15090
Mississippi River Alluvial Plain Dry-Mesic Loess Slope Forest

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Forest and Woodland

Map Zones

45, 47

Model Splits or Lumps

None. The original information about a model split was removed. See the original BpS description for details.

Geographic Range

This system of mesic upland forests is confined to a sheltered eastern, northern or cove aspects on Crowley's Ridge and Macon Ridge along the western margin of the lower Mississippi River.

Biophysical Site Description

This system is located on remnant loess-capped features rising from 30-60m+ (100-200ft) above the alluvial plain surface, to about 150m (50ft) above sea level. These are generally mesic and dry-mesic forests that occupy sheltered slopes and coves (usually north and east facing) in a highly dissected landscape. In many cases, these slopes and ravines provide habitat for plant species that are rare or absent from other parts of the alluvial plain (e.g., tulip tree [*Liriodendron tulipifera*]).

Vegetation Description

A diverse closed-canopy forest with dominant species including beech (*Fagus grandifolia*), tulip tree (*Liriodendron tulipifera*), Carolina basswood (*Tilia caroliniana*), southern sugar maple (*Acer barbatum*), red oak (*Quercus rubra*), and white oak (*Q. alba*).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
FAGR	*Fagus grandifolia*	American beech
LITU	*Liriodendron tulipifera*	Tuliptree
ACBA3	*Acer barbatum*	Southern sugar maple
QURU	*Quercus rubra*	Northern red oak
QUAL	*Quercus alba*	White oak
TIAMC	*Tilia americana var. caroliniana*	Carolina basswood

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

The mesic loess forest type fire regime is characterized by surface fires with return in intervals 30-100yrs+. Mixed severity fires will occur approximately every 100yrs opening the canopy with increased mortality. This effect may also be achieved by recurrent, severe insect defoliations or droughts. Straight-line winds or microbursts may cause blow-downs on a scale of 1-100ac. Stand replacement fires happen very infrequently.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	473	9		
Moderate (Mixed)	104	41		
Low (Surface)	87	50		
All Fires	43	100		

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Limited to two loess outcrops in the Mississippi River Alluvial Valley.

Adjacency or Identification Concerns

Mapping loess mesic slope forests would likely focus on specific topographic positions, such as coves, valley bottoms typically v-shaped (excluding broad u-shaped floodplains), lower north and east facing slopes; sometimes west and south facing lower slopes where moisture permits; wet-mesic to mesic conditions on the landscape; rich fertile conditions/sites; and shaded topographic positions.

Issues or Problems

Native Uncharacteristic Conditions

Comments

MZ45 BpS 1509 is identical to VDDT model and description for MZ45 BpS 1322. A separate model was not developed for BpS 1509 and because it was mapped adjacent to BpS 1322, the BpS 1322 model and description were applied to it.

MZ45 BpS 1322 was adapted from Rapid Assessment model R8MMHW -- Mixed Mesophytic Hardwood by April Moore, Greg Nowacki, and Aaron Burk, and reviewed by Carl Nordman. Significant changes to the model resulted in a change in modelership.

Succession Classes

Mapping Rules

Upper Layer Lifeform	Height (m)	Canopy Cover (%)									
		0-10	11-20	21-30	31-40	41 - 50	51-60	61-70	71-80	81-90	91-100

Herb	0-0.5	A	A	A	A	A	A	A	A	A	A
Herb	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Herb	>1.0	A	A	A	A	A	A	A	A	A	A
Shrub	0-0.5	A	A	A	A	A	A	A	A	A	A
Shrub	0.5-1.0	A	A	A	A	A	A	A	A	A	A
Shrub	1.0-3.0	A	A	A	A	A	A	A	A	A	A
Shrub	>3.0	A	A	A	A	A	A	A	A	A	A
Tree	0-5	A	A	A	A	A	A	A	A	A	A
Tree	5-10	C	C	C	C	C	C	C	C	B	B
Tree	10-25	C	C	C	C	C	C	C	C	D	D
Tree	25-50	C	C	C	C	C	C	C	C	D	D
Tree	>50	C	C	C	C	C	C	C	C	D	D

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

Description

Class A 9 Early Development 1 - All Structures

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
LITU	Liriodendron tulipifera	Tuliptree	Upper
ACBA3	Acer barbatum	Southern sugar maple	Upper
FAGR	Fagus grandifolia	American beech	Upper
QURU	Quercus rubra	Northern red oak	Upper

Description

Regenerating stands established after catastrophic disturbance, primarily wind and ice storms and fire following regional drought. Replacement and mixed fires occur.

