USDA Natural Resources Conservation Service

Ecological site F116BY002MO
Loamy Floodplain Forest

Last updated: 10/06/2020
Accessed: 05/04/2024

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 116B–Springfield Plain

The Springfield Plain is in the western part of the Ozark Uplift. It is primarily a smooth plateau with some dissection along streams. Elevation is about 1,000 feet in the north to over 1,700 feet in the east along the Burlington Escarpment adjacent to the Ozark Highlands. The underlying bedrock is mainly Mississippian-aged limestone, with areas of shale on lower slopes and structural benches, and intermittent Pennsylvanian-aged sandstone deposits on the plateau surface.

Classification relationships

Terrestrial Natural Community Type in Missouri (Nelson, 2010):
The reference state for this ecological site is most similar to a Riverfront Forest.

Missouri Department of Conservation Forest and Woodland Communities (Missouri Department of Conservation, 2006):
The reference state for this ecological site is most similar to a Riverfront Bottomland Forest.

National Vegetation Classification System Vegetation Association (NatureServe, 2010):
The reference state for this ecological site is most similar to a Fraxinus pennsylvanica - Celtis spp. - Quercus spp. -

Platanus occidentalis Bottomland Forest (CEGL002410).

Geographic relationship to the Missouri Ecological Classification System (Nigh & Schroeder, 2002):
This ecological site occurs throughout the Springfield Plain Subsection.

Ecological site concept

NOTE: This is a “provisional” Ecological Site Description (ESD) that is under development. It contains basic ecological information that can be used for conservation planning, application and land management. As additional information is collected, analyzed and reviewed, this ESD will be refined and published as “Approved”.

Loamy Floodplain Forests occur on small floodplains throughout the Springfield Plain, as well as in a few small valleys to the north in Pettis County. Soils are loamy and very deep, and are subject to frequent flooding. The reference plant community is forest dominated by American elm, hackberry, sycamore, eastern cottonwood, and green ash.

Associated sites

F116BY006MO	**Chert Limestone Upland Woodland** Chert Limestone Upland Woodlands, and other upland ecological sites, are upslope.
F116BY014MO	**Wet Terrace Woodland** Wet Terrace Woodlands are on higher positions in the valley, above the active floodplain.
F116BY015MO	**Loamy Terrace Woodland** Loamy Terrace Woodlands are on higher positions in the valley, above the active floodplain.
F116BY017MO	**Gravelly/Loamy Upland Drainageway Woodland** Gravelly/Loamy Upland Drainageway Woodlands are upstream.

Similar sites

F116BY002MO	**Loamy Floodplain Forest** There are no similar sites to this ecological site in this MLRA.

Table 1. Dominant plant species

Tree	(1) *Ulmus americana* (2) *Celtis occidentalis*
Shrub	(1) *Vitis* (2) *Staphylea trifolia*
Herbaceous	(1) *Carex* (2) *Laportea canadensis*

Physiographic features

This site is on low floodplains with slopes of 0 to 3 percent. This ecological site is generally on the lowest floodplain directly adjacent to the stream channel, but also occurs along abandoned channels farther from the active stream channel. The site receives some runoff from higher floodplains, stream terraces and uplands. This site is subject to frequent flooding.

The following figure (adapted from Kichler and Henderson, 1999) shows the typical landscape position of this ecological site, and landscape relationships with other ecological sites. The site is within the area labeled “5”, on the low floodplain adjacent to the current stream channel. Terrace ecological sites, labeled “3” and “4”, are often on adjacent, higher landscape positions.

