (4) VINCENNES 5 NE [USC00129113], Vincennes, IN
- (5) TERRE HAUTE CAA AP [USW00093823], Terre Haute, IN

Influencing water features

Silty Backslope sites are not influenced by wetland or riparian water features. Precipitation is the main source of water for these sites, and permeability is moderately slow to slow. Due to slopes, surface runoff water flows to downslope ecological sites.

Soil features

These soils are deep, well-drained, have moderately slow permeability, and are formed in loess. Soil series associated with this site include Alford and Sylvan. All soils in this group are well-drained and have a sodium adsorption ratio of zero. Ph levels range between 4.5 to 8.4, and available water capacity (AWC) generally varies between 7-8 inches. Soils of this ecological site are classified as fine-silty, mesic Alfisols. (NASIS, 2020)

OSD Taxonomic Classes:
Alford: Fine-silty, mixed, superactive, mesic Ultic Hapludalfs
Sylvan: Fine-silty, mixed, superactive, mesic Typic Hapludalfs

Table 4. Representative soil features

Parent material	(1) Loess
Surface texture	(1) Silt loam
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	17.78–20.32 cm
Calcium carbonate equivalent (Depth not specified)	0–30%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm

Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	4.5–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

These ecological sites on located on well drained loess uplands throughout LRU 115XA. Historic reference sites were a mature oak-hickory forest with a high level of diversity in the shrub and herbaceous understory. Canopy species included chestnut oak, red hickory, white oak, shagbark hickory, southern red oak, scarlet oak, and black oak. Sub-canopy trees included flowering dogwood, wild black cherry, sassafras, hophornbeam, and red maple.

Density and composition of understory species would be noticeably influenced by slope and aspect. Common species on these sites would include Virginia creeper (*Parthenocissus quinquefolia*), pointedleaf ticktrefoil (*Desmodium glutinosum*), clustered blacksnakeroot (*Sanicula odorata*), spotted geranium (*Geranium maculatum*), American hogpeanut (*Amphicarpaea bracteata*), and shining bedstraw (*Galium concinnum*).

Natural impacts such as drought, wind damage, ice storms, and wildfires influenced these communities over centuries. Periodic fire was one of the disturbances that helped to maintain the oak dominance. Often these fires were of low-severity and helped to clear the litter from the forest floor, reduced shrub, and encourage oak regeneration. Lightening was the usual ignition source; although native Americans did use fire to reduce understory brush, increase forage, and improve hunting. Long-term periods of drought did occur and would have influenced the fire severity thereby altering species composition, shrub density, plant mortality, and tree growth rates.

Cleared sites are often grazed; however, management is limited by slope. Landowners should be aware of potential overgrazing impacts such as soil erosion, soil compaction, water quality impacts, and noxious weeds. Invasive non-native vegetation is a serious concern in many remaining wooded areas as bush honeysuckle, euonymus, Japanese honeysuckle, privet, and other non-native plants have been introduced and are increasing without management controls.

Long-term fire suppression has resulted in many sites transitioning to an oak-maple-hickory forest with a dense understory of sugar maple, red maple, and white ash saplings. In Indiana, tulip poplar has become co-dominant on some sites. Without management inputs such as prescribed fire or timber stand improvement work, oak regeneration is often limited and species composition on these sites will continue to transition toward shade-tolerant, fast-growing tree species.