Maximum Tree Size Class

Sapling >4.5ft; <5" DBH

Class B 19 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
LITU	Liriodendron tulipifera	Tuliptree	Upper
ACBA3	Acer barbatum	Southern sugar maple	Upper
FAGR	Fagus grandifolia	American beech	Upper
QURU	Quercus rubra	Northern red oak	Upper

Description

Mid-seral closed overstory. Intense competition begins after canopy closure and lasts until trees are large enough to form, upon their death, canopy gaps that are not captured by lateral growth of neighboring trees. Alternative succession is this trajectory where an old open canopy forest will develop. This released growing space is captured by tree and shrub regeneration. Replacement fire and surface fire occur. Blowdowns and drought also have a replacement effect.

Maximum Tree Size Class
Medium 9-21"DBH

Class C 16 Late Development 1 - Open

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
LITU	Liriodendron tulipifera	Tuliptree	Upper
FAGR	Fagus grandifolia	American beech	Upper
ACBA3	Acer barbatum	Southern sugar maple	Upper
QURU	Quercus rubra	Northern red oak	Upper

Description
Mature forest with gaps created by wind, ice storms, insect and disease, and to a lesser extent by fire leading to open overstory conditions. Partial canopy disturbances from moderate-level wind events and ice storms are common and lead to multi-cohort stands. Blowdowns and drought also have a replacement effect. Rare replacement fires occur.

Maximum Tree Size Class
Very Large >33" DBH

Class D 56 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
FAGR	Fagus grandifolia	American beech	Upper
LITU	Liriodendron tulipifera	Tuliptree	Upper
ACBA3	Acer barbatum	Southern sugar maple	Upper
QURU	Quercus rubra	Northern red oak	Middle

Description
Closed-canopy mixed-mesophytic forests that develop on mesic landscape positions. Dominant species include *Fagus grandifolia*, *Acer barbatum*, and *Liriodendron tulipifera*. Also, *Tilia americana* var. *caroliniana*, *Quercus alba*, and *Quercus rubra*. Insects and disease, blowdowns and drought, and mixed fire open this canopy. Less frequently, fire, blowdowns and drought also have a replacement effect. Surface fire maintains this class.

Maximum Tree Size Class
Very Large >33" DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:CLS	9
Mid1:CLS	10	Late1:CLS	59
Late1:OPN	60	Late1:CLS	80
Late1:CLS	60	Late1:CLS	999

Probabilistic Transitions

Disturbance Type	Disturbance occurs In	Moves vegetation to	Disturbance Probability	Return Interval (yrs)	Reset Age to New Class Start Age After Disturbance?	Years Since Last Disturbance
Replacement Fire	Early1:ALL	Early1:ALL	0.003	333	Yes	0
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.07	14	Yes	0
Mixed Fire	Early1:ALL	Early1:ALL	0.07	14	Yes	0
Alternative Succession	Mid1:CLS	Late1:OPN	0.001	1000	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.002	500	Yes	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.004	250	Yes	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.0125	80	No	0
Replacement Fire	Late1:OPN	Early1:ALL	0.002	500	Yes	0
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.005	200	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.0125	80	No	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.002	500	Yes	0
Replacement Fire	Late1:CLS	Early1:ALL	0.002	500	Yes	0
Wind or Weather or Stress	Late1:CLS	Late1:OPN	0.005	200	Yes	0
Mixed Fire	Late1:CLS	Late1:OPN	0.005	200	Yes	0
Insects or Disease	Late1:CLS	Late1:OPN	0.005	200	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.0125	80	No	0

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