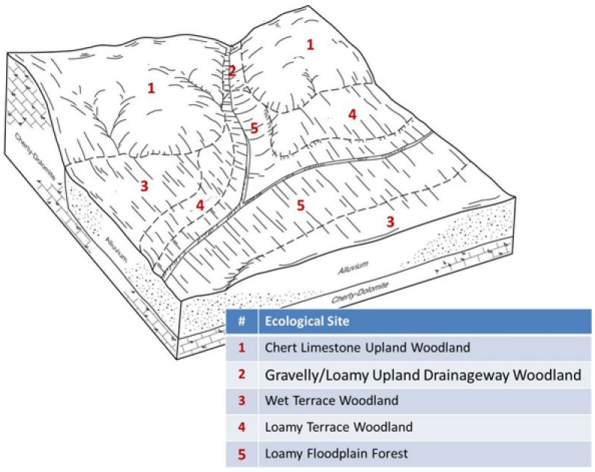


Figure 2. Landscape relationships for this ecological site.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding frequency	None
Slope	0–3%
Water table depth	20–183 cm
Aspect	Aspect is not a significant factor

Climatic features

The Springfield Plain has a continental type of climate marked by strong seasonality. In winter, dry-cold air masses, unchallenged by any topographic barriers, periodically swing south from the northern plains and Canada. If they invade reasonably humid air, snowfall and rainfall result. In summer, moist, warm air masses, equally unchallenged by topographic barriers, swing north from the Gulf of Mexico and can produce abundant amounts of rain, either by fronts or by convectional processes. In some summers, high pressure stagnates over the region, creating extended droughty periods. Spring and fall are transitional seasons when abrupt changes in temperature and precipitation may occur due to successive, fast-moving fronts separating contrasting air masses.

The Springfield Plain experiences few regional differences in climates. The average annual precipitation in this area is 41 to 45 inches. Snow falls nearly every winter, but the snow cover lasts for only a few days. The average annual temperature is about 55 to 58 degrees F. The lower temperatures occur at the higher elevations. Mean July maximum temperatures have a range of only one or two degrees across the area.
Mean annual precipitation varies along a west to east gradient. Seasonal climatic variations are more complex. Seasonality in precipitation is very pronounced due to strong continental influences. June precipitation, for example, averages three to four times greater than January precipitation. Most of the rainfall occurs as high-intensity, convective thunderstorms in summer.

During years when precipitation comes in a fairly normal manner, moisture is stored in the top layers of the soil during the winter and early spring, when evaporation and transpiration are low. During the summer months the loss of water by evaporation and transpiration is high, and if rainfall fails to occur at frequent intervals, drought will result. Drought directly affects plant and animal life by limiting water supplies, especially at times of high temperatures and high evaporation rates.

Superimposed upon the basic MLRA climatic patterns are local topographic influences that create topoclimatic, or microclimatic variations. In regions of appreciable relief, for example, air drainage at nighttime may produce temperatures several degrees lower in valley bottoms than on side slopes. At critical times during the year, this phenomenon may produce later spring or earlier fall freezes in valley bottoms. Deep sinkholes often have a

microclimate significantly cooler, moister, and shadier than surrounding surfaces, a phenomenon that may result in a strikingly different ecology. Higher daytime temperatures of bare rock surfaces and higher reflectivity of these un-vegetated surfaces may create distinctive environmental niches such as glades and cliffs. Slope orientation is an important topographic influence on climate. Summits and south-and-west-facing slopes are regularly warmer and drier than adjacent north- and-east-facing slopes. Finally, the climate within a canopied forest is measurably different from the climate of a more open grassland or savanna areas.

Source: University of Missouri Climate Center - http://climate.missouri.edu/climate.php; Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin, United States Department of Agriculture Handbook 296 - http://soils.usda.gov/survey/geography/mlra/

Table 3. Representative climatic features

Frost-free period (characteristic range)	142-162 days
Freeze-free period (characteristic range)	181-192 days
Precipitation total (characteristic range)	1,168-1,194 mm
Frost-free period (actual range)	141-162 days
Freeze-free period (actual range)	180-193 days
Precipitation total (actual range)	1,168-1,219 mm
Frost-free period (average)	152 days
Freeze-free period (average)	186 days
Precipitation total (average)	1,168 mm