State and transition model

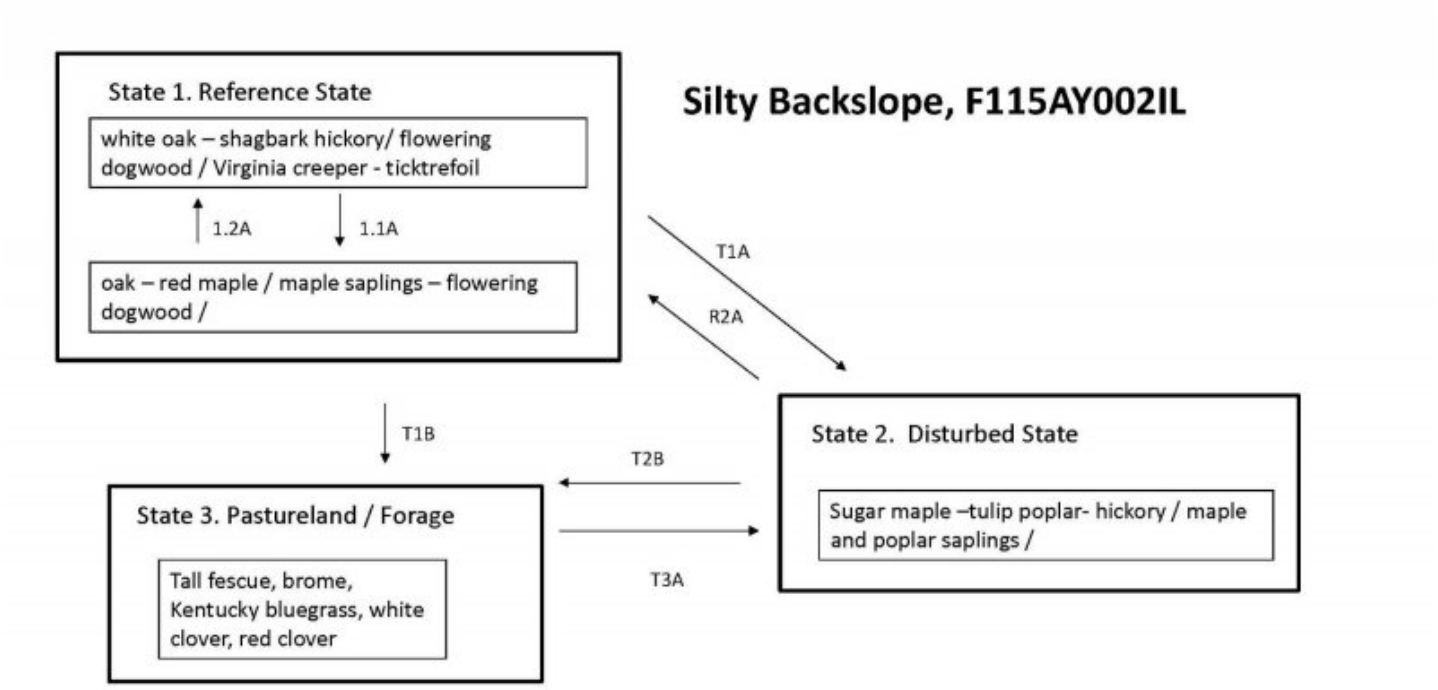

Figure 7. Silty Backslope STM

State 1
Reference State

These ecological sites on located on well drained loess uplands throughout LRU 115XA. Sites have slopes 18% or higher. Historic reference sites were a mature oak-hickory forest with a high level of diversity in the shrub and herbaceous understory. Common canopy species included white oak, shagbark hickory, southern red oak, scarlet oak, and black oak. The driest sites may include post oak, chestnut oak, and red hickory. Sub-canopy trees included flowering dogwood, wild black cherry, sassafras, hophornbeam, and red maple. Density and composition of understory species would be noticeably influenced by slope and aspect. Common species on these sites would includeVirginia creeper (*Parthenocissus quinquefolia*), pointedleaf ticktrefoil (*Desmodium glutinosum*), clustered blacksnakeroot (*Sanicula odorata*), spotted geranium (*Geranium maculatum*), roundleaf greenbrier (*Smilax rotundifolia*), and shining bedstraw (*Galium concinnum*). Natural impacts such as drought, wind damage, ice storms, and wildfires influenced these communities over centuries. Periodic fire was one of the disturbances that helped to maintain the oak dominance. Often these fires were of low-severity and helped to clear the litter from the forest floor, reduced shrub, and encourage oak regeneration. Lightening was the usual ignition source; although native Americans did use fire to reduce understory brush, increase forage, and improve hunting. Long-term periods of drought did occur and would have influenced the fire severity thereby altering species composition, shrub density, plant mortality, and tree growth rates. Cleared sites are often grazed; however, management is limited by slope. Landowners should be aware of potential overgrazing impacts such as soil erosion, soil compaction, water quality impacts, and noxious weeds. Invasive non-native vegetation is a serious concern in many remaining wooded areas as bush honeysuckle, euonymus, Japanese honeysuckle, privet, and other non-native plants have been introduced and are increasing without management controls. Long-term fire suppression has resulted in many sites transitioning to an oak-maple-hickory forest with a dense understory of sugar maple, red maple, and white ash saplings. In Indiana, tulip poplar has become co-dominant on some sites. Without management inputs such as prescribed fire or timber stand improvement work, oak regeneration is often limited and species composition on these sites will continue to transition toward shade-tolerant, fast-growing tree species.

Dominant plant species

- white oak (*Quercus alba*), tree
- shagbark hickory (*Carya ovata*), tree
- flowering dogwood (*Cornus florida*), shrub
- Virginia creeper (*Parthenocissus quinquefolia*), other herbaceous
- ticktrefoil (*Desmodium*), other herbaceous

- sanicle (*Sanicula*), other herbaceous
- greenbrier (*Smilax*), other herbaceous

Community 1.1
Reference community

The overstory in this phase has multiple co-dominant oak and hickory species including white oak, black oak, scarlet oak, red hickory, pignut hickory, and shagbark hickory. Chestnut oak and post oak would have been on the driest sites. Reoccurring fires would have maintained an oak-dominated forest along with an open understory and diverse understory layer.

