

### Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	29,216	11,280	631

### Species Information

The columns below provide brief summaries of the species associated with the region and described in the table on the next pages. Definitions are provided in the Excel file for this region.

Genus	Species	Abundance		Model		Potential Change in Habitat Suitability		Capability to Cope or Persist		Migration Potential					
				Reliability	Adaptability	Scenario RCP45	Scenario RCP85	Scenario RCP45	Scenario RCP85	SHIFT RCP45	SHIFT RCP85				
Ash	3			High	18	27	Increase	32	39	Very Good	12	18	Likely	0	0
Hickory	7			Medium	33	53	No Change	17	14	Good	20	17	Infill	17	20
Maple	4	Abundant	4	Low	37	11	Decrease	21	17	Fair	12	12	Migrate	4	4
Oak	19	Common	30	FIA	7		New	12	13	Poor	14	14			
Pine	5	Rare	43				Unknown	13	12	Very Poor	11	8			
Other	39	Absent	18							FIA Only	4	4			
	<b>77</b>		<b>95</b>		<b>95</b>	<b>91</b>		<b>95</b>	<b>95</b>	Unknown	6	5		<b>21</b>	<b>24</b>
											<b>79</b>	<b>78</b>			

### Potential Changes in Climate Variables

#### Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	50.5	51.9	53.5	53.8	
	CCSM85	50.5	52.2	54.3	56.7	
	GFDL45	50.5	52.9	54.5	55.2	
	GFDL85	50.5	52.7	55.2	58.1	
	HAD45	50.5	52.6	55.1	56.3	
HAD85	50.5	52.9	56.5	59.6		
Growing Season (May-Sep)	CCSM45	63.2	64.8	66.0	66.5	
	CCSM85	63.2	65.2	67.3	70.3	
	GFDL45	63.2	66.0	68.0	69.2	
	GFDL85	63.2	66.0	68.9	72.6	
	HAD45	63.2	65.7	68.0	69.5	
HAD85	63.2	66.1	70.8	73.7		
Coldest Month (Average)	CCSM45	30.3	31.9	33.1	33.4	
	CCSM85	30.3	32.6	33.4	34.8	
	GFDL45	30.3	33.9	34.1	34.4	
	GFDL85	30.3	32.4	33.4	33.9	
	HAD45	30.3	31.5	33.4	33.5	
HAD85	30.3	32.5	34.3	35.7		
Warmest Month (Average)	CCSM45	68.0	69.5	70.3	70.6	
	CCSM85	68.0	70.1	71.3	72.7	
	GFDL45	68.0	70.9	71.9	72.7	
	GFDL85	68.0	71.0	72.4	74.7	
	HAD45	68.0	70.9	72.5	73.1	
HAD85	68.0	72.1	75.0	76.4		

#### Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	34.7	33.7	38.2	36.7	
	CCSM85	34.7	36.6	37.1	38.4	
	GFDL45	34.7	39.6	41.4	42.0	
	GFDL85	34.7	39.3	44.3	45.3	
	HAD45	34.7	34.6	37.1	36.9	
HAD85	34.7	36.3	34.3	37.0		
Growing Season (May-Sep)	CCSM45	15.2	14.3	16.0	14.9	
	CCSM85	15.2	15.6	14.6	15.2	
	GFDL45	15.2	17.3	17.2	17.9	
	GFDL85	15.2	17.4	18.5	18.8	
	HAD45	15.2	14.3	14.1	13.9	
HAD85	15.2	14.6	12.1	12.3		

**NOTE:** For the six climate variables, four 30-year periods are used to indicate six potential future trajectories. The period ending in 2009 is based on modeled observations from the PRISM Climate Group and the three future periods were obtained from the NASA NEX-DCP30 dataset. Future climate projections from three models under two emission scenarios show estimates of each climate variable within the region. The three models are CCSM4, GFDL CM3, and HadGEM2-ES and the emission scenarios are the 4.5 and 8.5 RCP. The average value for the region is reported, even though locations within the region may vary substantially based on latitude, elevation, land-use, or other factors.

**Cite as:** Iverson, L.R.; Prasad, A.M.; Peters, M.P.; Matthews, S.N. 2019. Facilitating Adaptive Forest Management under Climate Change: A Spatially Specific Synthesis of 125 Species for Habitat Changes and Assisted Migration over the Eastern United States. *Forests*. 10(11): 989. <https://doi.org/10.3390/f10110989>.