Climate stations used

- (1) MT VERNON M U SW CTR [USC00235862], Mount Vernon, MO
- (2) NEOSHO [USC00235976], Neosho, MO
- (3) STOCKTON DAM [USC00238082], Stockton, MO
- (4) SPRINGFIELD [USW00013995], Springfield, MO

Influencing water features

This ecological site is typically in natural levee positions directly adjacent to a perennial stream. Stream levels typically respond quickly to storm events, especially in watersheds where surface runoff is dominant. Short- to medium- duration flooding is common in many areas, particularly during spring and early summer storm events. Constructed levees, often accompanied by stream channelization, have altered the hydrology and flooding dynamics in many places. Streambeds are typically incised into the surrounding floodplain by as much as 10 feet.

Some soils in this ecological site have seasonal water tables in the winter and spring, generally receding with the falling river levels in the early summer. In most areas the water table has a minimal effect on the vegetative community. A few depressional, backswamp areas are in the RIVERINE class in the Hydrogeomorphic (HGM) system (Brinson, 1993), and are Forested Palustrine wetlands (Cowardin et al., 1979).

Soil features

These soils have no rooting restrictions. They were formed under forest vegetation, with periodic depositional flood events. Organic matter content is high. Parent material is alluvium from prairie soils high in organic material. They have silt loam surface horizons and loamy subsoils that are skeletal in some soils. Some areas are affected by seasonal wetness. Soil series associated with this site include Dameron, Dapue and Humansville.

The accompanying picture of the Dapue series shows the nearly uniform yellowish brown silt loam characteristic of this series. Scale is in centimeters. Picture courtesy of John Preston, NRCS.

Figure 9. Dapue series

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow to slow
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.1–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–40%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

Information contained in this section was developed using historical data, professional experience, field reviews, and scientific studies. The information presented is representative of very complex vegetational communities. Key indicator plants, animals 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 aspect. The Reference Plant Community is not necessarily the management goal. The species lists are 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.

The reference plant community is a forest dominated by an overstory of eastern cottonwood, American elm and hackberry with sycamore, green ash and other early successional species scattered throughout. Occasionally, bur

oak, shellbark hickory, black walnut and other hardwood species may occur in later stages of development. Canopy height is normally 85 to 110 feet and canopy closure 80 to 100 percent.

Loamy Floodplain Forests are widely distributed throughout the MLRA. They occur on natural levees and low floodplains that flood frequently. Flooding of these ecological sites commonly occurs annually or at least once every 3 years. Loamy sediments, originating from the loess and weathered residuum in the surrounding uplands, make up a significant portion of the alluvium in these floodplains.

The forest is dominated by flood tolerant, tree species such as elm, hackberry, sycamore, cottonwood and green ash. Young stands of these species tend to stabilize the low floodplain and continue to accumulate loamy materials. Consequently, these developing ecological sites tend to be near even aged. Young stands are often dense with a sparse understory and ground flora.

Over the long term, these floodplains may become elevated and/or isolated and begin to accumulate more fine sediments, becoming more stable and enduring. Oak, shellbark hickory and black walnut begin to accumulate in these later stages of succession. Catastrophic floods will often partially or completely knock down the earlier species and regenerate this site creating a mosaic of early to late successional floodplain forests.