Dominant plant species

- white oak (*Quercus alba*), tree
- shagbark hickory (*Carya ovata*), tree
- flowering dogwood (*Cornus florida*), shrub
- ticktrefoil (*Desmodium*), other herbaceous
- Virginia creeper (*Parthenocissus quinquefolia*), other herbaceous
- greenbrier (*Smilax*), other herbaceous
- bedstraw (*Galium*), other herbaceous

Community 1.2
Oak-maple community

This community would be characterized by an increase in fire-intolerant species such as maple and poplar. The understory would especially have a noticeable increase in density of maple regeneration. The shrub layer would be denser than community 1.1.

Dominant plant species

- northern red oak (*Quercus rubra*), tree
- white oak (*Quercus alba*), tree
- sugar maple (*Acer saccharum*), tree
- flowering dogwood (*Cornus florida*), shrub
- sugar maple (*Acer saccharum*), shrub

Pathway 1.1.A
Community 1.1 to 1.2

With a reduction in fire, fire-intolerant tree species become more prevalent.

Pathway 1.2.A
Community 1.2 to 1.1

Increase in natural fire frequent will decrease shrub density and fire intolerant tree species.

State 2
Disturbed State

Most remaining Silty Backslope sites have been ecologically altered due to a long-term absence of fire, grazing, clearing, or selective harvest (i.e. oak removal). Trees on site, will depending on the type, length and severity of disturbances. However, sites that have had a long-term absence of fire will display the following characteristics: an increase in fire -intolerant species, an increase in shrub density, an increase in leaf-litter buildup, and an increase in shade-tolerant understory species. Diversity of species may also be reduced, especially if there has been an introduction of non-native species such as bush honeysuckle (*Lonicera maackii*).

Dominant plant species

- sugar maple (*Acer saccharum*), tree

- white ash (*Fraxinus americana*), tree
- tuliptree (*Liriodendron tulipifera*), tree
- hybrid hickory (*Carya*), tree

Community 2.1
Disturbed community

This is a disturbed, successional community that includes a variety of fast-growing trees such as maples and ashes. Other species may include hickories, honey locust, black locust, elms, and poplar. Shrub and understory species will depend on the type, severity and length of disturbances, available seed sources, and management inputs, if present.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- white ash (*Fraxinus americana*), tree
- hybrid hickory (*Carya*), tree
- tuliptree (*Liriodendron tulipifera*), tree

State 3
Pastureland/ Forage State

A portion of these sites have been converted to pastureland or forage production. Slopes will be limiting on many sites; thereby not appropriate for clearing or grazing. For sites that are appropriate for conversion, species selection will depend upon the objectives and goals of the landowner; however, commonly planted grasses include tall fescue (*Schedonorus arundinaceus*), brome (Bromus spp.), white clover (*Trifolium repens*) and red clover (*Trifolium pratense*). Species health and productivity are determined by the management and long-term overgrazing on some sites has caused soil erosion and compaction.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- white clover (*Trifolium repens*), other herbaceous
- red clover (*Trifolium pratense*), other herbaceous

Community 3.1
Pastureland/forage community

These sites have slopes 18% and above, so many sites are not appropriate for clearing or grazing due to soil erosion and water quality concerns. For sites that are suitable for managed grazing, planted species often include tall fescue (*Schedonorus arundinaceus*), brome (Bromus spp.), white clover (*Trifolium repens*) and red clover (*Trifolium pratense*). Selection of species will depend on the landowner's objectives. These sites are are at a higher risk of soil erosion and should be managed to protect soil and water resources.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- red clover (*Trifolium pratense*), other herbaceous
- white clover (*Trifolium repens*), other herbaceous

Transition T1A
State 1 to 2

Severe disturbances, such as clearing or selective harvesting (oak/hickory removal) , will transition this site to State 2.

Transition T1C
State 1 to 3

Site is transitioned to an agricultural site focused on forage production. Management inputs would include clearing, site preparation, seeding and weed/brush control.

Restoration pathway R2A
State 2 to 1

Restoration would require long-term management inputs including planting of desired species, weed control, brush control, timber stand improvement, and prescribed fire.

Transition T2B
State 2 to 3

Site is cleared and forage/pasture production is initiated. Management inputs would include tree/shrub removal, site preparation, seeding, and weed/brush control.

Transition T3A
State 3 to 2

Site is abandoned and slowly would transition to a wooded state dominated by deciduous trees. Species on site would depend on the severity and length of disturbance and available seed sources.

Additional community tables

Inventory data references

A Provisional Ecological Site Description (PESD) describes ecological potential and ecosystem dynamics of land areas and their potential management. Ecological sites are linked to soil survey map unit components, which allows for mapping of ecological sites. A PESD with a provisional status represents the lowest tier of documentation that is releasable to the public. No field level data have been collected as part of this PESD. It is expected that a PESD will continue to be refined through field verification and field sampling.

Reference and alternative state concepts, including the state-and-transition model and vegetative communities are not yet well-documented and will require field sampling for verification.

This document is provisional.

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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	01/09/2025
Approved by	Suzanne Mayne-Kinney
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:**
