

**U.S. Census Bureau Urban Areas**  
**Climate Change Atlas Tree Species**  
 Current and Potential Future Habitat, Capability, and Migration

Area of Region    sq. km    sq. mi    FIA Plots  
 8,059.3    3,111.7    65

**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	2			High	13	20	Increase	12	11	Very Good	6	4	Likely	1	1
Hickory	4			Medium	23	32	No Change	10	9	Good	7	7	Infill	11	12
Maple	5	Abundant	1	Low	24	10	Decrease	17	19	Fair	10	14	Migrate	1	5
Oak	8	Common	28	FIA	7		New	18	18	Poor	9	7		<b>13</b>	<b>18</b>
Pine	3	Rare	17				Unknown	10	10	Very Poor	5	5			
Other	24	Absent	19							FIA Only	2	2			
	<b>46</b>		<b>65</b>		<b>67</b>	<b>62</b>		<b>67</b>	<b>67</b>	Unknown	3	3			
											<b>42</b>	<b>42</b>			

**Potential Changes in Climate Variables**

**Temperature (°F)**

	Scenario	2009	2039	2069	2099	
Annual Average	CCSM45	48.8	50.7	53.4	53.5	
	CCSM85	48.8	51.3	54.0	57.3	
	GFDL45	48.8	53.1	54.5	55.5	
	GFDL85	48.8	51.9	55.5	59.9	
	HAD45	48.8	52.0	55.4	57.2	
	HAD85	48.8	52.2	56.6	61.9	
Growing Season (May—Sep)	CCSM45	66.4	68.2	70.6	70.9	
	CCSM85	66.4	69.0	71.4	75.4	
	GFDL45	66.4	71.5	73.2	74.7	
	GFDL85	66.4	70.3	74.5	79.6	
	HAD45	66.4	69.8	72.3	74.7	
	HAD85	66.4	69.4	74.3	79.7	
Coldest Month Average	CCSM45	21.9	23.5	26.1	26.0	
	CCSM85	21.9	24.5	26.3	28.3	
	GFDL45	21.9	24.8	26.1	26.6	
	GFDL85	21.9	25.3	26.6	28.5	
	HAD45	21.9	23.7	27.6	27.4	
	HAD85	21.9	25.6	28.6	32.0	
Warmest Month Average	CCSM45	72.4	74.6	76.2	76.5	
	CCSM85	72.4	75.7	77.3	79.5	
	GFDL45	72.4	75.5	77.3	78.3	
	GFDL85	72.4	76.4	78.5	81.7	
	HAD45	72.4	76.3	78.0	79.6	
	HAD85	72.4	76.8	80.1	83.9	

**Precipitation (in)**

	Scenario	2009	2039	2069	2099	
Annual Total	CCSM45	33.5	33.3	32.8	34.2	
	CCSM85	33.5	34.0	34.2	34.5	
	GFDL45	33.5	36.3	40.0	40.3	
	GFDL85	33.5	36.2	40.4	42.0	
	HAD45	33.5	33.8	36.0	35.6	
	HAD85	33.5	35.8	33.5	36.4	
Growing Season (May—Sep)	CCSM45	16.6	16.5	15.8	16.1	
	CCSM85	16.6	16.0	16.3	15.3	
	GFDL45	16.6	17.6	18.9	19.3	
	GFDL85	16.6	18.0	18.5	18.8	
	HAD45	16.6	16.2	15.2	15.8	
	HAD85	16.6	16.3	13.1	14.2	