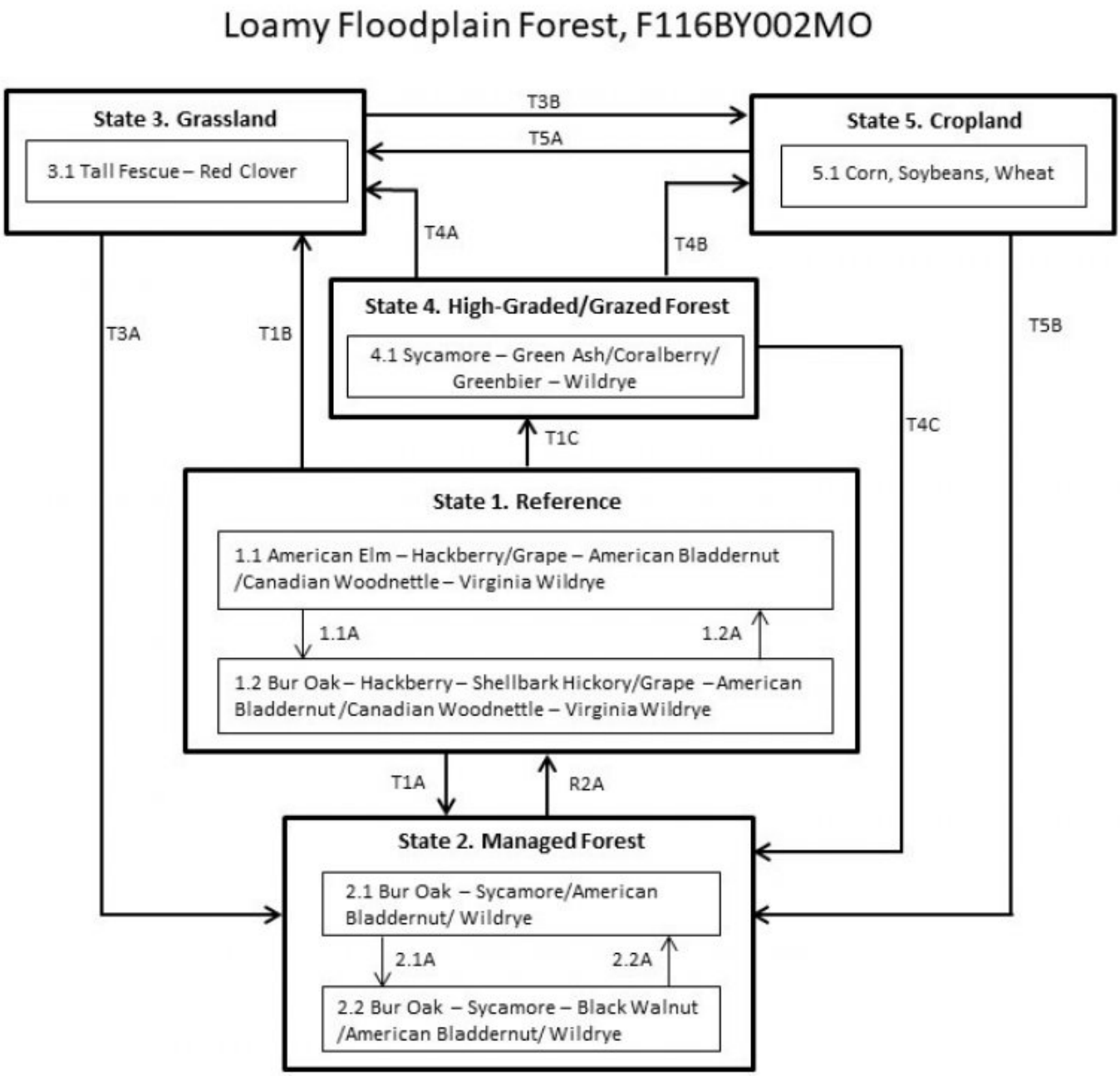
These sites are very productive. Today most of these ecological sites have been cleared and converted to agriculture. While some cleared fields have retained a narrow strip of forest along the river, other sites are often cleared right up to the bank. In such cases, flooding may cause severe stream bank erosion.

Uncontrolled grazing by domestic livestock in the remaining strips of forest is not uncommon and can cause significant damage, killing trees and removing the ground cover, resulting in further de-stabilization and degradation of this ecological site as well. Carefully planned timber harvests can be tolerated in this system, but high grading of the timber will eventually degrade the ecological site.

Loamy Floodplain Forests, generally occurring as a rather narrow band of forests traversing the river edge, are an abundant floodplain forest type. These bands of forest still play an important role as a source of food and shelter for migrating birds and as a source for course woody debris for the adjacent stream systems.

A State and Transition Diagram follows. Detailed descriptions of each state, transition, plant community, and pathway follow the model. This model is based on available experimental research, field observations, professional consensus, and interpretations. It is likely to change as knowledge increases.