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
white oak	Quercus alba	WDH	Medium	69.5	1133.3	15.7	Sm. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
black oak	Quercus velutina	WDH	High	68.4	847.0	11.7	Sm. dec.	Sm. dec.	Medium	Abundant	Fair	Fair			0	2
post oak	Quercus stellata	WDH	High	56.9	783.1	13.4	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	3
eastern redcedar	Juniperus virginiana	WDH	Medium	44.7	638.9	11.7	No change	Sm. inc.	Medium	Abundant	Good	Very Good			1	4
sugar maple	Acer saccharum	WDH	High	42.5	285.6	6.7	No change	No change	High	Common	Good	Good			1	5
northern red oak	Quercus rubra	WDH	Medium	38.9	210.8	4.5	No change	No change	High	Common	Good	Good			1	6
shortleaf pine	Pinus echinata	WDH	High	16.7	199.2	10.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	7
pignut hickory	Carya glabra	WDL	Medium	44.8	195.2	4.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
American elm	Ulmus americana	WDH	Medium	64	180.9	3.6	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	9
shagbark hickory	Carya ovata	WSL	Medium	53.7	155.3	3.4	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	10
mockernut hickory	Carya alba	WDL	Medium	45.5	152.1	3.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	11
sassafras	Sassafras albidum	WSL	Low	51.1	149.5	2.9	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
black hickory	Carya texana	NDL	High	35.6	143.2	3.6	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	13
white ash	Fraxinus americana	WDL	Medium	39.3	128.0	3.2	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
black cherry	Prunus serotina	WDL	Medium	48.4	127.3	3.4	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	15
scarlet oak	Quercus coccinea	WDL	Medium	20.5	121.0	4.2	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	16
green ash	Fraxinus pennsylvanica	WSH	Low	36.4	118.7	4.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
black walnut	Juglans nigra	WDH	Low	35	116.2	3.4	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
yellow-poplar	Liriodendron tulipifera	WDH	High	11.4	113.8	9.2	Lg. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	19
shingle oak	Quercus imbricaria	NDH	Medium	25.6	103.4	5.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	20
boxelder	Acer negundo	WSH	Low	31.3	103.0	7.3	No change	Sm. inc.	High	Common	Good	Very Good			1	21
blackgum	Nyssa sylvatica	WDL	Medium	30.9	97.4	2.7	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	22
hackberry	Celtis occidentalis	WDH	Medium	39.4	95.7	3.7	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	23
chinkapin oak	Quercus muehlenbergii	NSL	Medium	21.7	92.9	3.7	No change	No change	Medium	Common	Fair	Fair			1	24
black willow	Salix nigra	NSH	Low	11.4	88.9	12.4	No change	Sm. inc.	Low	Common	Poor	Fair	Infill +	Infill +	1	25
sycamore	Platanus occidentalis	NSL	Low	20.2	88.8	4.4	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
slippery elm	Ulmus rubra	WSL	Low	42.3	85.0	2.4	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	27
silver maple	Acer saccharinum	NSH	Low	20.6	79.5	9.6	No change	Sm. inc.	High	Common	Good	Very Good			1	28
sweetgum	Liquidambar styraciflua	WDH	High	12.6	75.8	8.2	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good	Infill ++	Infill ++	1	29
flowering dogwood	Cornus florida	WDL	Medium	40.7	69.5	1.5	No change	No change	Medium	Common	Fair	Fair			1	30
winged elm	Ulmus alata	WDL	Medium	25.5	64.2	2.7	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	31
blackjack oak	Quercus marilandica	NSL	Medium	15	60.4	2.9	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	32
red maple	Acer rubrum	WDH	High	33.8	60.2	2.1	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	33
bitternut hickory	Carya cordiformis	WSL	Low	23	54.9	2.8	Lg. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	34
black locust	Robinia pseudoacacia	NDH	Low	4.2	44.3	13.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	35
common persimmon	Diospyros virginiana	NSL	Low	27.6	43.9	2.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	36
honeylocust	Gleditsia triacanthos	NSH	Low	15	42.4	3.3	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	37
red mulberry	Morus rubra	NSL	Low	27.3	38.2	1.7	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			1	38
pin oak	Quercus palustris	NSH	Low	17.4	32.5	5.6	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			0	39
eastern redbud	Cercis canadensis	NSL	Low	20.5	32.0	1.8	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	40
eastern cottonwood	Populus deltoides	NSH	Low	10.6	30.7	6.5	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	1	41
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	13	28.1	1.8	Sm. inc.	Lg. inc.	High	Rare	Good	Good			1	42
Shumard oak	Quercus shumardii	NSL	Low	7.9	24.8	3.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	43
American beech	Fagus grandifolia	WDH	High	5.8	20.8	3.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	44
southern red oak	Quercus falcata	WDL	Medium	4.1	13.0	3.1	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	45
