

HUC 103001 Lower Missouri-Blackwater

HUC 6 Watershed Climate Change Atlas Tree Species

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

Current and Potential Future Habitat, Capability, and Migration

	sq. km	sq. mi	FIA Plots
Area of Region	22,678	8,756.1	237

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	10	Increase	21	27	Very Good	3	7	Likely	0	0
Hickory	7			Medium	25	No Change	14	10	Good	17	14	Infill	15	16
Maple	5	Abundant	0	Low	30	Decrease	18	16	Fair	9	13	Migrate	2	5
Oak	12	Common	20	FIA	4	New	9	9	Poor	13	8			
Pine	0	Rare	37			Unknown	7	7	Very Poor	10	10			
Other	30	Absent	11						FIA Only	2	2			
	57		68				69	69	Unknown	3	3			
										57	57			

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	49.1	50.6	52.0	52.4	
	CCSM85	49.1	51.1	52.9	55.3	
	GFDL45	49.1	52.2	53.1	53.9	
	GFDL85	49.1	51.3	53.6	56.7	
	HAD45	49.1	51.1	53.5	54.7	
HAD85	49.1	51.4	55.0	57.9		
Growing Season (May—Sep)	CCSM45	62.3	64.0	65.1	65.7	
	CCSM85	62.3	64.6	66.5	69.4	
	GFDL45	62.3	66.0	67.1	68.3	
	GFDL85	62.3	65.0	67.8	71.6	
	HAD45	62.3	64.4	66.4	67.8	
HAD85	62.3	64.8	69.1	71.7		
Coldest Month (Average)	CCSM45	28.2	29.8	31.0	31.4	
	CCSM85	28.2	30.4	31.2	32.6	
	GFDL45	28.2	31.4	31.8	32.0	
	GFDL85	28.2	30.4	31.4	32.2	
	HAD45	28.2	29.2	31.4	31.4	
HAD85	28.2	30.7	32.8	34.3		
Warmest Month (Average)	CCSM45	67.2	69.0	69.9	70.3	
	CCSM85	67.2	69.9	71.0	72.2	
	GFDL45	67.2	69.9	71.2	72.0	
	GFDL85	67.2	70.2	71.4	74.1	
	HAD45	67.2	69.4	70.8	71.5	
HAD85	67.2	70.6	73.1	74.4		

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	32.7	31.2	34.2	32.7	
	CCSM85	32.7	32.5	33.7	33.2	
	GFDL45	32.7	35.7	36.4	36.4	
	GFDL85	32.7	35.6	40.0	39.7	
	HAD45	32.7	33.6	34.5	34.2	
HAD85	32.7	34.0	32.2	34.8		
Growing Season (May—Sep)	CCSM45	17.6	16.7	18.3	16.9	
	CCSM85	17.6	17.4	17.5	16.7	
	GFDL45	17.6	19.2	18.3	18.7	
	GFDL85	17.6	19.2	20.6	20.0	
	HAD45	17.6	17.5	17.4	17.3	
HAD85	17.6	17.6	15.3	15.9		

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.