State and transition model



Code	Event/Activity/Process
T1A	Uneven-age timber management; harvesting
T1B, T4A	Clearing; pasture planting; prescribed grazing
T5A	Pasture planting; prescribed grazing
T1C	Poorly planned harvest (high-grading); uncontrolled grazing
T3B	Tillage; conservation cropping system
T4B	Clearing ; tillage; conservation cropping system
T3A, T5B	Tree planting; long-term succession (+30-50 years); forest stand improvement; access control
T4C	Forest stand improvement; access control
R2A	Forest stand improvement; long term succession (+10-20 years)
1.1A	Long term succession (+10-30 years); sediment accumulation
1.2A	Catastrophic flood: blow-down
2.1A	Crop Tree Release; little to no harvesting (10-20 years)
2.2A	Uneven-age timber management; harvesting

Figure 10. State and transition diagram for this ecological site

State 1

Reference

The reference state for this ecological site was old growth bottomland forest. Natural flooding cycles were the primary processes affecting this ecologic site. Maximum tree age was likely 150 to 200 years. The understory was complex, with multiple layers of shade-tolerant species. A highly diverse ground flora was also present. Vines were common and went well into the canopy. Scattered open areas were common. A change to more frequent, higher-intensity floods on the modern landscape creates more frequent canopy gaps, and introduces or helps to maintain more flood-tolerant species such as sycamore, eastern cottonwood, green ash and hackberry. Over the long term, these floodplains may become more elevated and/or isolated and accumulate more fine sediments, becoming more stable and enduring. Oak, shellbark hickory and black walnut begin to accumulate in these later stages of succession. Catastrophic floods will often partially or completely knock down the early species and regenerate this site creating a mosaic of early to late successional floodplain forests.

Community 1.1
American Elm - Hackberry/Grape - American Bladdernut/Canadian Woodnettle - Virginia Wildrye

Forest overstory. The Overstory Species list is based on field reconnaissance as well as commonly occurring species listed in Nelson 2010; names and symbols are from USDA PLANTS database.

Forest understory. The Understory Species list is based on field reconnaissance as well as commonly occurring species listed in Nelson 2010; names and symbols are from USDA PLANTS database.

Community 1.2
Bur Oak - Hackberry - Shellbark Hickory/Grape - American Bladdernut/Canadian Woodnettle - Virginia Wildrye

Pathway P1.1A
Community 1.1 to 1.2

Long term succession (10-30 years); sediment accumulation

Pathway P1.2A
Community 1.2 to 1.1

Catastrophic flood; blow-downs

State 2
Managed Forest

Where this state remains, it has often been subjected to very selective timber harvests. While these forested areas may resemble the reference state, the diversity of tree species has been selectively (removal of oak and black walnut) altered. Reducing harvests and extending rotations will cause a transition to community phase 2.2. Eliminating harvests, implementing selective thinning, and allowing long tern succession may allow a return to the reference state where hydrologic regimes are least altered.

Community 2.1
Bur Oak - Sycamore/American Bladdernut/Wildrye

Community 2.2
Bur Oak - Sycamore - Black Walnut/American Bladdernut/Wildrye

Pathway P2.1A
Community 2.1 to 2.2

Crop tree release; little to no harvesting (10-20 years)

Pathway P2.2A
Community 2.2 to 2.1

Uneven-age timber management; harvesting; forest stand improvement

State 3
Grassland

Many acres of this ecological site have been converted to non-native grasslands of tall fescue and red clover. If the site experiences poor grassland management a shift to community phase 3.2 will occur. This phase has diminished ground cover, reduction in productivity, and an increase in oak sprouting and non-native species invasion. This state frequently transitions to a cropland state especially when commodity prices are high. A return to a near-reference state from this state is not recommended. Transitioning to a Managed Forest state is possible through long-term commitments of time and money.

