

HUC 103002 Lower Missouri

HUC 6 Watershed Climate Change Atlas Tree Species

Current and Potential Future Habitat, Capability, and Migration

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

sq. km sq. mi FIA Plots
Area of Region 4,119.5 1,590.6 84

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		Potential Change in Habitat Suitability				Capability to Cope or Persist			Migration Potential				
				Model		Scenario		Scenario							
		Abundance		Reliability		Adaptability		RCP45		RCP85		SHIFT			
												RCP45			
Ash	3			High	15	22	Increase	24	27	Very Good	7	10	Likely	2	2
Hickory	7			Medium	26	43	No Change	6	9	Good	17	18	Infill	5	10
Maple	4	Abundant	6	Low	33	10	Decrease	26	20	Fair	9	9	igrate	5	6
Oak	12	Common	24	FIA	3		New	12	13	Poor	10	8		12	18
Pine	3	Rare	29				Unknown	9	8	Very Poor	11	9			
Other	30	Absent	18					77	77	FIA Only	1	1			
	59		77		77	75				Unknown	6	5			
												61	60		
Potential Changes in Climate Variables															

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	45.0	46.1	47.2	47.4	
	CCSM85	45.0	46.4	47.8	49.6	
	GFDL45	45.0	46.8	48.0	48.5	
	GFDL85	45.0	46.6	48.4	50.7	
	HAD45	45.0	46.6	48.4	49.3	
	HAD85	45.0	46.7	49.5	51.7	
Growing Season May—Sep	CCSM45	54.6	55.8	56.6	57.1	
	CCSM85	54.6	56.2	57.6	59.9	
	GFDL45	54.6	56.6	58.2	59.0	
	GFDL85	54.6	56.6	58.7	61.5	
	HAD45	54.6	56.4	57.9	59.1	
	HAD85	54.6	56.6	59.9	62.0	
Coldest Month Average	CCSM45	29.8	31.0	31.9	32.1	
	CCSM85	29.8	31.5	32.1	33.1	
	GFDL45	29.8	32.4	32.6	32.9	
	GFDL85	29.8	31.5	32.3	32.8	
	HAD45	29.8	30.6	32.1	32.3	
	HAD85	29.8	31.5	33.0	34.1	
Warmest Month Average	CCSM45	58.2	59.5	60.1	60.4	
	CCSM85	58.2	60.0	60.9	61.9	
	GFDL45	58.2	60.2	61.2	61.7	
	GFDL85	58.2	60.5	61.5	63.3	
	HAD45	58.2	60.2	61.3	61.8	
	HAD85	58.2	61.0	63.0	64.1	

Precipitation (in)

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	24.3	23.6	26.3	25.3	
	CCSM85	24.3	25.0	25.9	26.0	
	GFDL45	24.3	27.1	27.9	28.4	
	GFDL85	24.3	26.8	30.1	30.7	
	HAD45	24.3	24.7	25.7	25.7	
	HAD85	24.3	25.5	24.4	26.1	
Growing Season May—Sep	CCSM45	11.8	11.3	12.7	11.7	
	CCSM85	11.8	11.8	11.9	11.6	
	GFDL45	11.8	12.9	12.6	13.1	
	GFDL85	11.8	13.0	13.8	13.8	
	HAD45	11.8	11.6	11.2	11.3	
	HAD85	11.8	11.7	10.0	10.3	

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.