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

Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIAiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
black cherry	Prunus serotina	WDL	Medium	34.7	642.9	20.0	Sm. dec.	Sm. dec.	Low	Abundant	Fair	Fair	Infill +	Infill +	2	1
American elm	Ulmus americana	WDH	Medium	42.2	396.8	10.5	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			2	2
red maple	Acer rubrum	WDH	High	26.1	392.9	16.2	Sm. dec.	Sm. dec.	High	Common	Fair	Fair	Infill +	Infill +	2	3
black oak	Quercus velutina	WDH	High	18.6	342.5	16.6	No change	No change	Medium	Common	Fair	Fair		Infill +	2	4
sugar maple	Acer saccharum	WDH	High	12.4	304.8	22.1	No change	Sm. dec.	High	Common	Good	Fair		Infill +	2	5
white oak	Quercus alba	WDH	Medium	22.3	302.4	14.8	Sm. inc.	Sm. dec.	High	Common	Very Good	Fair		Infill +	2	6
black walnut	Juglans nigra	WDH	Low	12.4	216.4	23.9	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	7
shagbark hickory	Carya ovata	WSL	Medium	21.1	186.0	16.3	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		2	8
northern red oak	Quercus rubra	WDH	Medium	13.6	176.8	11.7	Sm. inc.	No change	High	Common	Very Good	Good			2	9
green ash	Fraxinus pennsylvanica	WSH	Low	21.7	176.1	9.0	Lg. inc.	Lg. inc.	Medium	Common	Very Good	Very Good			2	10
sassafras	Sassafras albidum	WSL	Low	13.6	175.8	11.6	Sm. dec.	Lg. dec.	Medium	Common	Poor	Poor	Infill +		2	11
eastern cottonwood	Populus deltoides	NSH	Low	18	167.7	18.7	Sm. inc.	Sm. inc.	Medium	Common	Good	Good			2	12
American basswood	Tilia americana	WSL	Medium	21.1	158.9	10.9	No change	Sm. dec.	Medium	Common	Fair	Poor	Infill +	Infill +	2	13
scarlet oak	Quercus coccinea	WDL	Medium	1.2	137.9	100.0	Very Lg. dec.	Very Lg. dec.	Medium	Common	Lost	Lost			0	14
northern pin oak	Quercus ellipsoidalis	NSH	Medium	1.2	113.1	82.0	Very Lg. dec.	Very Lg. dec.	High	Common	Lost	Lost			0	15
swamp white oak	Quercus bicolor	NSL	Low	7.4	108.4	13.1	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	16
boxelder	Acer negundo	WSH	Low	16.8	87.7	9.4	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			2	17
white ash	Fraxinus americana	WDL	Medium	18.6	87.6	8.3	Lg. inc.	Lg. inc.	Low	Common	Good	Good			2	18
red pine	Pinus resinosa	NSH	Medium	2.5	84.3	30.6	Lg. dec.	Lg. dec.	Low	Common	Very Poor	Very Poor			0	19
silver maple	Acer saccharinum	NSH	Low	5	78.6	14.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			2	20
eastern hophornbeam; ironw	Ostrya virginiana	WSL	Low	8.7	77.2	8.0	Lg. dec.	Lg. dec.	High	Common	Fair	Fair			0	21
black locust	Robinia pseudoacacia	NDH	Low	6.2	67.2	9.7	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	22
eastern white pine	Pinus strobus	WDH	High	2.5	56.9	20.6	No change	Lg. dec.	Low	Common	Poor	Very Poor	Infill +		2	23
bur oak	Quercus macrocarpa	NDH	Medium	17.4	56.4	25.3	Sm. inc.	Sm. inc.	High	Common	Very Good	Very Good			2	24
tamarack (native)	Larix laricina	NSH	High	2.5	56.3	20.4	Sm. dec.	Sm. dec.	Low	Common	Poor	Poor			0	25
pignut hickory	Carya glabra	WDL	Medium	7.4	54.8	6.6	No change	No change	Medium	Common	Fair	Fair	Infill +	Infill +	2	26
bigtooth aspen	Populus grandidentata	NSL	Medium	5	53.2	9.7	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor		Infill +	0	27
slippery elm	Ulmus rubra	WSL	Low	2.5	52.7	19.1	Sm. dec.	Sm. dec.	Medium	Common	Poor	Poor		Infill +	2	28
white spruce	Picea glauca	NSL	Medium	2.5	50.8	18.4	Lg. dec.	Lg. dec.	Medium	Common	Poor	Poor			0	29
bitternut hickory	Carya cordiformis	WSL	Low	7.4	48.4	5.9	No change	No change	High	Rare	Fair	Fair	Infill +	Infill +	2	30
Norway spruce	Picea abies	NSH	FIA	1.2	47.2	34.2	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	31
Scots pine	Pinus sylvestris	NSH	FIA	2.5	42.1	15.3	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	32
quaking aspen	Populus tremuloides	WDH	High	6.2	40.6	5.9	Lg. dec.	Lg. dec.	Medium	Rare	Very Poor	Very Poor			0	33
white mulberry	Morus alba	NSL	FIA	6.2	40.1	5.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	34
American beech	Fagus grandifolia	WDH	High	3.7	33.4	8.1	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	35
eastern redcedar	Juniperus virginiana	WDH	Medium	6.2	29.8	4.3	Lg. inc.	Lg. inc.	Medium	Rare	Good	Good			2	36
Shumard oak	Quercus shumardii	NSL	Low	1.2	27.4	19.9	Sm. dec.	No change	High	Rare	Poor	Fair			2	37
chokecherry	Prunus virginiana	NSLX	FIA	7.4	14.7	3.7	Unknown	Unknown	Medium	Rare	FIA Only	FIA Only			0	38
mockernut hickory	Carya alba	WDL	Medium	1.2	13.9	10.1	Sm. dec.	No change	High	Rare	Poor	Fair			0	39
Siberian elm	Ulmus pumila	NDH	FIA	2.5	13.3	4.8	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	40
American hornbeam; muscle	Carpinus caroliniana	WSL	Low	2.5	10.4	3.8	Sm. dec.	Sm. dec.	Medium	Rare	Very Poor	Very Poor			0	41
hackberry	Celtis occidentalis	WDH	Medium	4.4	8.5	21.6	Lg. inc.	Lg. inc.	High	Rare	Good	Good			2	42
butternut	Juglans cinerea	NSLX	FIA	2.5	5.7	2.1	Unknown	Unknown	Low	Rare	FIA Only	FIA Only			0	43
yellow-poplar	Liriodendron tulipifera	WDH	High	1.2	3.9	2.8	Lg. inc.	Sm. inc.	High	Rare	Good	Good			0	44
black willow	Salix nigra	NSH	Low	1.2	3.7	2.7	No change	Lg. inc.	Low	Rare	Very Poor	Fair			0	45
Norway maple	Acer platanoides	NSL	FIA	1.2	1.2	0.9	Unknown	Unknown	NA	Rare	NNIS	NNIS			0	46
ashe juniper	Juniperus ashei	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	47