Community 3.1
Tall Fescue/Red Clover

State 4
High-Graded/Grazed Forest

This state is subjected to uncontrolled grazing and high-graded timber harvests. The grazing will open up the understory and remove much of the diverse ground flora. This can lead to erosion of the topsoil during floods. Grazed units also often undergo timber harvest removing a wide variety of outstanding hardwood trees, further diminishing the structural and compositional diversity. A return to the near-reference state will require a long-term commitment including the elimination of grazing, planting of trees and perhaps shrub and herbaceous species, and very limited targeted timber harvests and thinning.

Dominant resource concerns

- Sheet and rill erosion
- Ephemeral gully erosion
- Nutrients transported to surface water
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Wildfire hazard from biomass accumulation
- Terrestrial habitat for wildlife and invertebrates

Community 4.1
Sycamore - Green Ash/Coralberry/Greenbrier - Wildrye

State 5
Cropland

Some areas of this ecological site have been converted to row crop agriculture. They often transition to a grassland state. A return to the near-reference state is not practical from this state. Transitioning to a Managed Forest state may be possible through long-term commitments of time and money.

Dominant resource concerns

- Sheet and rill erosion
- Ephemeral gully erosion
- Organic matter depletion
- Aggregate instability
- Terrestrial habitat for wildlife and invertebrates

Community 5.1

Corn, Soybeans, Wheat

Transition T1A
State 1 to 2

Uneven-age timber management; logging/harvesting

Transition T1B
State 1 to 3

Clearing; pasture planting; prescribed grazing

Transition T1C
State 1 to 4

Poorly planned harvests (high-grading); uncontrolled grazing

Restoration pathway R2A
State 2 to 1

Forest stand improvement; long term succession (10-20 years)

Restoration pathway T3A
State 3 to 2

Tree planting; long-term succession (30-50 years); forest stand improvement; access control

Transition T3B
State 3 to 5

Tillage; conservation cropping system

Restoration pathway T4C
State 4 to 2

Forest stand improvement; access control

Restoration pathway T4A
State 4 to 3

Clearing; pasture planting; prescribed grazing

Transition T4B
State 4 to 5

Clearing ; tillage; conservation cropping system

Restoration pathway T5B
State 5 to 2

Tree planting; long-term succession (30-50 years); forest stand improvement; access control