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCI45	ChngCI85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
white oak	Quercus alba	WDH	Medium	75.6	1767.3	13.6	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	1
eastern redcedar	Juniperus virginiana	WDH	Medium	65.2	1076.0	9.6	No change	No change	Medium	Abundant	Good	Good			1	2
sugar maple	Acer saccharum	WDH	High	42.4	791.0	9.7	Sm. dec.	Sm. dec.	High	Abundant	Good	Good			1	3
post oak	Quercus stellata	WDH	High	45.1	788.2	7.1	Sm. inc.	Sm. inc.	High	Abundant	Very Good	Very Good			1	4
northern red oak	Quercus rubra	WDH	Medium	63.3	685.3	5.4	Lg. dec.	Lg. dec.	High	Abundant	Good	Good			1	5
black oak	Quercus velutina	WDH	High	57.3	530.2	5.1	No change	No change	Medium	Abundant	Good	Good			1	6
white ash	Fraxinus americana	WDL	Medium	63.9	449.3	5.3	No change	No change	Low	Common	Poor	Poor			0	7
shagbark hickory	Carya ovata	WSL	Medium	65.7	393.2	3.8	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	8
hackberry	Celtis occidentalis	WDH	Medium	54.9	326.4	3.9	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	9
American elm	Ulmus americana	WDH	Medium	71.1	304.7	2.7	Sm. inc.	Lg. inc.	Medium	Common	Good	Very Good			1	10
silver maple	Acer saccharinum	NSH	Low	21	296.6	12.9	Sm. dec.	Sm. dec.	High	Common	Fair	Fair			1	11
chinkapin oak	Quercus muehlenbergii	NSL	Medium	39.7	267.9	4.3	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	12
eastern cottonwood	Populus deltoides	NSH	Low	24.4	261.9	12.2	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	13
green ash	Fraxinus pennsylvanica	WSH	Low	46.7	242.7	3.2	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	14
black walnut	Juglans nigra	WDH	Low	42.2	183.3	4.0	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			1	15
bitternut hickory	Carya cordiformis	WSL	Low	36.6	170.9	3.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			1	16
black hickory	Carya texana	NDL	High	34.4	131.1	2.1	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	17
shingle oak	Quercus imbricaria	NDH	Medium	25.8	130.6	2.8	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	18
boxelder	Acer negundo	WSH	Low	33.7	127.5	3.4	No change	Sm. inc.	High	Common	Good	Very Good			1	19
black locust	Robinia pseudoacacia	NDH	Low	15.5	103.3	10.3	Sm. dec.	Sm. inc.	Medium	Common	Poor	Good			1	20
black cherry	Prunus serotina	WDL	Medium	30.1	103.0	1.8	Sm. inc.	Sm. inc.	Low	Common	Fair	Fair			1	21
red mulberry	Morus rubra	NSL	Low	29.8	97.1	3.0	Lg. dec.	Sm. dec.	Medium	Common	Poor	Poor			0	22
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	20.8	91.2	2.5	Sm. dec.	No change	High	Common	Fair	Good			1	23
mockernut hickory	Carya alba	WDL	Medium	28.1	89.9	1.4	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	24
sugarberry	Celtis laevigata	NDH	Medium	0.4	87.6	6.0	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	25
slippery elm	Ulmus rubra	WSL	Low	36.9	81.8	2.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			1	26
honeylocust	Gleditsia triacanthos	NSH	Low	24.9	78.4	3.6	Sm. inc.	Lg. inc.	High	Common	Very Good	Very Good			1	27
sassafras	Sassafras albidum	WSL	Low	26.5	77.8	1.3	Sm. inc.	No change	Medium	Common	Good	Fair			1	28
Shumard oak	Quercus shumardii	NSL	Low	14.5	71.3	2.0	Sm. dec.	Sm. inc.	High	Common	Fair	Very Good		Infill ++	1	29
American basswood	Tilia americana	WSL	Medium	13.9	68.8	5.3	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	30
flowering dogwood	Cornus florida	WDL	Medium	40.8	51.4	0.7	No change	No change	Medium	Common	Fair	Fair			1	31
eastern white pine	Pinus strobus	WDH	High	2.4	51.3	21.1	Lg. dec.	Lg. dec.	Low	Rare	Very Poor	Very Poor			0	32
red maple	Acer rubrum	WDH	High	10.8	41.4	2.6	Sm. dec.	No change	High	Rare	Poor	Fair		Infill +	1	33
eastern redbud	Cercis canadensis	NSL	Low	21.2	35.8	2.4	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good			1	34
white mulberry	Morus alba	NSL	FIA	6.2	35.7	8.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	35
common persimmon	Diospyros virginiana	NSL	Low	21.5	31.4	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			1	36
scarlet oak	Quercus coccinea	WDL	Medium	6.7	29.2	1.2	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	37
pignut hickory	Carya glabra	WDL	Medium	10.6	28.4	1.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	1	38
sycamore	Platanus occidentalis	NSL	Low	22.5	27.0	2.2	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			1	39
pawpaw	Asimina triloba	NSL	Low	3.4	22.5	2.0	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	40
shellbark hickory	Carya laciniosa	NSL	Low	10.1	20.5	1.7	Lg. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	41
pin oak	Quercus palustris	NSH	Low	9	19.8	1.5	No change	No change	Low	Rare	Very Poor	Very Poor			2	42
blackjack oak	Quercus marilandica	NSL	Medium	2.9	19.2	0.7	Lg. inc.	Lg. inc.	High	Rare	Good	Good	Infill ++	Infill ++	2	43
winged elm	Ulmus alata	WDL	Medium	0.8	19.1	0.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good	Infill ++	Infill ++	2	44
black willow	Salix nigra	NSH	Low	11.1	16.7	0.9	Sm. inc.	Lg. inc.	Low	Rare	Poor	Fair			1	45
Ohio buckeye	Aesculus glabra	NSL	Low	2.6	16.3	2.7	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	46
blue ash	Fraxinus quadrangulata	NSL	Low	7.5	16.2	1.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	47