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Common Name	Scientific Name	Range	MR	%Cell	FIAsum	FIaiv	ChngCl45	ChngCl85	Adap	Abund	Capabil45	Capabil85	SHIFT45	SHIFT85	SSO	N
serviceberry	Amelanchier spp.	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	48
pawpaw	Asimina triloba	NSL	Low	0	0	0	Unknown	Unknown	Medium	Modeled	Unknown	Unknown			0	49
yellow birch	Betula alleghaniensis	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	50
pecan	Carya illinoensis	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			3	51
black hickory	Carya texana	NDL	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	52
sugarberry	Celtis laevigata	NDH	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	53
eastern redbud	Cercis canadensis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	54
common persimmon	Diospyros virginiana	NSL	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	55
honeylocust	Gleditsia triacanthos	NSH	Low	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat	Likely +	Likely +	3	56
Osage-orange	Maclura pomifera	NDH	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate +	3	57
red mulberry	Morus rubra	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			3	58
blackgum	Nyssa sylvatica	WDL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	59
sycamore	Platanus occidentalis	NSL	Low	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat	Migrate +	Migrate +	3	60
blackjack oak	Quercus marilandica	NSL	Medium	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat			3	61
pin oak	Quercus palustris	NSH	Low	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat		Migrate +	3	62
post oak	Quercus stellata	WDH	High	0	0	0	New Habitat	New Habitat	High	Absent	New Habitat	New Habitat		Migrate ++	3	63
live oak	Quercus virginiana	NDH	High	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat			0	64
bluejack oak	Quercus incana	NSL	Low	0	0	0	Unknown	Unknown	Medium	Absent	Unknown	Unknown			0	65
winged elm	Ulmus alata	WDL	Medium	0	0	0	New Habitat	New Habitat	Medium	Absent	New Habitat	New Habitat		Migrate +	3	66
cedar elm	Ulmus crassifolia	NDH	Medium	0	0	0	New Habitat	New Habitat	Low	Absent	New Habitat	New Habitat			0	67