HUC 102300 Missouri-Little Sioux

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	24,260	9,366.7	60

Species Information

The columns below provide breif 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
Ash	2
Hickory	2
Maple	2
Oak	3
Pine	1
Other	19
	29

Abundance	
Abundant	0
Common	4
Rare	25
Absent	9
	38

	Model Reliability	Adaptability
High	4	12
Medium	16	20
Low	15	6
FIA	4	
	39	**38**

Potential Change in Habitat Suitability	Scenario RCP45	Scenario RCP85
Increase	9	10
No Change	8	7
Decrease	8	8
New	8	8
Unknown	6	6
	39	**39**

Capability to Cope or Persist	Scenario RCP45	Scenario RCP85
Very Good	1	1
Good	5	6
Fair	9	8
Poor	3	3
Very Poor	7	7
FIA Only	3	3
Unknown	2	2
	30	**30**

Migration Potential	SHIFT RCP45	SHIFT RCP85
Likely	0	0
Infill	12	11
Migrate	2	5
	14	**16**

Potential Changes in Climate Variables

Temperature (°F)

	Scenario	2009	2039	2069	2099
Annual Average	CCSM45	43.9	45.3	47.1	47.6
	CCSM85	43.9	45.8	47.8	50.2
	GFDL45	43.9	48.2	47.5	48.5
	GFDL85	43.9	46.0	48.4	51.7
	HAD45	43.9	45.9	48.4	49.6
	HAD85	43.9	46.4	49.8	52.9
Growing Season May—Sep	CCSM45	58.5	60.2	62.0	62.6
	CCSM85	58.5	60.7	62.7	65.6
	GFDL45	58.5	64.0	63.0	64.5
	GFDL85	58.5	61.3	64.0	68.1
	HAD45	58.5	60.2	62.1	63.4
	HAD85	58.5	60.8	64.1	66.9
Coldest Month Average	CCSM45	20.6	22.4	23.7	24.3
	CCSM85	20.6	22.6	23.8	25.3
	GFDL45	20.6	23.1	23.7	24.0
	GFDL85	20.6	22.7	23.9	25.2
	HAD45	20.6	22.4	25.0	24.8
	HAD85	20.6	24.6	27.5	29.4
Warmest Month Average	CCSM45	63.1	65.0	66.3	66.9
	CCSM85	63.1	66.2	67.5	69.3
	GFDL45	63.1	65.6	66.7	67.7
	GFDL85	63.1	66.3	67.4	70.2
	HAD45	63.1	64.6	66.1	66.7
	HAD85	63.1	66.0	67.9	69.8

Precipitation (in)

	Scenario	2009	2039	2069	2099
Annual Total	CCSM45	22.6	22.9	22.5	22.3
	CCSM85	22.6	23.0	23.4	23.7
	GFDL45	22.6	25.2	27.4	26.5
	GFDL85	22.6	25.4	27.5	26.8
	HAD45	22.6	25.5	24.8	24.6
	HAD85	22.6	23.5	23.7	26.5
Growing Season May—Sep	CCSM45	14.3	14.0	13.4	13.4
	CCSM85	14.3	13.6	13.3	13.3
	GFDL45	14.3	16.0	17.0	15.9
	GFDL85	14.3	16.3	16.7	15.6
	HAD45	14.3	15.4	14.6	14.4
	HAD85	14.3	14.1	13.4	13.3

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	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
bur oak	Quercus macrocarpa	NDH	Medium	24.2	128.3	24.6	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	1
red mulberry	Morus rubra	NSL	Low	26.9	78.4	15.7	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor	Infill +	Infill +	2	2
hackberry	Celtis occidentalis	WDH	Medium	22	52.8	14.2	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			2	3
green ash	Fraxinus pennsylvanica	WSH	Low	17.4	50.0	23.6	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			2	4
American basswood	Tilia americana	WSL	Medium	8.7	46.9	14.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	5
black walnut	Juglans nigra	WDH	Low	18.1	37.0	17.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	6
boxelder	Acer negundo	WSH	Low	18.9	34.2	14.5	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	7
eastern cottonwood	Populus deltoides	NSH	Low	12.4	26.4	16.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	8
eastern redcedar	Juniperus virginiana	WDH	Medium	16.3	25.8	13.7	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	9
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	14.4	25.1	7.2	Sm. dec.	Sm. dec.	High	Rare	Poor	Poor	Infill +	Infill +	2	10
slippery elm	Ulmus rubra	WSL	Low	20.7	25.0	5.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			2	11
American elm	Ulmus americana	WDH	Medium	26.8	24.7	7.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	12
black willow	Salix nigra	NSH	Low	4	19.0	46.1	Sm. dec.	No change	Low	Rare	Very Poor	Very Poor			2	13
bitternut hickory	Carya cordiformis	WSL	Low	14.2	15.9	5.3	No change	Sm. dec.	High	Rare	Fair	Poor	Infill +	Infill +	2	14
white ash	Fraxinus americana	WDL	Medium	5.4	12.9	14.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	15
silver maple	Acer saccharinum	NSH	Low	3.8	11.4	13.8	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	16
northern red oak	Quercus rubra	WDH	Medium	8.8	8.9	7.7	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	17
honeylocust	Gleditsia triacanthos	NSH	Low	2.1	8.4	9.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	18
Siberian elm	Ulmus pumila	NDH	FIA	7.7	7.4	3.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	19
black locust	Robinia pseudoacacia	NDH	Low	2.9	4.3	18.3	No change	Sm. inc.	Medium	Rare	Poor	Fair	Infill +	Infill +	2	20
black cherry	Prunus serotina	WDL	Medium	1.2	1.9	13.2	No change	No change	Low	Rare	Very Poor	Very Poor			2	21
eastern redbud	Cercis canadensis	NSL	Low	1.4	0.7	6.2	Sm. inc.	Sm. inc.	Medium	Rare	Fair	Fair	Infill +	Infill +	2	22
sycamore	Platanus occidentalis	NSL	Low	0	0.6	0.1	Sm. inc.	Lg. inc.	Medium	Rare	Fair	Good	Infill +		2	23
Kentucky coffeetree	Gymnocladus dioicus	NSLX	FIA	3.3	0.5	2.5	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	24
wild plum	Prunus americana	NSLX	FIA	0.8	0.4	1.8	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	25
red pine	Pinus resinosa	NSH	Medium	0	0.4	0.1	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	26
overcup oak	Quercus lyrata	NSL	Medium	0.8	0.3	1.5	Sm. dec.	Sm. dec.	Low	Rare	Very Poor	Very Poor			0	27
shagbark hickory	Carya ovata	WSL	Medium	1.4	0.3	2.4	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	28
peachleaf willow	Salix amygdaloides	NSLX	FIA	1.3	0.2	1.2	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	29
sugar maple	Acer saccharum	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	30
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	31
pignut hickory	Carya glabra	WDL	Medium	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	32
pecan	Carya illinoinensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate ++	3	33
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	34
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate ++	Migrate ++	3	35
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	36
chinkapin oak	Quercus muehlenbergii	NSL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	37
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Migrate +	Migrate ++	3	38
black oak	Quercus velutina	WDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	39