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shortleaf pine	Pinus echinata	WDH	High	10.7	13.0	2.1	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good		Infill ++	1	48
American hornbeam; musclev	Carpinus caroliniana	WSL	Low	0.1	12.9	0.3	Sm. dec.	No change	Medium	Rare	Very Poor	Poor			0	49
serviceberry	Amelanchier spp.	NSL	Low	10.4	10.8	1.1	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	50
Osage-orange	Maclura pomifera	NDH	Medium	2.1	10.8	1.0	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	2	51
pecan	Carya illinoensis	NSH	Low	0.4	8.1	0.6	Lg. inc.	Lg. inc.	Low	Rare	Fair	Fair	Infill +	Infill +	2	52
swamp white oak	Quercus bicolor	NSL	Low	8.7	6.5	2.5	Very Lg. dec.	Very Lg. dec.	Medium	Rare	Lost	Lost			0	53
river birch	Betula nigra	NSL	Low	5.7	5.1	4.9	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	54
ailanthus	Ailanthus altissima	NSL	FIA	6.7	4.4	5.0	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	55
bur oak	Quercus macrocarpa	NDH	Medium	10.2	3.9	0.5	Very Lg. dec.	Very Lg. dec.	High	Rare	Lost	Lost			0	56
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	0.8	2.8	0.4	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	57
cittamwood/gum bumelia	Sideroxylon lanuginosum ssp.	NSL	Low	2.4	1.5	0.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good		Infill ++	2	58
Virginia pine	Pinus virginiana	NDH	High	9.7	0.2	0.3	Lg. dec.	Lg. inc.	Medium	Rare	Very Poor	Good			0	59
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	60
loblolly pine	Pinus taeda	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate ++	3	61
mountain maple	Acer spicatum	NSL	Low	0	0	0	Unknown	Unknown	High	Absent	Unknown	Unknown			0	62
American beech	Fagus grandifolia	WDH	High	0	0	0	Unknown	New Habitat	Medium	Absent	Unknown	New Habitat			3	63
black ash	Fraxinus nigra	WSH	Medium	0	0	0	Unknown	Unknown	Low	Absent	Unknown	Unknown			0	64
sweetgum	Liquidambar styraciflua	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	65
yellow-poplar	Liriodendron tulipifera	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +		3	66
cucumbertree	Magnolia acuminata	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	67
bignleaf magnolia	Magnolia macrophylla	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	68
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	69
pin cherry	Prunus pensylvanica	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	70
southern red oak	Quercus falcata	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	71
cherrybark oak; swamp red o.	Quercus pagoda	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	72
overcup oak	Quercus lyrata	NSL	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	73
water oak	Quercus nigra	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	74
willow oak	Quercus phellos	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	75
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	76
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	77