Transition T5A
State 5 to 3

Pasture planting; prescribed grazing

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
American elm	ULAM	*Ulmus americana*	Native	–	5–20	–	–
black walnut	JUNI	*Juglans nigra*	Native	–	5–20	–	–
sugarberry	CELA	*Celtis laevigata*	Native	–	5–20	–	–
green ash	FRPE	*Fraxinus pennsylvanica*	Native	–	5–20	–	–
common hackberry	CEOC	*Celtis occidentalis*	Native	–	5–20	–	–
bitternut hickory	CACO15	*Carya cordiformis*	Native	–	5–20	–	–
bur oak	QUMA2	*Quercus macrocarpa*	Native	–	5–20	–	–
shellbark hickory	CALA21	*Carya laciniosa*	Native	–	5–20	–	–
Kentucky coffeetree	GYDI	*Gymnocladus dioicus*	Native	–	5–20	–	–
eastern cottonwood	PODE3	*Populus deltoides*	Native	–	5–20	–	–
honeylocust	GLTR	*Gleditsia triacanthos*	Native	–	5–20	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
scouringrush horsetail	EQHY	*Equisetum hyemale*	Native	–	5–10
Indian woodoats	CHLA5	*Chasmanthium latifolium*	Native	–	5–10
Virginia wildrye	ELVI3	*Elymus virginicus*	Native	–	5–10
squarrose sedge	CASQ2	*Carex squarrosa*	Native	–	5–10
hop sedge	CALU4	*Carex lupulina*	Native	–	5–10
Canada wildrye	ELCA4	*Elymus canadensis*	Native	–	5–10
Forb/Herb					
Canadian woodnettle	LACA3	*Laportea canadensis*	Native	–	20–30
cutleaf coneflower	RULA3	*Rudbeckia laciniata*	Native	–	10–20
eastern waterleaf	HYVI	*Hydrophyllum virginianum*	Native	–	10–20
eastern false rue anemone	ENBI	*Enemion biternatum*	Native	–	10–20
Virginia bluebells	MEVI3	*Mertensia virginica*	Native	–	10–20
evening campion	SINI	*Silene nivea*	Native	–	10–20
striped cream violet	VIST3	*Viola striata*	Native	–	5–10
Canadian clearweed	PIPU2	*Pilea pumila*	Native	–	5–10
pale touch-me-not	IMPA	*Impatiens pallida*	Native	–	5–10
giant goldenrod	SOGI	*Solidago gigantea*	Native	–	5–10
Canadian blacksnakeroot	SACA15	*Sanicula canadensis*	Native	–	5–10
Shrub/Subshrub					
American bladdernut	STTR	*Staphylea trifolia*	Native	–	5–10
burningbush	EUAT5	*Euonymus atropurpureus*	Native	–	5–10
Tree					
slippery elm	ULRU	*Ulmus rubra*	Native	–	10–20
Ohio buckeye	AEGL	*Aesculus glabra*	Native	–	10–20
American hornbeam	CACA18	*Carpinus caroliniana*	Native	–	10–20
red mulberry	MORU2	*Morus rubra*	Native	–	10–20
Vine/Liana					
eastern poison ivy	TORA2	*Toxicodendron radicans*	Native	–	10–20
Virginia creeper	PAQU2	*Parthenocissus quinquefolia*	Native	–	10–20
summer grape	VIAE	*Vitis aestivalis*	Native	–	10–20

Animal community

Wildlife (MDC, 2006):

Wild turkey, white-tailed deer, and eastern gray squirrel depend on hard and soft mast food sources and are typical upland game species of this type

This ecological site is a dense, muti-layered forest, with snags and cavities and down dead wood that provides habitat for many species requiring cool, rich, moist conditions.

Bird species associated with these mature forests include Great Blue Heron (colonies especially in large sycamores and cottonwoods), Bald Eagle, Belted Kingfisher, Red-shouldered Hawk, Northern Parula, Louisiana Waterthrush, Wood Duck, Hooded Merganser, Kentucky Warbler, Hooded Warbler, Acadian Flycatcher, Barred Owl, Pileated Woodpecker, Cerulean Warbler, and Yellow-throated Warbler.

Reptiles and amphibians associated with this ecological site include small-mouthed salamander, central newt, midland brown snake, and gray treefrog.

Other information

Forestry (NRCS 2002; 2014)
Management: Estimated site index values range from 70 to 100. Timber management opportunities are good to excellent. Create group openings of at least 2 acres. Large clearcuts should be minimized if possible to reduce impacts on wildlife and aesthetics. Uneven-aged management using single tree selection or group selection cuttings of ½ to 1 acre are other options that can be used if clear cutting is not desired or warranted. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Maintain adequate riparian buffer areas.

Limitations: Wetness from flooding – short duration and/or high water table; Use of equipment may be restricted in spring and other excessively wet periods. Equipment use when wet may compact soil and damage tree roots. Tree planting is difficult during spring flooding periods. Seedling mortality may be high due to excess wetness. Ridging the soil and planting on the ridges may increase survival.

Inventory data references

Potential Reference Sites: Loamy Floodplain Forest

Plot LIKICA01 – Dapue soil
Located in Lime Kiln Access CA, Newton County MO
Latitude: 36.8969
Longitude: -94.366465

Plot TIFOCA01 - Dapue soil
Located in Tipton Ford Access, Newton County MO
Latitude: 36.977536
Longitude: -94.438811

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Contributors

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Approval

Nels Barrett, 10/06/2020

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Missouri Department of Conservation and Missouri Department of Natural Resources personnel provided significant and helpful field and technical support in the development of this ecological site.

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	09/14/2020
Approved by	Nels Barrett
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:**