American basswood	Tilia americana	WSL	Medium	1.9	12.9	2.4	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
Osage-orange	Maclura pomifera	NDH	Medium	5.9	12.4	3.9	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	7	11.5	2.0	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	48
pecan	Carya illinoensis	NSH	Low	6.5	11.0	2.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	49
river birch	Betula nigra	NSL	Low	7.5	10.6	2.9	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	50
cherrybark oak; swamp red o	Quercus pagoda	NSL	Medium	9.1	9.9	2.9	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +	Infill ++	2	51
pawpaw	Asimina triloba	NSL	Low	9.1	8.7	1.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	52
bald cypress	Taxodium distichum	NSH	Medium	0.7	8.5	12.4	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	53
Ohio buckeye	Aesculus glabra	NSL	Low	1	8.4	8.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	54
bur oak	Quercus macrocarpa	NDH	Medium	5.5	7.4	2.5	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor			0	55
pumpkin ash	Fraxinus profunda	NSH	FIA	1	6.8	2.1	Unknown	Unknown	NA	Rare	FIA Only	FIA Only			0	56
serviceberry	Amelanchier spp.	NSL	Low	7.6	6.4	0.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	57
Virginia pine	Pinus virginiana	NDH	High	0.3	6.2	18.0	Sm. dec.	No change	Medium	Rare	Very Poor	Poor		Infill +	2	58
sugarberry	Celtis laevigata	NDH	Medium	2.3	6.0	2.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	59
loblolly pine	Pinus taeda	WDH	High	1.7	6.0	10.8	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	60
water tupelo	Nyssa aquatica	NSH	Medium	0.6	4.3	3.4	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	61
ailanthus	Ailanthus altissima	NSL	FIA	1.1	3.5	2.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	62
shellbark hickory	Carya laciniosa	NSL	Low	3	3.5	6.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	63
chestnut oak	Quercus prinus	NDH	High	0.3	3.0	8.9	No change	Sm. inc.	High	Rare	Fair	Good	Infill +		2	64
white mulberry	Morus alba	NSL	FIA	5	3.0	1.6	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	65
swamp white oak	Quercus bicolor	NSL	Low	4.6	2.9	1.7	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	66
eastern white pine	Pinus strobus	WDH	High	0.5	2.5	3.1	Very Lg. dec.	Very Lg. dec.	Low	Rare	Lost	Lost			0	67
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	2.1	1.9	0.9	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	2	68
cucumber tree	Magnolia acuminata	NSL	Low	1.7	1.8	1.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	69
overcup oak	Quercus lyrata	NSL	Medium	0.9	0.6	0.9	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	70
wild plum	Prunus americana	NSLX	FIA	0.7	0.5	0.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	71
willow oak	Quercus phellos	NSL	Low	0.2	0.5	1.0	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	72
swamp chestnut oak	Quercus michauxii	NSL	Low	0.3	0.4	1.3	No change	Sm. inc.	Medium	Rare	Poor	Fair		Infill +	2	73
northern catalpa	Catalpa speciosa	NSHX	FIA	1.4	0.2	1.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	74
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.3	0.1	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	75
Nuttall oak	Quercus texana	NSH	Medium	0.3	0.1	0.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			0	76
Scots pine	Pinus sylvestris	NSH	FIA	0.1	0.1	0.1	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	77
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	78
slash pine	Pinus elliotii	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	79
longleaf pine	Pinus palustris	NSH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	80
florida maple	Acer barbatum	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	81
striped maple	Acer pensylvanicum	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	82
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	83
water hickory	Carya aquatica	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	84
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	New Habitat	Low	Absent	Unknown	New Habitat			3	85
blue ash	Fraxinus quadrangulata	NSL	Low	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	86
silverbell	Halesia spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	87
sweetbay	Magnolia virginiana	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	88
bigleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	89
sourwood	Oxydendrum arboreum	NDL	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	90
redbay	Persea borbonia	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	91
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	92
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	93
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	94

# HUC 071401 Upper Mississippi-Meramec

## HUC 6 Watershed Climate Change Atlas Tree Species

USDA Forest Service  
Northern Research Station  
Landscape Change Research Group  
Iverson, Peters, Prasad, Matthews

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	95