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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	35.2	430.2	16.2	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			1	1
eastern redcedar	Juniperus virginiana	WDH	Medium	45	346.5	11.2	No change	No change	Medium	Common	Fair	Fair			1	2
shagbark hickory	Carya ovata	WSL	Medium	61.6	280.1	7.6	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	3
post oak	Quercus stellata	WDH	High	22.8	244.6	12.1	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good	Infill ++	Infill ++	1	4
black walnut	Juglans nigra	WDH	Low	67.2	240.5	8.5	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	5
American elm	Ulmus americana	WDH	Medium	77.4	200.9	6.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	6
hackberry	Celtis occidentalis	WDH	Medium	69.6	185.2	8.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	7
northern red oak	Quercus rubra	WDH	Medium	39.7	148.0	6.3	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	8
honeylocust	Gleditsia triacanthos	NSH	Low	54.7	141.5	7.6	No change	No change	High	Common	Good	Good			1	9
black oak	Quercus velutina	WDH	High	31.5	130.2	6.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	10
chinkapin oak	Quercus muehlenbergii	NSL	Medium	30.9	116.6	6.6	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	11
sugar maple	Acer saccharum	WDH	High	18.8	106.6	8.0	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	12
shingle oak	Quercus imbricaria	NDH	Medium	56	97.2	5.5	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	13
white ash	Fraxinus americana	WDL	Medium	46.4	94.6	3.9	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	14
bitternut hickory	Carya cordiformis	WSL	Low	45.1	94.2	6.2	No change	Sm. inc.	High	Common	Good	Very Good			1	15
Osage-orange	Maclura pomifera	NDH	Medium	41.9	88.8	8.9	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	16
black locust	Robinia pseudoacacia	NDH	Low	16.6	66.8	8.7	Sm. dec.	No change	Medium	Common	Poor	Fair			1	17
slippery elm	Ulmus rubra	WSL	Low	40.4	60.0	3.3	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	18
sycamore	Platanus occidentalis	NSL	Low	21.7	54.3	5.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good	Infill ++	Infill ++	1	19
boxelder	Acer negundo	WSH	Low	22.4	51.1	4.2	No change	Sm. inc.	High	Common	Good	Very Good	Infill ++	Infill ++	1	20
pin oak	Quercus palustris	NSH	Low	15.5	45.9	4.8	No change	No change	Low	Rare	Very Poor	Very Poor			0	21
silver maple	Acer saccharinum	NSH	Low	8.9	45.6	7.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	1	22
black cherry	Prunus serotina	WDL	Medium	36.7	38.1	2.9	Sm. inc.	Sm. inc.	Low	Rare	Poor	Poor			1	23
red mulberry	Morus rubra	NSL	Low	47	34.5	2.5	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair			1	24
black hickory	Carya texana	NDL	High	10.8	32.0	3.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	1	25
green ash	Fraxinus pennsylvanica	WSH	Low	26.4	32.0	4.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	26
mockernut hickory	Carya alba	WDL	Medium	12	30.8	3.3	Sm. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	1	27
black willow	Salix nigra	NSH	Low	10.5	29.2	6.2	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair	Infill +	Infill +	1	28
bur oak	Quercus macrocarpa	NDH	Medium	24.6	23.6	5.0	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	29
eastern redbud	Cercis canadensis	NSL	Low	22.3	22.4	3.3	No change	Sm. inc.	Medium	Rare	Poor	Fair			1	30
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	16.2	19.6	2.2	Sm. dec.	Sm. inc.	High	Rare	Poor	Good		Infill ++	1	31
common persimmon	Diospyros virginiana	NSL	Low	13.3	16.6	2.2	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	32
river birch	Betula nigra	NSL	Low	2.4	16.3	9.3	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	33
eastern cottonwood	Populus deltoides	NSH	Low	13.3	15.9	7.4	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	1	34
swamp white oak	Quercus bicolor	NSL	Low	7.2	15.9	4.0	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	35
flowering dogwood	Cornus florida	WDL	Medium	9.1	15.6	1.5	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	36
Shumard oak	Quercus shumardii	NSL	Low	7.1	14.4	4.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	37
blue ash	Fraxinus quadrangulata	NSL	Low	5.9	12.7	3.4	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	38
sassafras	Sassafras albidum	WSL	Low	3.7	11.3	3.1	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	1	39
American basswood	Tilia americana	WSL	Medium	6.9	10.8	3.3	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	40
pecan	Carya illinoensis	NSH	Low	7.2	9.6	5.2	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	41
Ohio buckeye	Aesculus glabra	NSL	Low	20.3	8.4	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	42
white mulberry	Morus alba	NSL	FIA	5.3	6.8	1.5	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	43
pignut hickory	Carya glabra	WDL	Medium	7	6.4	2.2	No change	No change	Medium	Rare	Poor	Poor	Infill +	Infill +	2	44
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	4.7	5.8	3.1	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			2	45
serviceberry	Amelanchier spp.	NSL	Low	3	4.8	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
blackjack oak	Quercus marilandica	NSL	Medium	2.3	3.4	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	47



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shellbark hickory	<i>Carya laciniosa</i>	NSL	Low	6.8	3.1	2.4	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	48
pawpaw	<i>Asimina triloba</i>	NSL	Low	10.8	3.1	1.5	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor				0	49
scarlet oak	<i>Quercus coccinea</i>	WDL	Medium	0.9	2.5	2.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor				0	50
sugarberry	<i>Celtis laevigata</i>	NDH	Medium	2.3	2.1	1.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	51
northern catalpa	<i>Catalpa speciosa</i>	NSHX	FIA	0.4	2.0	4.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only				0	52
cittamwood/gum bumelia	<i>Sideroxylon lanuginosum ssp.</i>	NSL	Low	0.8	1.3	1.4	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	53
ailanthus	<i>Ailanthus altissima</i>	NSL	FIA	0.3	1.1	1.7	Unknown	Unknown	NA	Rare	NNIS	NNIS				0	54
winged elm	<i>Ulmus alata</i>	WDL	Medium	0	0.9	0.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good				2	55
black maple	<i>Acer nigrum</i>	NSH	Low	0.4	0.4	0.9	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost				0	56
red maple	<i>Acer rubrum</i>	WDH	High	1.2	0.3	2.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good				2	57
ashe juniper	<i>Juniperus ashei</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	58
loblolly pine	<i>Pinus taeda</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++		3	59
black ash	<i>Fraxinus nigra</i>	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown				0	60
sweetgum	<i>Liquidambar styraciflua</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	61
bigleaf magnolia	<i>Magnolia macrophylla</i>	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown				0	62
blackgum	<i>Nyssa sylvatica</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++		3	63
bigtooth aspen	<i>Populus grandidentata</i>	NSL	Medium	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown				0	64
pin cherry	<i>Prunus pensylvanica</i>	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				3	65
southern red oak	<i>Quercus falcata</i>	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate +		3	66
water oak	<i>Quercus nigra</i>	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +		3	67
live oak	<i>Quercus virginiana</i>	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat				0	68
cedar elm	<i>Ulmus crassifolia</i>	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat				3	69